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Definition of Managed Objects for the IPv6 Routing Protocol for Low  
Power and Lossy Networks (RPL)  
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## 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 defines objects for managing the IPv6 Routing Protocol for Low Power and Lossy Networks (RPL).

## Status of This Memo

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Internet-Draft

RPL-MIB

October 2012

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">3</a>
<a href="#">2.</a>	The Internet-Standard Management Framework . . . . .	<a href="#">3</a>
<a href="#">3.</a>	Conventions . . . . .	<a href="#">3</a>
<a href="#">4.</a>	Overview . . . . .	<a href="#">3</a>
<a href="#">5.</a>	Relationship to Other MIB Modules . . . . .	<a href="#">5</a>
<a href="#">6.</a>	Definitions . . . . .	<a href="#">5</a>
<a href="#">7.</a>	Security Considerations . . . . .	<a href="#">29</a>
<a href="#">8.</a>	IANA Considerations . . . . .	<a href="#">30</a>
<a href="#">9.</a>	Acknowledgements . . . . .	<a href="#">30</a>
<a href="#">10.</a>	References . . . . .	<a href="#">30</a>
<a href="#">10.1.</a>	Normative References . . . . .	<a href="#">30</a>
<a href="#">10.2.</a>	Informative References . . . . .	<a href="#">31</a>
<a href="#">Appendix A.</a>	JSON Representation . . . . .	<a href="#">32</a>

Internet-Draft

RPL-MIB

October 2012

## 1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols. In particular it defines objects for managing the IPv6 Routing Protocol for Low Power and Lossy Networks (RPL) [[RFC6550](#)]. It also provides management access to the Trickle [[RFC6206](#)] parameters as they are used by RPL.

## 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](#)].

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](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

## 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](#)].

## 4. Overview

The MIB module is organized into a group of scalars and tables.

# RPL-MIB registration tree (generated by smidump 0.4.8)

-rplMib(1.3.6.1.2.1.XXXX)

```

+-rplNotifications(0)
+-rplObjects(1)
  +-rplDefaults(1)
    | +- rwn RplDISMode          rplDefaultDISMode(1)
    | +- rwn Unsigned32         rplDefaultDISMessages(2)
    | +- rwn Unsigned32         rplDefaultDISTimeout(3)
    | +- rwn RplDAODelay        rplDefaultDAODelay(4)
    | +- rwn TruthValue          rplDefaultDAOAckEnabled(5)
    | +- rwn RplDodagPreference rplDefaultPreference(6)
    | +- rwn RplMinHopRankIncrease rplDefaultMinHopRankIncrease(7)
    | +- rwn Unsigned32         rplDefaultMaxRankIncrease(8)
    | +- rwn RplModeOfOperation rplDefaultModeOfOperation(9)

```

```

    | +- rwn Unsigned32          rplDefaultIntervalDoublings(10)
    | +- rwn Unsigned32          rplDefaultIntervalMin(11)
    | +- rwn Unsigned32          rplDefaultRedundancyConstant(12)
+-rplActive(2)
  | +- rwn RplInstanceID        rplActiveInstance(1)
  | +- rwn InetAddressIPv6      rplActiveDodag(2)
  | +- rwn Unsigned32           rplActiveDodagTriggerSequence(3)
+-rplOCPTable(3)
  | +-rplOCPEntry(1) [rplOCPCodepoint]
  |   +- --- RplObjectiveCodePoint rplOCPCodepoint(1)
  |   +- rwn TruthValue          rplOCPEnabled(2)
+-rplInstanceTable(4)
  | +-rplInstanceEntry(1) [rplInstanceID]
  |   +- --- RplInstanceID        rplInstanceID(1)
  |   +- r-n RplDISMode           rplInstanceDISMode(2)
  |   +- r-n Unsigned32           rplInstanceDISMessages(3)
  |   +- r-n Unsigned32           rplInstanceDISTimeout(4)
  |   +- r-n RplModeOfOperation   rplInstanceModeOfOperation(5)
+-rplDodagTable(5)
  | +-rplDodagEntry(1) [rplInstanceID,rplDodagIndex]
  |   +- --- Unsigned32           rplDodagIndex(1)
  |   +- --- InetAddressIPv6      rplDodagRoot(2)
  |   +- r-n RplDodagVersionNumber rplDodagVersion(3)
  |   +- r-n RplRank              rplDodagRank(4)
  |   +- r-n Enumeration          rplDodagState(5)
  |   +- r-n RplObjectiveCodePoint rplDodagOCP(6)
  |   +- r-n RplDAODelay          rplDodagDAODelay(7)
  |   +- r-n TruthValue           rplDodagDAOAckEnabled(8)
  |   +- r-n RplDodagPreference   rplDodagPreference(9)

```

```

|      +- r-n RplMinHopRankIncrease rplDodagMinHopRankIncrease(10)
|      +- r-n Unsigned32            rplDodagMaxRankIncrease(11)
|      +- r-n Unsigned32            rplDodagIntervalDoublings(12)
|      +- r-n Unsigned32            rplDodagIntervalMin(13)
|      +- r-n Unsigned32            rplDodagRedundancyConstant(14)
|      +- r-n RplPathControlSize    rplDodagPathControlSize(15)
+-rplDodagParentTable(6)
|  +-rplDodagParentEntry(1) [rplInstanceID,rplDodagIndex,
|      |                      rplDodagParentID]
|      +- --- InetAddressIPv6 rplDodagParentID(1)
|      +- r-n InterfaceIndex  rplDodagParentIf(2)
+-rplDodagChildTable(7)
|  +-rplDodagChildEntry(1) [rplInstanceID,rplDodagIndex,
|      |                      rplDodagChildID]
|      +- --- InetAddressIPv6 rplDodagChildID(1)
|      +- r-n InterfaceIndex  rplDodagChildIf(2)
+-rplStats(8)
|  +- r-n Counter32 rplMemOverflows(1)
|  +- r-n Counter32 rplParseErrors(2)

```

```

|  +- r-n Counter32 rplUnknownMsgTypes(3)
|  +- r-n Counter32 rplSecurityPolicyViolations(4)
|  +- r-n Counter32 rplIntegrityCheckFailures(5)
|  +- r-n Counter32 rplReplayProtectionFailures(6)
|  +- r-n Counter32 rplValidParentFailures(7)
|  +- r-n Counter32 rplNoInstanceIDs(8)
|  +- r-n Counter32 rplTriggeredLocalRepairs(9)
|  +- r-n Counter32 rplTriggeredGlobalRepairs(10)
|  +- r-n Counter32 rplNoParentSecs(11)
|  +- r-n Counter32 rplActiveNoParentSecs(12)
|  +- r-n Counter32 rpl0BitSetDownwards(13)
|  +- r-n Counter32 rpl0BitClearedUpwards(14)
|  +- r-n Counter32 rplFBitSet(15)
|  +- r-n Counter32 rplRBitSet(16)
|  +- r-n Counter32 rplTrickleTimerResets(17)
+-rplMsgStatsTable(9)
|  +-rplMsgStatsEntry(1) [rplMsgStatsType]
|      +- --- RplMessageType rplMsgStatsType(1)
|      +- r-n Counter32      rplMsgStatsInMsgs(2)
|      +- r-n Counter32      rplMsgStatsOutMsgs(3)

```

## [5.](#) Relationship to Other MIB Modules

The MIB module IMPORTS definitions from SNMPv2-SMI [[RFC2578](#)], SNMPv2-TC [[RFC2579](#)], SNMPv2-CONF [[RFC2580](#)], IF-MIB [[RFC2863](#)] and the INET-ADDRESS-MIB [[RFC4001](#)].

The IPv6 routing table SHOULD be exposed via the inetCidrRouteTable defined in the IP-FORWARD-MIB [[RFC4292](#)]. Since an RPL node can participate in multiple RPL instances, the inetCidrRoutePolicy object SHOULD carry the OID of the rplInstanceID instance, including the value of rplInstanceID.

The prefixes used by DODAGs SHOULD be exported via the ipAddressPrefixTable of the IP-MIB [[RFC4293](#)]. The value of ipAddressPrefixOrigin should be routeradv(5).

## [6](#). Definitions

RPL-MIB DEFINITIONS ::= BEGIN

IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, Counter32, mib-2
    FROM SNMPv2-SMI                                -- RFC 2578
TEXTUAL-CONVENTION, TruthValue
    FROM SNMPv2-TC                                -- RFC 2579
OBJECT-GROUP, MODULE-COMPLIANCE
    FROM SNMPv2-CONF                                -- RFC 2580
```

Korte, et al.

Expires April 22, 2013

[Page 5]

---

Internet-Draft

RPL-MIB

October 2012

```
InterfaceIndex
    FROM IF-MIB                                -- RFC 2863
InetAddressIPv6
    FROM INET-ADDRESS-MIB;                    -- RFC 4001
```

rplMib MODULE-IDENTITY

LAST-UPDATED "201210190000Z"

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DESCRIPTION

"The MIB module for monitoring nodes implementing the IPv6 routing protocol for low power and lossy networks (RPL).

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REVISION "201210190000Z"

DESCRIPTION

"Initial version, published as RFC XXXX."

-- RFC Ed.: replace XXXX with actual RFC number & remove this note

Korte, et al.

Expires April 22, 2013

[Page 6]

---

Internet-Draft

RPL-MIB

October 2012

::= { mib-2 XXXX }

RplMessageType ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The type of an RPL control message as defined in [Section 6 of RFC 6550](#)."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
SYNTAX Unsigned32 (0..255)

RplInstanceID ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"A global or local RplInstanceID as defined in [Section 5.1. of RFC 6550](#)."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
SYNTAX Unsigned32 (0..255)

RplDodagVersionNumber ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The version number of a DODAG as defined in [Section 6.3 of RFC 6550](#)."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
SYNTAX Unsigned32 (0..255)

RplRank ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The rank of a node within a DODAG as defined in [Section 6.3 of RFC 6550](#)."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
SYNTAX Unsigned32 (0..65535)

RplObjectiveCodePoint ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"The Objective Code Point of a DODAG as defined in [Section 6.7.6 of RFC 6550](#)."

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
SYNTAX            Unsigned32 (0..65535)

RplDISMode ::= TEXTUAL-CONVENTION

STATUS            current

DESCRIPTION

"Determines whether a DIS message is send upon boot-up  
or not as defined in [Section 18.2.1.1 of RFC 6550](#):

    silent(1)    do not send DIS messages

    send(2)     send DIS messages"

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX            INTEGER {  
                    silent(1),  
                    send(2)  
                  }

RplModeOfOperation ::= TEXTUAL-CONVENTION

STATUS            current

DESCRIPTION

"Determines the mode of operation."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX            INTEGER {  
                    noDownwardRoutes(0),  
                    nonStoringMode(1),  
                    storingWithoutMulticastSupport(2),  
                    storingWithMulticastSupport(3)  
                  }

RplDAODelay ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS            current

DESCRIPTION

"The delay time used for aggregation before a DAO message  
is send."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX            Unsigned32

RplDodagPreference ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS            current

DESCRIPTION

"The preference of a DODAG compared to another DODAG of the  
same instance as defined in [Section 6.3 of RFC 6550](#)."

## REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX        Unsigned32 (0..7)

RplMinHopRankIncrease ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS        current

## DESCRIPTION

"The minimal increase of a rank within a single hop as defined in [Section 6.7.6 of RFC 6550](#)."

## REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX        Unsigned32 (0..131071)

RplPathControlSize ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS        current

## DESCRIPTION

"The Path Control Size within a DODAG as defined in [Section 6.7.6 of RFC 6550](#)."

## REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

SYNTAX        Unsigned32 (0..7)

-- object definitions

rplNotifications OBJECT IDENTIFIER ::= { rplMib 0 }

rplObjects        OBJECT IDENTIFIER ::= { rplMib 1 }

rplConformance   OBJECT IDENTIFIER ::= { rplMib 2 }

rplDefaults OBJECT IDENTIFIER ::= { rplObjects 1 }

rplDefaultDISMode OBJECT-TYPE

SYNTAX        RplDISMode

MAX-ACCESS    read-write

STATUS        current

## DESCRIPTION

"Determines whether a DIS message is send upon boot-up.  
Changes to this value may not persist across restarts."

::= { rplDefaults 1 }

rplDefaultDISMessages OBJECT-TYPE

SYNTAX        Unsigned32 (1..255)

MAX-ACCESS    read-write

STATUS        current

## DESCRIPTION

"The number of DIS messages that are sent as an initial probe for nearby DODAGs if the DIS mode is 'send'. The

Internet-Draft

RPL-MIB

October 2012

value of this object is ignored if the DIS mode is 'silent'. Changes to this value may not persist across restarts."

DEFVAL { 1 }

::= { rplDefaults 2 }

rplDefaultDISTimeout OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The number of seconds after which a node in DIS mode 'send' in the absence of DIO messages may decide to root a floating DODAG. Changes to this value may not persist across restarts."

DEFVAL { 60 }

::= { rplDefaults 3 }

rplDefaultDAODelay OBJECT-TYPE

SYNTAX RplDAODelay

UNITS "milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default delay for aggregations before a DAO is send. Changes to this value may not persist across restarts."

DEFVAL { 1000 }

::= { rplDefaults 4 }

rplDefaultDAOAckEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates whether DAO Acknowledgements are sent on this RPL instance. Changes to this value may not persist across restarts."

DEFVAL { false }

```
::= { rplDefaults 5 }
```

rplDefaultPreference OBJECT-TYPE

SYNTAX RplDodagPreference

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default preference of this DODAG compared to other DODAGs within the same instance. Changes to this value

Korte, et al.

Expires April 22, 2013

[Page 10]

---

Internet-Draft

RPL-MIB

October 2012

may not persist across restarts."  
DEFVAL { 0 }  
::= { rplDefaults 6 }

rplDefaultMinHopRankIncrease OBJECT-TYPE

SYNTAX RplMinHopRankIncrease

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default minimum increase of the rank in a single hop. Changes to this value may not persist across restarts."

DEFVAL { 256 }  
::= { rplDefaults 7 }

rplDefaultMaxRankIncrease OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default maximum allowable increase in rank in support of local repair. If DAGMaxRankIncrease is 0 then this mechanism is disabled. Changes to this value may not persist across restarts."

DEFVAL { 65535 }  
::= { rplDefaults 8 }

rplDefaultModeOfOperation OBJECT-TYPE

SYNTAX RplModeOfOperation

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The mode of operation of the RPL instance. Changes to this

value may not persist across restarts."  
DEFVAL { storingWithoutMulticastSupport }  
::= { rplDefaults 9 }

rplDefaultIntervalDoublings OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default I<sub>max</sub> parameter of the DIO trickle timer. Changes to this value may not persist across restarts."

REFERENCE

"[RFC 6206](#): The Trickle Algorithm"

DEFVAL { 20 }

::= { rplDefaults 10 }

rplDefaultIntervalMin OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default I<sub>min</sub> parameter of the DIO trickle timer. Changes to this value may not persist across restarts."

REFERENCE

"[RFC 6206](#): The Trickle Algorithm"

DEFVAL { 3 }

::= { rplDefaults 11 }

rplDefaultRedundancyConstant OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default k parameter of the DIO trickle timer. Changes to this value may not persist across restarts."

REFERENCE

"[RFC 6206](#): The Trickle Algorithm"

DEFVAL { 10 }

::= { rplDefaults 12 }

rplActive OBJECT IDENTIFIER ::= { rplObjects 2 }

rplActiveInstance OBJECT-TYPE

SYNTAX RplInstanceID

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The currently active RPL Instance. Changes to this value may not persist across restarts."

::= { rplActive 1 }

rplActiveDodag OBJECT-TYPE

SYNTAX InetAddressIPv6

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The currently active RPL DODAG in the active RPL Instance. Changes to this value may not persist across restarts."

::= { rplActive 2 }

rplActiveDodagTriggerSequence OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-write

STATUS current

Korte, et al.

Expires April 22, 2013

[Page 12]

---

Internet-Draft

RPL-MIB

October 2012

DESCRIPTION

"The DAO Trigger Sequence Number (DTSN) of the active DODAG as defined in [Section 6.3.1 of RFC 6550](#). Changes to this value may not persist across restarts."

REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

::= { rplActive 3 }

rplOCPTable OBJECT-TYPE

SYNTAX SEQUENCE OF RplOCPEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table of all supported Objective Code Points (OCs)."

::= { rplObjects 3 }

rplOCPEntry OBJECT-TYPE

SYNTAX RplOCPEntry

MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
    "An entry representing a supported Objective Code Point."  
INDEX { rplOCPCodepoint }  
::= { rplOCPTable 1 }

RplOCPEntry ::= SEQUENCE {  
    rplOCPCodepoint RplObjectiveCodePoint,  
    rplOCPEnabled TruthValue  
}

rplOCPCodepoint OBJECT-TYPE  
SYNTAX RplObjectiveCodePoint  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
    "A supported Objective Code Point."  
::= { rplOCPEntry 1 }

rplOCPEnabled OBJECT-TYPE  
SYNTAX TruthValue  
MAX-ACCESS read-write  
STATUS current  
DESCRIPTION  
    "Enables the usage of this Objective Code Point. Changes to  
    this value may not persist across restarts."  
::= { rplOCPEntry 2 }

rplInstanceTable OBJECT-TYPE

SYNTAX SEQUENCE OF RplInstanceEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
    "The table represents information about all known  
    RPL Instances."  
::= { rplObjects 4 }

rplInstanceEntry OBJECT-TYPE  
SYNTAX RplInstanceEntry  
MAX-ACCESS not-accessible

```

STATUS      current
DESCRIPTION
    "An entry representing information about a RPL Instance."
INDEX { rplInstanceID }
::= { rplInstanceTable 1 }

RplInstanceEntry ::= SEQUENCE {
    rplInstanceID          RplInstanceID,
    rplInstanceDISMode     RplDISMode,
    rplInstanceDISMessages Unsigned32,
    rplInstanceDISTimeout  Unsigned32,
    rplInstanceModeOfOperation RplModeOfOperation
}

rplInstanceID OBJECT-TYPE
    SYNTAX      RplInstanceID
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The InstanceID of this RPL Instance."
    ::= { rplInstanceEntry 1 }

rplInstanceDISMode OBJECT-TYPE
    SYNTAX      RplDISMode
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Reports whether a DIS message is send for this instance
         upon boot-up."
    ::= { rplInstanceEntry 2 }

rplInstanceDISMessages OBJECT-TYPE
    SYNTAX      Unsigned32 (1..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of DIS messages that are sent as an initial

```

```

        probe for nearby DODAGs if the DIS mode is 'send'."
    ::= { rplInstanceEntry 3 }

```

```

rplInstanceDISTimeout OBJECT-TYPE

```

SYNTAX           Unsigned32 (0..255)  
 UNITS            "seconds"  
 MAX-ACCESS      read-only  
 STATUS           current  
 DESCRIPTION  
     "The number of seconds after which a node in DIS mode 'send'  
     in the absence of DIO messages may decide to root a  
     floating DODAG."  
 ::= { rplInstanceEntry 4 }

#### rplInstanceModeOfOperation OBJECT-TYPE

SYNTAX           RplModeOfOperation  
 MAX-ACCESS      read-only  
 STATUS           current  
 DESCRIPTION  
     "The mode of operation of the RPL instance."  
 ::= { rplInstanceEntry 5 }

#### rplDodagTable OBJECT-TYPE

SYNTAX           SEQUENCE OF RplDodagEntry  
 MAX-ACCESS      not-accessible  
 STATUS           current  
 DESCRIPTION  
     "The table represents information about all locally known  
     DODAGs."  
 ::= { rplObjects 5 }

#### rplDodagEntry OBJECT-TYPE

SYNTAX           RplDodagEntry  
 MAX-ACCESS      not-accessible  
 STATUS           current  
 DESCRIPTION  
     "An entry representing information about a DODAG."  
 INDEX { rplInstanceID, rplDodagIndex }  
 ::= { rplDodagTable 1 }

#### RplDodagEntry ::= SEQUENCE {

rplDodagIndex	Unsigned32,
rplDodagID	InetAddressIPv6,
rplDodagVersion	RplDodagVersionNumber,
rplDodagRank	RplRank,
rplDodagState	INTEGER,
rplDodagOCP	RplObjectiveCodePoint,
rplDodagDAODelay	RplDAODelay,

```
    rplDodagDAOAckEnabled      TruthValue,
    rplDodagPreference         RplDodagPreference,
    rplDodagMinHopRankIncrease RplMinHopRankIncrease,
    rplDodagMaxRankIncrease    Unsigned32,
    rplDodagIntervalDoublings Unsigned32,
    rplDodagIntervalMin        Unsigned32,
    rplDodagRedundancyConstant Unsigned32,
    rplDodagPathControlSize    RplPathControlSize
}
```

**rplDodagIndex OBJECT-TYPE**

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index identifying a DODAG within an RPL instance. This index is used to keep the table indexes short. The RPL protocol identifies a DODAG within an RPL instance by the DODAGID."

::= { rplDodagEntry 1 }

**rplDodagID OBJECT-TYPE**

SYNTAX InetAddressIPv6

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The identifier of a DODAG root (DODAGID) of this RPL instance. The root of the DODAG reports its own IPv6 address as the DODAG root. This is uniquely identifying a DODAG within an RPL instance."

::= { rplDodagEntry 2 }

**rplDodagVersion OBJECT-TYPE**

SYNTAX RplDodagVersionNumber

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The version of the DODAG in this RPL instance."

::= { rplDodagEntry 3 }

**rplDodagRank OBJECT-TYPE**

SYNTAX RplRank

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The rank of the node within the DODAG."

::= { rplDodagEntry 4 }

Internet-Draft

RPL-MIB

October 2012

```

SYNTAX      INTEGER {
                    other(0),
                    grounded(1),
                    floating(2)
                }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The status of the DODAG:

        other(0)      An unknown state.

        grounded(1)   The DODAG is grounded.

        floating(2)   The DODAG is floating (not grounded)."
```

::= { rplDodagEntry 5 }

rplDodagOCP OBJECT-TYPE

```

SYNTAX      RplObjectiveCodePoint
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The Objective Code Point of this DODAG."
```

::= { rplDodagEntry 6 }

rplDodagDAODelay OBJECT-TYPE

```

SYNTAX      RplDAODelay
UNITS       "milliseconds"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The delay for aggregations before a DAO is send."
```

::= { rplDodagEntry 7 }

rplDodagDAOAckEnabled OBJECT-TYPE

```

SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates whether DAO Acknowledgements are sent on this
```

```
DODAG."
 ::= { rplDodagEntry 8 }
```

```
rplDodagPreference OBJECT-TYPE
    SYNTAX      RplDodagPreference
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

Korte, et al.

Expires April 22, 2013

[Page 17]

---

Internet-Draft

RPL-MIB

October 2012

```
    "How preferred this DODAG is compared to other DODAGs
      within the same instance."
 ::= { rplDodagEntry 9 }
```

```
rplDodagMinHopRankIncrease OBJECT-TYPE
    SYNTAX      RplMinHopRankIncrease
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The minimum increase of the rank in a single hop."
 ::= { rplDodagEntry 10 }
```

```
rplDodagMaxRankIncrease OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The maximum allowable increase in rank in support of local
          repair.  If DAGMaxRankIncrease is 0 then this mechanism is
          disabled."
 ::= { rplDodagEntry 11 }
```

```
rplDodagIntervalDoublings OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Imax parameter of the DIO trickle timer."
    REFERENCE
        "RFC 6206: The Trickle Algorithm"
 ::= { rplDodagEntry 12 }
```

```
rplDodagIntervalMin OBJECT-TYPE
```

SYNTAX        Unsigned32 (0..255)  
MAX-ACCESS   read-only  
STATUS        current  
DESCRIPTION  
    "The Imin parameter of the DIO trickle timer."  
REFERENCE  
    "[RFC 6206](#): The Trickle Algorithm"  
::= { rplDodagEntry 13 }

rplDodagRedundancyConstant OBJECT-TYPE  
SYNTAX        Unsigned32 (0..255)  
MAX-ACCESS   read-only  
STATUS        current  
DESCRIPTION  
    "The k parameter of the DIO trickle timer."

Korte, et al.

Expires April 22, 2013

[Page 18]

---

Internet-Draft

RPL-MIB

October 2012

REFERENCE  
    "[RFC 6206](#): The Trickle Algorithm"  
::= { rplDodagEntry 14 }

rplDodagPathControlSize OBJECT-TYPE  
SYNTAX        RplPathControlSize  
MAX-ACCESS   read-only  
STATUS        current  
DESCRIPTION  
    "The Path Control Size of this DODAG."  
::= { rplDodagEntry 15 }

rplDodagParentTable OBJECT-TYPE  
SYNTAX        SEQUENCE OF RplDodagParentEntry  
MAX-ACCESS   not-accessible  
STATUS        current  
DESCRIPTION  
    "The list of parents for a DODAG."  
::= { rplObjects 6 }

rplDodagParentEntry OBJECT-TYPE  
SYNTAX        RplDodagParentEntry  
MAX-ACCESS   not-accessible  
STATUS        current  
DESCRIPTION  
    "Information about a known DODAG parent."

```
INDEX { rplInstanceID, rplDodagIndex, rplDodagParentID }  
 ::= { rplDodagParentTable 1 }
```

```
RplDodagParentEntry ::= SEQUENCE {  
    rplDodagParentID      InetAddressIPv6,  
    rplDodagParentIf      InterfaceIndex  
}
```

```
rplDodagParentID OBJECT-TYPE  
    SYNTAX      InetAddressIPv6  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "An RPL parent associated with this DODAG."  
    ::= { rplDodagParentEntry 1 }
```

```
rplDodagParentIf OBJECT-TYPE  
    SYNTAX      InterfaceIndex  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The interface over which the parent can be reached."
```

```
 ::= { rplDodagParentEntry 2 }
```

```
rplDodagChildTable OBJECT-TYPE  
    SYNTAX      SEQUENCE OF RplDodagChildEntry  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "The list of children for a DODAG."  
    ::= { rplObjects 7 }
```

```
rplDodagChildEntry OBJECT-TYPE  
    SYNTAX      RplDodagChildEntry  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "Information about a known DODAG child."  
    INDEX { rplInstanceID, rplDodagIndex, rplDodagChildID }  
    ::= { rplDodagChildTable 1 }
```

```
RplDodagChildEntry ::= SEQUENCE {
    rplDodagChildID      InetAddressIPv6,
    rplDodagChildIf      InterfaceIndex
}
```

```
rplDodagChildID OBJECT-TYPE
    SYNTAX      InetAddressIPv6
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "An RPL child associated with this DODAG."
    ::= { rplDodagChildEntry 1 }
```

```
rplDodagChildIf OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The interface over which the child can be reached."
    ::= { rplDodagChildEntry 2 }
```

```
rplStats OBJECT IDENTIFIER ::= { rplObjects 8 }
```

```
rplMemOverflows OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of memory allocation failures (e.g., routing table
```

```
        overflows)."
    ::= { rplStats 1 }
```

```
rplParseErrors OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of received malformed messages."
    ::= { rplStats 2 }
```

```
rplUnknownMsgTypes OBJECT-TYPE
```

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of received RPL messages that we dropped because  
the message type is not recognized by the implementation."  
::= { rplStats 3 }

rplSecurityPolicyViolations OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of messages discarded because the described level  
of security for the message type and originator is unknown or  
does not meet locally maintained security policies as defined  
in [Section 10.7. of RFC 6550](#)."  
REFERENCE  
"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
::= { rplStats 4 }

rplIntegrityCheckFailures OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of messages discarded because the integrity  
check failed against the received message authentication  
code (MAC) as defined in [Section 10.7. of RFC 6550](#)."  
REFERENCE  
"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
::= { rplStats 5 }

rplReplayProtectionFailures OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only

STATUS current  
DESCRIPTION  
"The number of messages discarded because the received  
message Counter value is non-zero and less than the  
maintained incoming Counter watermark or because the

received Timestamp Counter value indicates a message transmission time that is earlier than the Current time less the acceptable packet delay as defined in [Section 10.7. of RFC 6550](#). This counter is also incremented if the temporal consistency check of the message fails as defined in [Section 10.7.1.](#)"

#### REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"

::= { rplStats 6 }

#### rplValidParentFailures OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The number of times a packet could not be sent to a DODAG parent flagged as valid."

::= { rplStats 7 }

#### rplNoInstanceIDs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The number of times a packet could not be sent because of a missing RPLInstanceID."

::= { rplStats 8 }

#### rplTriggeredLocalRepairs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The number of times a local repair procedure was triggered."

::= { rplStats 9 }

#### rplTriggeredGlobalRepairs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The number of times a global repair procedure was triggered."

::= { rplStats 10 }

rplNoParentSecs OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of seconds without a next hop (DODAG parent)."  
 ::= { rplStats 11 }

rplActiveNoParentSecs OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of seconds with packets to forward without a  
next hop (DODAG parent)."  
 ::= { rplStats 12 }

rplOBitSetDownwards OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of packets received with the '0' bit set from  
a node with a higher rank as defined in [Section 18.3.2  
of RFC 6550](#)."  
REFERENCE  
"RFC 6550: RPL: IPv6 Routing Protocol for LLNs"  
 ::= { rplStats 13 }

rplOBitClearedUpwards OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of packets received with the '0' bit cleared  
from a node with a lower rank as defined in [Section 18.3.2  
of RFC 6550](#)."  
REFERENCE  
"RFC 6550: RPL: IPv6 Routing Protocol for LLNs"  
 ::= { rplStats 14 }

rplFBitSet OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of packets received with the 'F' bit set as  
defined in [Section 18.3.2 of RFC 6550](#)."

Internet-Draft

RPL-MIB

October 2012

## REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
::= { rplStats 15 }

## rplRBitSet OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"Number of packets received with the 'R' bit set as  
defined in [Section 18.3.2 of RFC 6550](#)."

## REFERENCE

"[RFC 6550](#): RPL: IPv6 Routing Protocol for LLNs"  
::= { rplStats 16 }

## rplTrickleTimerResets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The number of trickle timer resets."  
::= { rplStats 17 }

## rplMsgStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF RplMsgStatsEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Basic RPL message statistics by message type."  
::= { rplObjects 9 }

## rplMsgStatsEntry OBJECT-TYPE

SYNTAX RplMsgStatsEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Statistics for a specific RPL message type."

INDEX { rplMsgStatsType }

::= { rplMsgStatsTable 1 }

RplMsgStatsEntry ::= SEQUENCE {  
    rplMsgStatsType RplMessageType,

```
    rplMsgStatsInMsgs Counter32,  
    rplMsgStatsOutMsgs Counter32  
}
```

```
rplMsgStatsType OBJECT-TYPE  
    SYNTAX      RplMessageType
```

Korte, et al.

Expires April 22, 2013

[Page 24]

---

Internet-Draft

RPL-MIB

October 2012

```
MAX-ACCESS not-accessible  
STATUS      current  
DESCRIPTION  
    "The RPL message type being counted by this row."  
 ::= { rplMsgStatsEntry 1 }
```

```
rplMsgStatsInMsgs OBJECT-TYPE  
    SYNTAX      Counter32  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The number of RPL messages received of this type."  
 ::= { rplMsgStatsEntry 2 }
```

```
rplMsgStatsOutMsgs OBJECT-TYPE  
    SYNTAX      Counter32  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The number of RPL messages sent of this type."  
 ::= { rplMsgStatsEntry 3 }
```

-- conformance definitions

```
rplGroups      OBJECT IDENTIFIER ::= { rplConformance 1 }  
rplCompliances OBJECT IDENTIFIER ::= { rplConformance 2 }
```

```
rplFullCompliance MODULE-COMPLIANCE  
    STATUS      current  
    DESCRIPTION  
        "Compliance statement for implementations supporting  
        read/write access, according to the object definitions."  
    MODULE      -- this module  
    MANDATORY-GROUPS {  
        rplGeneralGroup,
```

```
        rplInstanceGroup,
        rplStatsGroup
    }
    ::= { rplCompliances 1 }
```

```
rplReadOnlyCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "Compliance statement for implementations supporting
        only readonly access."
    MODULE      -- this module
    MANDATORY-GROUPS {
        rplGeneralGroup,
```

Korte, et al.

Expires April 22, 2013

[Page 25]

---

Internet-Draft

RPL-MIB

October 2012

```
        rplInstanceGroup,
        rplStatsGroup
    }
```

```
OBJECT rplDefaultDISMode
MIN-ACCESS read-only
DESCRIPTION
    "Write access is not required."
```

```
OBJECT rplDefaultDISMessages
MIN-ACCESS read-only
DESCRIPTION
    "Write access is not required."
```

```
OBJECT rplDefaultDISTimeout
MIN-ACCESS read-only
DESCRIPTION
    "Write access is not required."
```

```
OBJECT rplDefaultDAODelay
MIN-ACCESS read-only
DESCRIPTION
    "Write access is not required."
```

```
OBJECT rplDefaultDAOAckEnabled
MIN-ACCESS read-only
DESCRIPTION
    "Write access is not required."
```

OBJECT rplDefaultPreference  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultMinHopRankIncrease  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultMaxRankIncrease  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultModeOfOperation  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultIntervalDoublings  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultIntervalMin  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplDefaultRedundancyConstant  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplActiveInstance  
MIN-ACCESS read-only  
DESCRIPTION  
    "Write access is not required."

OBJECT rplActiveDodag

MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT rplActiveDodagTriggerSequence  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT rplOCPEEnabled  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

::= { rplCompliances 2 }

rplGeneralGroup OBJECT-GROUP  
OBJECTS {  
    rplDefaultDISMode,  
    rplDefaultDISMessages,  
    rplDefaultDISTimeout,  
    rplDefaultDAODelay,  
    rplDefaultDAOAckEnabled,  
    rplDefaultPreference,  
    rplDefaultMinHopRankIncrease,  
    rplDefaultMaxRankIncrease,  
    rplDefaultModeOfOperation,

    rplDefaultIntervalDoublings,  
    rplDefaultIntervalMin,  
    rplDefaultRedundancyConstant,  
    rplActiveInstance,  
    rplActiveDodag,  
    rplActiveDodagTriggerSequence,  
    -- rplOCPCodepoint,  
    rplOCPEEnabled  
}  
STATUS current  
DESCRIPTION  
"A collection of objects providing general information about  
the RPL implementation."  
::= { rplGroups 1 }

```

rplInstanceGroup OBJECT-GROUP
  OBJECTS {
    -- rplInstanceID,
    rplInstanceDISMode,
    rplInstanceDISMessages,
    rplInstanceDISTimeout,
    rplInstanceModeOfOperation,
    -- rplDodagIndex,
    rplDodagID,
    rplDodagVersion,
    rplDodagRank,
    rplDodagState,
    rplDodagOCP,
    rplDodagDAODelay,
    rplDodagDAOAckEnabled,
    rplDodagPreference,
    rplDodagMinHopRankIncrease,
    rplDodagMaxRankIncrease,
    rplDodagIntervalDoublings,
    rplDodagIntervalMin,
    rplDodagRedundancyConstant,
    rplDodagPathControlSize,
    -- rplDodagParentID,
    rplDodagParentIf,
    -- rplDodagChildID,
    rplDodagChildIf
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing insight into RPL
    Instances and RPL DODAGs."
  ::= { rplGroups 2 }

```

```

rplStatsGroup OBJECT-GROUP
  OBJECTS {
    rplMemOverflows,
    rplParseErrors,
    rplUnknownMsgTypes,
    rplSecurityPolicyViolations,
    rplIntegrityCheckFailures,

```

```

    rplReplayProtectionFailures,
    rplValidParentFailures,
    rplNoInstanceIDs,
    rplTriggeredLocalRepairs,
    rplTriggeredGlobalRepairs,
    rplNoParentSecs,
    rplActiveNoParentSecs,
    rplOBitSetDownwards,
    rplOBitClearedUpwards,
    rplFBitSet,
    rplRBitSet,
    rplTrickleTimerResets,
    -- rplMsgStatsType,
    rplMsgStatsInMsgs,
    rplMsgStatsOutMsgs
}
STATUS      current
DESCRIPTION
    "A collection of objects providing statistics about the
    RPL implementation."
 ::= { rplGroups 3 }

```

END

## 7. Security Considerations

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:

- o rplActiveInstance: [ TBD ] explain sensitivity

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: Need to describe vulnerabilities here.]

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 [\[RFC3410\]](#), [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.

## [8.](#) IANA Considerations

IANA is requested to assign a value for "XXXX" 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 "XXXX" (here and in the MIB module) with the assigned value and to remove this note.

IANA has allocated a number for RPL in the IANAipRouteProtocol textual convention of the IANA-RTPROTO-MIB.

## [9.](#) Acknowledgements

The authors like to thank Michael Richardson for providing helpful comments during the development of this specification.

## [10.](#) References

### [10.1.](#) Normative References

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Internet-Draft

RPL-MIB

October 2012

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Internet-Draft RPL-MIB October 2012

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## [Appendix A.](#) JSON Representation

Using the translation algorithm defined in [[RFC6643](#)], the SMIv2 module can be translated to YANG. Using the JSON representation of data modeled in YANG defined in [[I-D.lhotka-netmod-yang-json](#)], the objects defined in the MIB module can be represented in JSON as shown below. The compact representation without any white space uses XXXX octets. (Of course, this number depends on the number of octets needed for the counter values.)

```
{
  "RPL-MIB:RPL-MIB": {
    "rplGeneral": {
      "rplDefaultDISMode": "silent",
      "rplDefaultDISMessages": 1,
      "rplDefaultDISTimeout": 60,
      "rplDefaultDAODelay": 1000,
      "rplDefaultDAOAckEnabled": false,
      "rplDefaultPreference": 0,
      "rplDefaultMinHopRankIncrease": 256,
      "rplDefaultMaxRankIncrease": 65535,
      "rplDefaultModeOfOperation":
        "storingWithoutMulticastSupport",
```

```

        "rplDefaultIntervalDoublings": 20,
        "rplDefaultIntervalMin": 3,
        "rplDefaultRedundancyConstant": 10
    },
    "rplActive": {
        "rplActiveInstance": 0,
        "rplActiveDodag": "2001:db8:bad:cafe::1",
        "rplActiveDodagTriggerSequence": 4
    },
    "rplStats": {
        "rplMemOverflows": 0,
        "rplParseErrors": 0,

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        "rplUnknownMsgTypes": 1,
        "rplSecurityPolicyViolations": 0,
        "rplIntegrityCheckFailures": 0,
        "rplReplayProtectionFailures": 0,
        "rplValidParentFailures": 1,
        "rplNoInstanceIDs": 0,
        "rplTriggeredLocalRepairs": 3,
        "rplTriggeredGlobalRepairs": 0,
        "rplNoParentSecs": 15,
        "rplActiveNoParentSecs": 0,
        "rplOBitSetDownwards": 0,
        "rplOBitClearedUpwards": 0,
        "rplFBitSet": 0,
        "rplRBitSet": 0,
        "rplTrickleTimerResets": 42
    },
    "rplOCPTable": {
        "rplOCPEntry": [
            {
                "rplOCPCodepoint": 0,
                "rplOCPEnabled": true
            }
        ]
    },
    "rplInstanceTable": {
        "rplInstanceEntry": [
            {
                "rplInstanceID": 0,
                "rplInstanceDISMode": "send",

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        "rplInstanceDISMessages": 1,
        "rplInstanceDISTimeout": 60,
        "rplInstanceModeOfOperation":
            "storingWithoutMulticastSupport"
    }
]
},
"rplDodagTable": {
    "rplDodagEntry": [
        {
            "rplInstanceID": 0,
            "rplDodagIndex": 1,
            "rplDodagID": "2001:db8:bad:cafe::1",
            "rplDodagVersion": 3,
            "rplDodagRank": 2,
            "rplDodagState": "grounded",
            "rplDodagOCP": 0,
            "rplDodagDAODelay": 1000,
            "rplDodagDAOAckEnabled": false,

```

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        "rplDodagPreference": 0,
        "rplDodagMinHopRankIncrease": 256,
        "rplDodagMaxRankIncrease": 0,
        "rplDodagIntervalDoublings": 20,
        "rplDodagIntervalMin": 3,
        "rplDodagRedundancyConstant": 10,
        "rplDodagPathControlSize": 0
    }
]
},
"rplDodagParentTable": {
    "rplDodagParentEntry": [
        {
            "rplRPLInstanceID": 0,
            "rplDodagIndex": 1,
            "rplDodagParentID": "2001:db8:bad:cafe::8",
            "rplDodagParentIf": 1
        }
    ]
},
"rplDodagChildTable": {
    "rplDodagChildEntry": [

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    {
      "rplRPLInstanceID": 0,
      "rplDodagIndex": 1,
      "rplDodagChildID": "2001:db8:bad:cafe::a"
      "rplDodagChildIf": 1
    },
    {
      "rplRPLInstanceID": 0,
      "rplDodagIndex": 1,
      "rplDodagChildID": "2001:db8:bad:cafe::b"
      "rplDodagChildIf": 2
    }
  ]
},
"rplMsgStatsTable": {
  "rplMsgStatsEntry": [
    {
      "rplMsgStatsType": 0,
      "rplMsgStatsInMsgs": 78,
      "rplMsgStatsOutMsgs": 23
    },
    {
      "rplMsgStatsType": 1,
      "rplMsgStatsInMsgs": 11,
      "rplMsgStatsOutMsgs": 54
    },
  ],

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    {
      "rplMsgStatsType": 2,
      "rplMsgStatsInMsgs": 87,
      "rplMsgStatsOutMsgs": 28
    },
    {
      "rplMsgStatsType": 4,
      "rplMsgStatsInMsgs": 47,
      "rplMsgStatsOutMsgs": 38
    }
  ]
}
}
}
}

```

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