

RPL-MIB
draft-sehgal-roll-rpl-mib-02

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Document History

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Implementation Status

- Prototype implementation running on Redwire Econotag hardware using Contiki's RPL implementation
- Basically working, some quirks with lexicographic ordering still to be resolved
- Contact us if you are interested — we have not released the code yet but consider doing so at some point in time

RPL-MIB Structure (1/4)

```
+--rplGeneral(1)
| +- rwn RplDISMode rplDefaultDISMode(1)
|
+--rplActive(2)
| +- rwn RplInstanceID rplActiveInstance(1)
| +- rwn InetAddressIPv6 rplActiveDodag(2)
| +- r-n Unsigned32 rplActiveDodagDAOSequence(3)
| +- rwn Unsigned32 rplActiveDodagTriggerSequence(4)
|
+--rplOCPTable(3)
| +-rplOCPEntry(1) [rplOCPCodepoint]
|   +- --- RplObjectiveCodePoint rplOCPCodepoint(1)
|   +- rwn TruthValue rplOCPEnabled(2)
|
+--rplRPLInstanceTable(4)
| +-rplRPLInstanceEntry(1) [rplRPLInstanceID]
|   +- --- RplInstanceID rplRPLInstanceID(1)
|   +- rwn RplObjectiveCodePoint rplRPLInstanceOCP(2)
|   +- rwn RplDISMode rplRPLInstanceDisMode(3)
|   +- rwn Enumeration rplRPLInstanceDAOAcknowledgement(4)
|   +- rwn RplModeOfOperation rplRPLInstanceModeOfOperation(5)
```

RPL-MIB Structure (2/4)

```
+--rplDodagTable(5)
| +-rplDodagEntry(1) [rplRPLInstanceID,rplDodagRoot]
|   +- --- InetAddressIPv6      rplDodagRoot(1)
|   +- r-n RplDodagVersionNumber rplDodagVersion(2)
|   +- r-n RplRank                rplDodagRank(3)
|   +- r-n Enumeration           rplDodagState(4)
|   +- r-n RplDAODelay           rplDodagDAODelay(5)
|   +- r-n RplDodagPreference    rplDodagPreference(6)
|   +- r-n RplMinHopRankIncrease rplDodagMinHopRankIncrease(7)
|   +- r-n Unsigned32            rplDodagMaxRankIncrease(8)
|   +- r-n Unsigned32            rplDodagIntervalDoublings(9)
|   +- r-n Unsigned32            rplDodagIntervalMin(10)
|   +- r-n Unsigned32            rplDodagRedundancyConstant(11)
|   +- r-n RplPathControlSize    rplDodagPathControlSize(12)
```

RPL-MIB Structure (3/4)

```
+--rplDodagParentTable(6)
|  +-rplDodagParentEntry(1) [rplRPLInstanceID,rplDodagRoot,
|                               rplDodagParentID]
|     +- --- InetAddressIPv6 rplDodagParentID(1)
|     +- r-n InterfaceIndex  rplDodagParentIf(2)
|
+-rplDodagChildTable(7)
|  +-rplDodagChildEntry(1) [rplRPLInstanceID,rplDodagRoot,
|                               rplDodagChildID]
|     +- r-n InetAddressIPv6 rplDodagChildID(1)
|
+-rplDodagPrefixTable(8)
|  +-rplDodagPrefixEntry(1) [rplRPLInstanceID,rplDodagRoot,
|                               rplDodagPrefixIpv6Prefix,
|                               rplDodagPrefixIpv6PrefixLength]
|     |
|     |
|     +- r-n InetAddressIPv6          rplDodagPrefixIpv6Prefix(1)
|     +- r-n InetAddressPrefixLength  rplDodagPrefixIpv6PrefixLength(2)
```

RPL-MIB Structure (4/4)

```
+--rplStats(9)
  +- r-n Counter32 rplStatsMemOverflows(1)
  +- r-n Counter32 rplStatsValidParentFailures(2)
  +- r-n Counter32 rplStatsNoInstanceIDs(3)
  +- r-n Counter32 rplStatsTriggeredLocalRepairs(4)
  +- r-n Counter32 rplStatsTriggeredGlobalRepairs(5)
  +- r-n Counter32 rplStatsParseErrors(6)
  +- r-n Counter32 rplStatsNoParentSecs(7)
  +- r-n Counter32 rplStatsActiveNoParentSecs(8)
  +- r-n Counter32 rplStatsOBitSetDownwards(9)
  +- r-n Counter32 rplStatsOBitClearedUpwards(10)
  +- r-n Counter32 rplStatsFBitSet(11)
  +- r-n Counter32 rplStatsRBitSet(12)
```

Some open issues. . .

- Some detailed questions concerning the semantics of some objects and for writable objects concerning the persistence of written values can be found in the document
 - Add counters for the various RPL message types (the ICMP MIB only counts different ICMP types and does not distinguish ICMP type/code pairs)
 - What about exposing internal trickle variables?
 - How much detail to expose about the objective functions?
 - Need to work out / document the details of the interaction with the IP-FORWARD-MIB and the IP-MIB
- ⇒ We need more RPL experts / implementers to review and answer questions concerning RPL implementations
- ⇒ Is ROLL a good home for this work?



K. Korte, A. Sehgal, J. Schönwälder, T. Tsou, and C. Zhou.

Definition of Managed Objects for the IPv6 Routing Protocol for Low power and Lossy Networks (RPL).
Internet Draft <draft-sehgal-roll-rpl-mib-02>, Jacobs University, Huawei Technologies, October 2011.



S. Kuryla and J. Schönwälder.

Evaluation of the Resource Requirements of SNMP Agents on Constrained Devices.

In *Proc. of the 5th International Conference on Autonomous Infrastructure, Management and Security (AIMS 2011)*, number 6734 in LNCS, pages 100–111. Springer, June 2011.