

IPPM metrics registry

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Abstract

This memo defines a registry of the IPPM working group metrics. It assigns an OBJECT IDENTIFIER to each metric currently standardized by the IPPM WG. It defines the rules for the identification of the metrics standardized in the future.

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[1.](#) 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](#)].

[2.](#) Terms

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 [BCP 14](#), [RFC 2119](#) [[RFC2119](#)].

[3.](#) Overview

This memo defines a registry of the IPPM working group metrics. It assigns an OBJECT IDENTIFIER to each metric currently standardized by the IPPM WG. It defines the rules for the identification of the metrics standardized in the future.

[4.](#) The IPPM Framework

The IPPM Framework consists in four major components:

- + A general framework for defining performance metrics described in the Framework for IP Performance Metrics [RFC2330](#) [[RFC 2330](#)];

- + A set of standardized metrics, which conform to this framework.
- + Emerging metrics which are being specified in respect of this framework;

- + The IPPM-REPORTING-MIB for reporting the results of the measures and for interfacing heterogeneous measurement systems with management entities.

[5. Overview](#)

This memo defines a registry of the current metrics and a framework for the integration of future metrics for the following reasons:

- + to permit metrics to be clearly referenced by MIBs or other data models;
- + Metrics identifiers are needed to allow measurement interoperability;
- + As specification of new metrics is a continuous process, special care must be taken for the integration of future standardized metrics;
- + As the intent of the IPPM WG is to cooperate with other appropriate standards bodies and other areas of IETF to promote consistent metrics, there is a need to permit registration of such metrics.

[6. IPPM metrics Registry framework](#)

MIBs need OBJECT IDENTIFIERS to refer precisely to the standardized metrics. The registry associates an OBJECT IDENTIFIER with each metric. As an example oneWayDelay and oneWayDelayPoissonStream have different identifiers.

The registry has 2 root branches. The category of the document determines the node which branch the metric is identified in:

- + Metrics defined in a RFC are identified in the 'rfc' tree;
- + Metrics defined in cooperation with other bodies may be identified in the 'otherBodies' tree.

The name of the metric in the registry must respect the SMIV2 rules for descriptors ([\[RFC2578\], section 3.1](#)) and should be easily readable. Consequently the following is applied to adapt the name used in the metric definition:

- + The first letter is forced to lower case;
- + '-' are removed;
- + The letter following a '-' is forced to upper case;
- + 'Type-P' prefix is removed.

This document defines an initial registry of the existing metrics. Documents defining metrics in the future will include a registry section to clearly identify these metrics.

[6.1](#). Metrics registry template

Each memo includes a registry which identifies the metrics. The registry is defined using a MODULE-IDENTITY macro. The name of the module must be unique. Each metric is identified in the registry using an OBJECT-IDENTITY macro defining the metric name, status, reference and OBJECT IDENTIFIER.

The registry is defined in a dedicated section of the memo.

As an example, consider an improbable IPPM WG draft that defines 4 metrics in the sections [4](#), [4.1](#), [4.2](#) and [4.3](#), respectively:

- + Type-P-Packet-Speed metric;
- + Type-P-Average-Packet-Speed metric;
- + Type-P-Minimum-Packet-Speed metric;
- + Type-P-Maximum-Packet-Speed metric.

Following is the registry that may be included in the document:

- + The name of the section is 'IPPM Packet Speed metrics registry';
- + The name of the module is `ippmPacketSpeedMetricsRegistry`;

- + 'N' is the node assigned by IANA to the registry module;
- + The next free node of the sub tree `ippmMetricsRegistry.rfc(1)` is '34'.

IPPM-PACKET-SPEED-METRICS-REGISTRY DEFINITIONS ::= BEGIN

IMPORTS

OBJECT-IDENTITY, MODULE-IDENTITY, mib-2
FROM SNMPv2-SMI
rfc
FROM IPPM-METRICS-REGISTRY;

`ippmPacketSpeedMetricsRegistry` MODULE-IDENTITY

LAST-UPDATED "YYYYMMDD0000Z"

ORGANIZATION "IETF IPPM working Group"

CONTACT-INFO "

Tel:

E-mail:

Postal:

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Send comments to <ippm@ietf.org>

Mailing list subscription info:

<https://www1.ietf.org/mailman/listinfo/ippm> "

DESCRIPTION

" This memo defines the registry for IPPM Packet Speed metrics.

Copyright (C) The Internet Society (2003).

This version of this MIB module is part of RFC yyyy; see the RFC itself for full legal notices."

REVISION "YYYYMMDD0000Z"

DESCRIPTION

"Initial version of the module of the registry for IPPM Packet Speed metrics.

This version published as RFC yyyy."

::= { mib-2 N }

`ippmPacketSpeedMetric` OBJECT-IDENTITY

STATUS current

```

DESCRIPTION
    "The identifier for the Type-P-Packet-Speed metric."
REFERENCE "RFCyyyy, section 4."
::= { rfc 34 }

ippmAvgPacketSpeedmetric OBJECT-IDENTITY
    STATUS current
    DESCRIPTION
        "The identifier for the Type-P-Average-Packet-Speed metric."
    REFERENCE "RFCyyyy, section 4.1."
    ::= { rfc 35 }

ippmMinPacketSpeedmetric OBJECT-IDENTITY
    STATUS current
    DESCRIPTION
        "The identifier for the Type-P-Minimum-Packet-Speed metric."
    REFERENCE "RFCyyyy, section 4.2."
    ::= { rfc 36 }

ippmMaxPacketSpeedmetric OBJECT-IDENTITY
    STATUS current
    DESCRIPTION
        "The identifier for the Type-P-Maximum-Packet-Speed metric."
    REFERENCE "RFCyyyy, section 4.3."
    ::= { rfc 37 }

END

```

[6.2.](#) Initial IPPM metrics registry creation

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The initial registry identifies the metrics currently defined in the RFCs produced in the IPPM WG.

By now, the IPPM WG defined 33 metrics related to 7 topics:

- + IPPM Metrics for Measuring Connectivity, [RFC 2678](#) [[RFC2678](#)];
- + One-way Delay Metrics, [RFC 2679](#) [[RFC2679](#)];
- + One-way Packet Loss Metrics, [RFC 2680](#) [[RFC2680](#)];
- + Round-trip Delay Metrics, [RFC 2681](#) [[RFC2681](#)];
- + One-way Loss Pattern Sample Metrics, [RFC 3357](#) [[RFC3357](#)];
- + IP Packet Delay Variation Metric, [RFC 3393](#) [[RFC3393](#)];

- + IPPM Metrics for periodic streams, [RFC 3432](#) [[RFC3432](#)];

They are registered in the node rfc(1). They are numbered using the RFC order and the metrics definitions order in each memo. The node assigned to a metric is definitive and cannot be reused.

[6.3.](#) Future IPPM metrics registration

When the IPPM WG draft is considered mature enough:

- + The chair of the IPPM WG, or someone proposed by the directors of the Transport Area, assigns to each metric a sub node chosen in the tree rfc(1) of the IPPM-METRICS-REGISTRY;
- + Authors insert a registry template in their document. Then they create an OBJECT-IDENTITY instance per metric and complete the instance with the assigned sub nodes.

That helps to prepare the final version of the draft. Moreover it facilitates software integration and interoperability measurement during the specification process.

[6.4.](#) Metric defined in cooperation with other bodies

Such metrics may be registered in the node otherBodies(2).

Nothing prevents these bodies from registering metrics in their own object identifier trees.

[7.](#) Initial IPPM registry definition

```
IPPM-METRICS-REGISTRY DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-IDENTITY, MODULE-IDENTITY, mib-2  
    FROM SNMPv2-SMI;
```

```
ippmMetricsRegistry MODULE-IDENTITY
```

```
    LAST-UPDATED "200304170000Z"    -- April 17th, 2003
```

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```
ORGANIZATION    "IETF IPPM working Group"  
CONTACT-INFO    "  
                Emile STEPHAN
```

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<https://www1.ietf.org/mailman/listinfo/ippm> "

DESCRIPTION

"This memo defines a registry of the IPPM working group metrics.

Copyright (C) The Internet Society (2003). This version of this MIB module is part of RFC yyyy; see the RFC itself for full legal notices."

REVISION "200304170000Z" -- April 17th, 2003

DESCRIPTION

"Initial version of the IPPM metrics registry module.
This version published as RFC yyyy."

::= { mib-2 XXX }

rfc OBJECT IDENTIFIER ::= { ippmMetricsRegistry 1 }
otherBodies OBJECT IDENTIFIER ::= { ippmMetricsRegistry 2 }

--

-- Registry of the metrics of the IPPM WG RFCs

--

--

-- [RFC 2678](#) " IPPM Metrics for Measuring Connectivity"

--

instantUnidirectionConnectivity OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-Instantaneous-Unidirectional-Connectivity metric."

REFERENCE "[RFC2678, section 2.](#)"

::={[rfc 1](#)}

instantBidirectionConnectivity OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-Instantaneous-Bidirectional-Connectivity metric."

REFERENCE "[RFC2678, section 3.](#)"

::={[rfc 2](#)}

intervalUnidirectionConnectivity OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-Interval-Unidirectional-Connectivity metric."

REFERENCE "[RFC2678, section 4.](#)"

::= { [rfc 3](#) }

intervalBidirectionConnectivity OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-Interval-Bidirectional-Connectivity metric."

REFERENCE "[RFC2678, section 5.](#)"

::= { rfc 4 }

intervalTemporalConnectivity OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P1-P2-Interval-Temporal-Connectivity metric."

REFERENCE "[RFC2678, section 6.](#)"

::= { rfc 5 }

--

-- [RFC 2679](#) "A One-way Delay Metric for IPPM"

--

oneWayDelay OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-One-way-Delay metric."

REFERENCE "[RFC2679, section 3.](#)"

::= { rfc 6 }

oneWayDelayPoissonStream OBJECT-IDENTITY

STATUS current

DESCRIPTION

"The identifier for the Type-P-One-way-Delay-Poisson-Stream metric."

REFERENCE "[RFC2679, section 4.](#)"

::= { rfc 7 }

oneWayDelayPercentile OBJECT-IDENTITY

STATUS current

DESCRIPTION
"The identifier for the Type-P-One-way-Delay-Percentile
metric."
REFERENCE "[RFC2679, section 5.1.](#)"

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::= { rfc 8 }

oneWayDelayMedian OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Delay-Median metric."
REFERENCE "[RFC2679, section 5.2.](#)"
::= { rfc 9 }

oneWayDelayMinimum OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Delay-Minimum metric."
REFERENCE "[RFC2679, section 5.3.](#)"
::= { [rfc 10](#) }

oneWayDelayInversePercentile OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Delay-Inverse-Percentile
metric. "
REFERENCE "[RFC2679, section 5.4.](#)"
::= { [rfc 11](#) }

--

-- [RFC 2680](#) "One Way Packet Loss Metric for IPPM"

--

oneWayPacketLoss OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Packet-Loss metric."
REFERENCE "[RFC2680, section 2.](#)"
::= { [rfc 12](#) }

oneWayPacketLossPoissonStream OBJECT-IDENTITY
STATUS current
DESCRIPTION

"The identifier for the Type-P-One-way-Packet-Loss-Poisson-Stream metric."
REFERENCE "[RFC2680, section 3.](#)"
::= { [rfc 13](#) }

oneWayPacketLossAverage OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Packet-Loss-Average metric."
REFERENCE "[RFC2680, section 4.](#)"
::= { [rfc 14](#) }

--

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-- [RFC2681](#) "A Round-trip Delay Metric for IPPM"
--

roundtripDelay OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-Round-trip-Delay metric."
REFERENCE "[section 2](#) of the [rfc2681.](#)"
::= { [rfc 15](#) }

roundtripDelayPoissonStream OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-Round-trip-Delay-Poisson-Stream metric."
REFERENCE "[RFC2681, section 4.](#)"
::= { [rfc 16](#) }

roundtripDelayPercentile OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-Round-trip-Delay-Percentile metric."
REFERENCE "[RFC2681, section 4.1.](#)"
::= { [rfc 17](#) }

roundtripDelayMedian OBJECT-IDENTITY
STATUS current
DESCRIPTION

"The identifier for the Type-P-Round-trip-Delay-Median metric."
REFERENCE "[RFC2681, section 4.2.](#)"
::= { [rfc 18](#) }

roundtripDelayMinimum OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-Round-trip-Delay-Minimum
metric."
REFERENCE "[RFC2681, section 4.3.](#)"
::= { [rfc 19](#) }

roundtripDelayInversePercentile OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-Round-trip-Inverse-Percentile
metric."
REFERENCE "[RFC2681, section 4.4.](#)"
::= { [rfc 20](#) }

--
-- [RFC3357](#): "One-way Loss Pattern Sample Metrics"
--

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oneWayLossDistanceStream OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-Way-Loss-Distance-Stream
metric."
REFERENCE "[RFC3357, section 5.4.1.](#)"
::={ [rfc 21](#)}

oneWayLossPeriodStream OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-Way-Loss-Period-Stream
metric."
REFERENCE "[RFC3357, section 5.4.2.](#)"
::={ [rfc 22](#)}

oneWayLossNoticeableRate OBJECT-IDENTITY
STATUS current
DESCRIPTION

"The identifier for the Type-P-One-Way-Loss-Noticeable-Rate
metric."
REFERENCE " [RFC3357, section 6.1.](#)"
::= { [rfc 23](#) }

oneWayLossPeriodTotal OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-Way-Loss-Period-Total
metric."
REFERENCE " [RFC3357, section 6.2.](#)"
::= { [rfc 24](#) }

oneWayLossPeriodLengths OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-Way-Loss-Period-Lengths
metric."
REFERENCE " [RFC3357, section 6.3.](#)"
::= { [rfc 25](#) }

oneWayInterLossPeriodLengths OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-Way-Inter-Loss-Period-
Lengths metric."
REFERENCE " [RFC3357, section 6.4.](#)"
::= { [rfc 26](#) }

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-- [RFC3393](#):

-- "IP Packet Delay Variation Metric for IP Performance Metrics (IPPM)"

oneWayIpdv OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-ipdv metric."
REFERENCE " [RFC3393, section 2.](#)"
::= { [rfc 27](#) }

oneWayIpdvPoissonStream OBJECT-IDENTITY

STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-ipdv-Poisson-stream
metric."
REFERENCE " [RFC3393, section 3.](#)"
::= { [rfc 28](#) }

oneWayIpdvPercentile OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-ipdv-percentile metric."
REFERENCE " [RFC3393, section 4.3.](#)"
::= { [rfc 29](#) }

oneWayIpdvInversePercentile OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-ipdv-inverse-percentile
metric."
REFERENCE " [RFC3393, section 4.4.](#)"
::= { [rfc 30](#) }

oneWayIpdvJitter OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-ipdv-jitter metric."
REFERENCE " [RFC3393, section 4.5.](#)"
::= { [rfc 31](#) }

oneWayPeakToPeakIpdv OBJECT-IDENTITY
STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-peak-to-peak-ipdv
metric."
REFERENCE " [RFC3393, section 4.6.](#)"
::= { [rfc 32](#) }

--
-- [RFC3432](#): "Network performance measurement with periodic streams"
--

oneWayDelayPeriodicStream OBJECT-IDENTITY

STATUS current
DESCRIPTION
"The identifier for the Type-P-One-way-Delay-Periodic-Stream
metric."
REFERENCE " [RFC3432, section 4.](#)"
 ::= { [rfc 33](#) }

END

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9. Acknowledgments

The author gratefully acknowledges Andy Bierman and Randy Presuhn for their guidance and comments.

10. Normative References

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

[RFC3432] Raisanen, V., Grotefeld, G. and A. Morton, "Network performance measurement with periodic streams", [RFC 3432](#), November 2002.

12. Security Considerations

All the items specified in this MIB module are defined using the macro OBJECT-IDENTITY. This macro does not have a MAX-ACCESS clause.

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.

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.

[13.](#) Author's Address

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