

## IP Performance Metrics (IPPM) Metrics Registry

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### Abstract

This memo defines a registry for IP Performance Metrics (IPPM). It assigns and registers an initial set of OBJECT IDENTITIES to currently defined metrics in the IETF.

This memo also defines the rules for adding IP Performance Metrics that are defined in the future and for encouraging all IP performance metrics to be registered here.

IANA has been assigned to administer this new registry.

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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. Overview

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

- o to permit metrics to be clearly referenced by MIB modules or other data models;
- o to provide metrics identifiers for measurement interoperability;
- o to take special care with the integration of future standardized metrics because it is a continuous process;
- o to provide room where other standards bodies can register their metrics in order to encourage IP performance metrics to have OBJECT IDENTITIES rooted at a common point because the intent of the IPPM WG is to cooperate with other appropriate standards bodies (or fora) to promote consistent metrics;
- o and, similarly, to provide room for enterprises to register metrics.

## 3. IP Performance Metrics Registry Framework

MIB modules need to be able to reference IPPM Metrics precisely. The registry associates an OBJECT-IDENTITY with each metric. For example, Type-P-One-way-Delay and Type-P-One-way-Delay-Poisson-Stream have different OBJECT IDENTITIES.

The registry has one branch. Metrics are identified in the 'ianaIppmMetrics' subtree.

This document defines an initial registry of the existing metrics defined in the IPPM WG and the rules to manage the registry.

Documents defining metrics in the future will include in the IANA section the registration information to identify these metrics unambiguously.

#### 4. Initial IPPM Metrics Registry Creation

The initial registry identifies the metrics currently defined in the RFCs produced in the IPPM WG. To date, the IPPM WG defined 33 metrics related to the following 7 topics:

1. IPPM Metrics for Measuring Connectivity, RFC 2678 [RFC2678]
2. One-way Delay Metrics, RFC 2679 [RFC2679]
3. One-way Packet Loss Metrics, RFC 2680 [RFC2680]
4. Round-trip Delay Metrics, RFC 2681 [RFC2681]
5. One-way Loss Pattern Sample Metrics, RFC 3357 [RFC3357]
6. IP Packet Delay Variation Metric, RFC 3393 [RFC3393]
7. IPPM Metrics for periodic streams, RFC 3432 [RFC3432]

These are sequentially registered in the node `ianaIppmMetrics`.

The naming conventions used for the existing metrics, and encouraged for new IPPM metrics, are:

- o Metrics names conform SMIV2 rules for descriptors defined in section 3.1 of [RFC2578];
- o The name starts with the prefix 'ietf';
- o 'Type-P' prefix is removed;
- o '-' are removed;
- o The letter following a '-' is changed to uppercase.

## 5. IANA Considerations

This section describes the rules for the management of the registry by IANA.

### 5.1. Management Rules

Registrations are done sequentially by IANA in the `ianaIppmMetrics` subtree on the basis of 'Specification Required', as defined in [RFC2434].

The reference of the specification must point to a stable document including a title, a revision, and a date.

The name always starts with the name of the organization and must respect the SMIV2 rules for descriptors defined in section 3.1 of [RFC2578].

A document that creates new metrics would have an "IANA Considerations" section in which it would describe new metrics to be registered.

An OBJECT IDENTITY assigned to a metric is definitive and cannot be reused. If a new version of a metric is produced, then it is assigned with a new name and a new identifier.

### 5.2. Registration Template

The following is a proposed template to insert in the IANA considerations section. For each metric, that section would instantiate the following statement:

```
IANA has registered the following metric in the IANA-IPPM-METRICS-
REGISTRY-MIB:
```

```
aNewMetricName OBJECT-IDENTITY
STATUS          current
DESCRIPTION
  "The identifier for a new metric."
REFERENCE
  "Reference R, section n."
  ::= { ianaIppmMetrics nn }      -- IANA assigns nn
```

## 6. Initial IPPM Registry Definition

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

IMPORTS
```

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

ianaIppmMetricsRegistry MODULE-IDENTITY  
LAST-UPDATED "200507280000Z" -- July 28, 2005  
ORGANIZATION "IANA"  
CONTACT-INFO "Internet Assigned Numbers Authority

Postal: ICANN  
4676 Admiralty Way, Suite 330  
Marina del Rey, CA 90292

Tel: +1 310 823 9358  
E-Mail: iana@iana.org"

#### DESCRIPTION

"This module defines a registry for IP Performance Metrics.

Registrations are done sequentially by IANA in the ianaIppmMetrics subtree on the basis of 'Specification Required', as defined in [RFC2434].

The reference of the specification must point to a stable document including a title, a revision, and a date.

The name always starts with the name of the organization and must respect the SMIV2 rules for descriptors defined in section 3.1 of [RFC2578].

A document that creates new metrics would have an IANA considerations section in which it would describe new metrics to be registered.

An OBJECT IDENTITY assigned to a metric is definitive and cannot be reused. If a new version of a metric is produced, then it is assigned with a new name and a new identifier.

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REVISION "200507280000Z" -- July 28, 2005

#### DESCRIPTION

"Initial version of the IPPM metrics registry module.

This version published as RFC 4148."

::= { mib-2 128 }

```
ianaIppmMetrics OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Registration point for IP Performance Metrics."
  ::= { ianaIppmMetricsRegistry 1 }

--
-- Registry of the metrics of the IPPM WG RFCs
--

--
-- RFC 2678 "IPPM Metrics for Measuring Connectivity"
--

ietfInstantUnidirConnectivity OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Instantaneous-Unidirectional-Connectivity"
  REFERENCE  "RFC2678, section 2."
  ::= { ianaIppmMetrics 1}

ietfInstantBidirConnectivity OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Instantaneous-Bidirectional-Connectivity"
  REFERENCE  "RFC2678, section 3."
  ::= { ianaIppmMetrics 2}

ietfIntervalUnidirConnectivity OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Interval-Unidirectional-Connectivity"
  REFERENCE  "RFC2678, section 4."
  ::= { ianaIppmMetrics 3 }

ietfIntervalBidirConnectivity OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Interval-Bidirectional-Connectivity"
  REFERENCE  "RFC2678, section 5."
  ::= { ianaIppmMetrics 4 }

ietfIntervalTemporalConnectivity OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P1-P2-Interval-Temporal-Connectivity"
  REFERENCE  "RFC2678, section 6."
  ::= { ianaIppmMetrics 5 }
```

```
--  
-- RFC 2679 "A One-way Delay Metric for IPPM"  
--  
  
ietfOneWayDelay OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay"  
    REFERENCE "RFC2679, section 3."  
    ::= { ianaIppmMetrics 6 }  
  
ietfOneWayDelayPoissonStream OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay-Poisson-Stream"  
    REFERENCE "RFC2679, section 4."  
    ::= { ianaIppmMetrics 7 }  
  
ietfOneWayDelayPercentile OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay-Percentile"  
    REFERENCE "RFC2679, section 5.1."  
    ::= { ianaIppmMetrics 8 }  
  
ietfOneWayDelayMedian OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay-Median"  
    REFERENCE "RFC2679, section 5.2."  
    ::= { ianaIppmMetrics 9 }  
  
ietfOneWayDelayMinimum OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay-Minimum"  
    REFERENCE "RFC2679, section 5.3."  
    ::= { ianaIppmMetrics 10 }  
  
ietfOneWayDelayInversePercentile OBJECT-IDENTITY  
    STATUS      current  
    DESCRIPTION  
        "Type-P-One-way-Delay-Inverse-Percentile"  
    REFERENCE "RFC2679, section 5.4."  
    ::= { ianaIppmMetrics 11 }
```

```
--
-- RFC 2680 "One-way Packet Loss Metric for IPPM"
--

ietfOneWayPktLoss OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-Packet-Loss"
    REFERENCE "RFC2680, section 2."
    ::= { ianaIppmMetrics 12 }

ietfOneWayPktLossPoissonStream OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-Packet-Loss-Poisson-Stream"
    REFERENCE "RFC2680, section 3."
    ::= { ianaIppmMetrics 13 }

ietfOneWayPktLossAverage OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-Packet-Loss-Average"
    REFERENCE "RFC2680, section 4."
    ::= { ianaIppmMetrics 14 }

--
-- RFC 2681 "A Round-trip Delay Metric for IPPM"
--

ietfRoundTripDelay OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-Round-trip-Delay"
    REFERENCE " section 2 of the rfc2681."
    ::= { ianaIppmMetrics 15 }

ietfRoundTripDelayPoissonStream OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-Round-trip-Delay-Poisson-Stream"
    REFERENCE "RFC2681, section 4."
    ::= { ianaIppmMetrics 16 }

ietfRoundTripDelayPercentile OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-Round-trip-Delay-Percentile"
    REFERENCE "RFC2681, section 4.1."
```



```
 ::= { ianaIppmMetrics 17 }

ietfRoundTripDelayMedian OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Round-trip-Delay-Median"
  REFERENCE "RFC2681, section 4.2."
  ::= { ianaIppmMetrics 18 }

ietfRoundTripDelayMinimum OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Round-trip-Delay-Minimum"
  REFERENCE "RFC2681, section 4.3."
  ::= { ianaIppmMetrics 19 }

ietfRoundTripDelayInvPercentile OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-Round-trip-Inverse-Percentile"
  REFERENCE "RFC2681, section 4.4."
  ::= { ianaIppmMetrics 20 }

--
-- RFC 3357: "One-way Loss Pattern Sample Metrics"
--

ietfOneWayLossDistanceStream OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Loss-Distance-Stream"
  REFERENCE " RFC3357, section 5.4.1."
  ::= { ianaIppmMetrics 21 }

ietfOneWayLossPeriodStream OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Loss-Period-Stream"
  REFERENCE " RFC3357, section 5.4.2."
  ::= { ianaIppmMetrics 22 }

ietfOneWayLossNoticeableRate OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Loss-Noticeable-Rate"
  REFERENCE " RFC3357, section 6.1."
  ::= { ianaIppmMetrics 23 }
```

```
ietfOneWayLossPeriodTotal OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Loss-Period-Total"
  REFERENCE " RFC3357, section 6.2."
  ::= { ianaIppmMetrics 24 }

ietfOneWayLossPeriodLengths OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Loss-Period-Lengths"
  REFERENCE " RFC3357, section 6.3."
  ::= { ianaIppmMetrics 25 }

ietfOneWayInterLossPeriodLengths OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-Way-Inter-Loss-Period-Lengths"
  REFERENCE " RFC3357, section 6.4."
  ::= { ianaIppmMetrics 26 }

--
-- RFC 3393: "IP Packet Delay Variation Metric
--           for IP Performance Metrics (IPPM)"

ietfOneWayIpdv OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-way-ipdv"
  REFERENCE " RFC3393, section 2."
  ::= { ianaIppmMetrics 27 }

ietfOneWayIpdvPoissonStream OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-way-ipdv-Poisson-stream"
  REFERENCE " RFC3393, section 3."
  ::= { ianaIppmMetrics 28 }

ietfOneWayIpdvPercentile OBJECT-IDENTITY
  STATUS      current
  DESCRIPTION
    "Type-P-One-way-ipdv-percentile"
  REFERENCE " RFC3393, section 4.3."
  ::= { ianaIppmMetrics 29 }

ietfOneWayIpdvInversePercentile OBJECT-IDENTITY
  STATUS      current
```

```
DESCRIPTION
    "Type-P-One-way-ipdv-inverse-percentile"
REFERENCE " RFC3393, section 4.4."
::= { ianaIppmMetrics 30 }

ietfOneWayIpdvJitter OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-ipdv-jitter"
    REFERENCE " RFC3393, section 4.5."
    ::= { ianaIppmMetrics 31 }

ietfOneWayPeakToPeakIpdv OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-peak-to-peak-ipdv"
    REFERENCE " RFC3393, section 4.6."
    ::= { ianaIppmMetrics 32 }

--
-- RFC 3432: "Network performance measurement with periodic streams"
--

ietfOneWayDelayPeriodicStream OBJECT-IDENTITY
    STATUS      current
    DESCRIPTION
        "Type-P-One-way-Delay-Periodic-Stream"
    REFERENCE " RFC3432, section 4."
    ::= { ianaIppmMetrics 33 }

END
```

## 7. Security Considerations

This module does not define any management objects. Instead, it assigns a set of OBJECT-IDENTITIES which may be used by other MIB modules to identify specific IP Performance Metrics.

Meaningful security considerations can only be written in the MIB modules that define management objects. This document has therefore no impact on the security of the Internet.

## 8. References

### 8.1. Normative References

- [RFC2434] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.
- [RFC2578] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [RFC2678] Mahdavi, J. and V. Paxson, "IPPM Metrics for Measuring Connectivity", RFC 2678, September 1999.
- [RFC2679] Almes, G., Kalidindi, S., and M. Zekauskas, "A One-way Delay Metric for IPPM", RFC 2679, September 1999.
- [RFC2680] Almes, G., Kalidindi, S., and M. Zekauskas, "A One-way Packet Loss Metric for IPPM", RFC 2680, September 1999.
- [RFC2681] Almes, G., Kalidindi, S., and M. Zekauskas, "A Round-trip Delay Metric for IPPM", RFC 2681, September 1999.
- [RFC3357] Koodli, R. and R. Ravikanth, "One-way Loss Pattern Sample Metrics", RFC 3357, August 2002.
- [RFC3393] Demichelis, C. and P. Chimento, "IP Packet Delay Variation Metric for IP Performance Metrics (IPPM)", RFC 3393, November 2002.
- [RFC3432] Raisanen, V., Grotefeld, G., and A. Morton, "Network performance measurement with periodic streams", RFC 3432, November 2002.

### 8.2. Informative References

- [RFC2579] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.

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