

Internet Draft

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Transport Performance Metrics MIB

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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 describes managed objects used for monitoring selectable performance metrics and statistics derived from the monitoring of network packets and sub-application level transactions. The metrics can be defined through reference to existing IETF, ITU

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and other standards organizations' documents. The monitoring covers both passive and active traffic generation sources.

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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](#)].

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.](#) Overview

This document continues the architecture created in the RMON2-MIB [[RFC2021](#)] by providing a major feature upgrade, primarily by providing new metrics and studies to assist in the analysis of performance for sub-application transaction flows in the network, in direct relationship to the transporting of application layer protocols.

Performance monitoring agents have been widely used to analyze the parameters and metrics related to the perceived performance of distributed applications and services in networks. The metrics collected by these agents have ranged from basic response time to a

combination of metrics related to the loss and re-transmission of datagrams and PDUs. While the metrics are becoming more useful in the implementation of service level monitoring and troubleshooting tools, the lack of a standard method to report these has limited the deployment to very specific customer needs and areas.

This document is intended to create a general framework for the collection and reporting of performance related metrics on sub-application level transaction flows in a network. The MIB in this document is directly linked to the current RMON2-MIB [[RFC2021](#)] and uses the Protocol Directory as a key component in reporting the layering involved in the sub-application level transaction flows.

The specific objectives of this document are to:

- + Provide a drill-down capability to compliment the user-perceived monitoring defined within the APM-MIB [[RFC3729](#)]. This capability is intended to support trouble resolution, further characterization of performance, and a finer granularity of

monitoring capabilities. The APM-MIB provides a method for retrieving aggregated measurement data of the end-user's perception of application-level performance. APM additionally provides thresholding and associated alarms in the event the end-user perceived performance degrades below defined thresholds. The TPM-MIB compliments the APM-MIB capabilities by monitoring sub-application level transaction aspects not typically perceived by the end-user. As an example, APM-MIB provides response time statistics of a typical web-browser application. This application typically consists of DNS transactions, TCP connection establishment (or multiple establishments), HTTP download of the base page and multiple downloads of the various embedded objects. Ideally TPM-MIB would provide statistics on the performance aspects of these multiple sub-application level transactions.

- + Provide additional performance metrics and related statistics. For trouble shooting and a finer granularity of performance monitoring, it is useful to provide measurements of additional metrics beyond those supported by the APM-MIB.

- + Support standards based metrics and associated statistical aggregation by defining methods to reference those standards. The

TPM-MIB provides a capability to describe metrics by reference to appropriate IETF, ITU or other, including enterprise specific, standards bodies defining metrics. This capability is provided through the tpmMetricsDefTable.

Specifically, this MIB itself does not make references to such IETF, ITU and other organization's metric specifications. What it does do is to allow for the setup of the tpmMetricDefTable that does reference such IETF, ITU and other metric specifications, and it allows to (dynamically) list pointers to such specifications in this table. The following objects do allow for that, and the DESCRIPTION clauses (of the below objects) explain how such is done:

tpmMetricDefName OBJECT-TYPE
tpmMetricDefReference OBJECT-TYPE
tpmMetricDefGlobalID OBJECT-TYPE

The tpmMetricDefGlobalID object contains a reference to the Object ID in a metrics registration MIB being developed in the IPPM Working Group at the IETF, e.g., the IPPM-REGISTRY-MIB [[RFCXXX3](#)], which defines the metric. For metrics defined within the IPPM Working Group, which are included in the IPPM-REGISTRY-MIB, this object is used to reference those metrics directly. For metrics not included within the IPPM-REGISTRY-MIB, the value of this object is set to 0.0 for none.

Examples of appropriate references include the ITU-T Recommendation Y.1540 [[Y.1540](#)] on IP packet transfer performance metrics or the IETF documents from the IPPM WG, e.g., [RFC2681](#) on the round trip delay metric [[RFC2681](#)] or [RFC3393](#) on the delay variation metric [[RFC3393](#)] or others, including [RFC2679](#) [[RFC2679](#)], [RFC2680](#) [[RFC2680](#)], and [RFC3432](#) [[RFC3432](#)]. While no specific metric is mandatory, implementations should, at a minimum, support a round trip delay and a round trip loss metric.

+ Provide (as an option) a table storing the measurements of the metrics on a transaction by transaction basis. There are times when it is useful to have access to the raw measurements. The tpmCurReportTable optionally provides access to this capability.

While this document outlines the basic measurements of performance in regard to the transporting of application flows, it does not attempt to measure or provide a means to measure the actual perceived performance of the application transactions or quality. The detailed measurements of end-user perceived performance is directly related to this document and may be found in the APM-MIB [[RFC3729](#)].

The objects defined in this document are intended as an interface between an RMON agent and an RMON management application and are not intended for direct manipulation by humans. While some users may tolerate the direct display of some of these objects, few will tolerate the complexity of manually manipulating objects to accomplish row creation. These functions should be handled by the management application.

[3.1.](#) Terms

This document uses some terms that need introduction:

DataSource

A source of data for monitoring purposes. This term is used exactly as defined in the RMON2-MIB [[RFC2021](#)].

protocol

A specific protocol encapsulation, as identified for monitoring purposes. This term is used exactly as defined in the RMON Protocol Identifiers document [[RFC2895](#)].

performance metric

A specific, measured reporting metric, as identified for monitoring purposes. There can be several metrics reported by an agent in the same implementation. The metrics are extensible based on the agent implementation.

application

A network-based, high-level protocol performing useful work to an end-user of end-system. Typically the application performs multiple request/response transactions to complete its work. E.g., a web-application downloading a web page completes DNS, TCP-connect and multiple HTTP GET transactions prior to completing its task.

transactions

Elemental request/response transactions comprising more complex network-based applications. E.g., a transaction may include an ftp get request and the file download in response.

[3.2.](#) Report Aggregation

This MIB module provides functions to aggregate measurements into higher level summaries identical to the aggregation defined in the APM-MIB [[RFC3729](#)]. In addition to temporal aggregation of data, the Textual Convention, TransactionAggregationType, is imported from the APM-MIB, which specifies the nature of the spatial aggregation employed.

[3.3.](#) Structure of the MIB

The objects are arranged in the following groups:

- tpmCapabilitiesGroup
- tpmAggregateReportsGroup
- tpmCurrentReportsGroup
- tpmExceptionReportsGroup

These groups are the basic unit of conformance. If an agent implements a group, then it must implement all objects in that group. While this section provides an overview of grouping and conformance information for this MIB module, the authoritative reference for such information is contained in the MODULE-COMPLIANCE and OBJECT-GROUP macros later in this MIB module.

These groups are defined to provide a means of assigning object identifiers, and to provide a method for implementers of managed agents to know which objects they must implement.

[3.3.1.](#) The tpmCapabilitiesGroup

The tpmCapabilitiesGroup contains objects and tables which show the measurement protocol and metric capabilities of the agent. This group primarily consists of the tpmTransMetricDirTable and the tpmMetricDefTable.

[3.3.2.](#) The tpmAggregateReportsGroup

The tpmAggregateReportsGroup is used to provide the collection of aggregated statistical measurements for the configured report intervals. The tpmAggregateReportsGroup consists of the tpmAggrReportCntrlTable and the tpmAggrReportTable.

[3.3.3.](#) The tpmCurrentReportsGroup

The tpmCurrentReportsGroup is used to provide the collection of uncompleted measurements for the current configured report for those transactions caught in progress. A history of these transactions is also maintained once the current transaction has completed. The tpmCurrentReportsGroup consists of the tpmCurReportTable and the tpmCurReportSize object.

[3.3.4.](#) The tpmExceptionReportsGroup

The tpmExceptionReportsGroup is used to link immediate notifications of transactions that exceed certain thresholds defined in the apmExceptionGroup [[RFC3729](#)]. This group reports the aggregated sub-application measurements for those applications exceeding thresholds. The tpmExceptionReportsGroup consists of the tpmExcpReportTable.

[3.4.](#) Statistics for Aggregation of Data - Conventions

In order to measure the performance of traffic flows in a network, the proper analysis of a set of statistics is required. Since a large majority of the statistics have a basis of time, the use of a simple statistical model is feasible. Therefore, the MIB definitions within this document all use a basic set of statistical computed values to assist in further analysis by a management application.

The remaining subsections in this section detail the common structured features that are applied to the performance metrics in the statistical format described above. The tpmMetricsDefTable (discussed below) describes the set of metrics supported in this MIB module.

[3.5.](#) Relationship to the Remote Monitoring MIB

This document describes the implementation of an additional MIB for the support of performance related metrics within the framework of the RMON2-MIB [[RFC2021](#)]. The objects and table defined in this MIB module are an extension to the existing framework for the support of both Client/Server and Server push related applications and services.

[3.6.](#) Relationship to RMON2-MIB Protocol Identifier Reference

This document uses the Protocol Identifiers outlined in the current Protocol Identifier Reference document, [RFC 2895](#) [[RFC2895](#)]. The protocol index values throughout the document are a direct reference to the same relationship that exists between the RMON2-MIB [[RFC2021](#)] and the Protocol Identifier Reference document, [RFC 2895](#) [[RFC2895](#)]. An important extension of the Protocol Identification to application-level verbs is found in [RFC 3395](#) [[RFC3395](#)].

[3.7.](#) Relationship to Standards-Based Performance Metrics

This document uses the `tpmMetricsDefTable` to describe the metrics supported by an instance of the TPM-MIB. The performance metric index values throughout the document are a direct reference to the metrics defined in that table. The table defines metrics by directly referencing other standards that provide definitive descriptions of the metric.

[3.8.](#) Relationship to Application Performance Measurement MIB

This document uses the `apmReportControlIndex`, `appLocalIndex` and `apmReportIndex` as outlined in the current Application Performance Measurement MIB [[RFC3729](#)]. These objects are used to create a reference link for the purpose of reporting transaction flow details on application level measurements. As such, the TPM-MIB is designed to provide a drill-down extension to the APM-MIB. Further, it draws heavily on the ideas and designs laid out in the APM-MIB.

[4.](#) Statistics Perspective

When dealing with time based measurements on application data packets it would be ideal if all the timestamps and related data could be stored and forwarded for later analysis. However when faced with thousands of conversations per second on ever faster networks, storing all the data, even if compressed, would take too much processing, memory, and manager download time to be practical.

It is important to note that in dealing with network data we will be dealing with statistical populations and not samples. Statistics

books deal with both because the math is similar. In collecting agent data a population, i.e., all the data, must be processed.

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Because of the nature of application protocols just sampling some of the packets will not give good results. Missing just one critical packet, such as one that specified an ephemeral port on which data will be transmitted, or what application will be run, can cause much valid data to be lost.

The time-based measurements the agent collects will come from examining the entire group of data, i.e., the population. The population will be finite. The agent will seek only to provide information that will describe the actual data. Analysis of that data will be left to the management station.

The simplest form of representing a group of data is by frequency distributions, i.e., buckets. Statistics provides a great many ways of analyzing this type of data and there are some rules in creating the buckets. First the range needs to be known. Second a bucket size needs to be determined. Fixed bucket sizes are best, while variable may be used if needed. However the statistics texts tend to only refer to operations of fixed size buckets. This method of describing data is expensive for a agent to implement. First the agent must process a great amount of data at a time. In storing the data, determine the range, then locating the buckets and then fill in the data after the fact, takes a fair amount of storage and time. Fixing the range and bucket sizes in the beginning can be problematical as the agent may have to adjust the values for each of the applications it collects data on. Such numbers can be in the thousands. Additional complexity arises in adding new protocols and even in describing the buckets themselves to the management application. This is the approach taken in the APM-MIB.

A complimentary approach is to provide frequency distribution statistics. Frequency distribution statistics describes aggregation such as mean and standard deviation that can be obtained by summation functions on the individual data elements in a population. Analysis of the data described by these functions has been greatly studied and interpretation of these values is available to anyone with an introduction to statistics. In fact, frequency distributions are routinely analyzed to generate these varied numbers which are then used for further analysis. Also note that frequency distributions by

their very nature provide an exact characterization of the data. Whereas buckets, will introduce error factors that are not present with direct analysis by a summation type formulas. Because the TPM-MIB provides a drill-down capability to the APM MIB it has to measure and store much more information than the APM-MIB. For this reason, and to compliment the APM-MIB, the TPM-MIB relies on statistical descriptions rather than a bucket description of the measurement data.

The agent will provide data that can be used to calculate the most basic and useful statistical aggregates. The agent will not perform the calculations and provide the statistical measurement directly. There are several reason why this is not desired. The first is that to find the final measurement can be expensive in terms of computation and representation. There are divisions and square roots and the measurements are expressed as floating point values. The second is that by providing the variables to the statistical functions, those variables are scalable. It is possible to combine smaller intervals into larger ones.

An example is the arithmetic mean or average. This is the sum of the data divided by the number of data elements. The agent will provide the sum of the x and the number of elements N. The management station can perform the division to obtain the average. Given two samples, they can be combined by adding the sum of the x's and by adding the number of elements to get a combined sum and number of elements. The average formula then works just the same. Also the sum of the x and the number of element variables are used in calculating other statistical measurement values as well.

[4.1.](#) Statistics Structure

The data statistical elements, datum, of the metric have been chosen to maximize the amount of data available while minimizing the amount of memory needed to store the statistic and minimizing the CPU processing requirement needed to generate the statistic.

The statistic data structure contains five unsigned integer datum.

N	count of the number of data points for the metric
S(X)	sum of all the data point values for the metric

S(X ²)	sum of all the data point values squared for the metric
X _{max}	maximum data point value for the metric
X _{min}	minimum data point value for the metric
S(I*X)	sum of the data points multiplied by their order, i.e., = SUM from i=1 to N { i*X _i }

A performance metric is used to describe events over a time interval. The measurement points can be processed immediately into the statistic and do not have to be stored for later processing. For example, to count the number of events in a time interval it is sufficient to increment a counter for each event. It is not necessary to cache all the events and then count them at the end of the interval. The statistic is also designed to be easily scalable in terms of combining adjacent intervals. For example if an agent created a specific statistic every 30 seconds and a user table interval was set to 60 seconds, the 60 second statistic could be

obtained by combining the two 30 second statistics. The following rules will be applied when combining adjacent statistics.

N	S(N)
S(X)	S(S(X))
S(X ²)	S(S(X ²))
X _{max}	MAX(X _{max})
X _{min}	MIN(X _{min})
S(I*X)	S(I*X) + N*S(X) +S(I*X)

where the last two terms refer to the statistics from the later 30 second period and N is the count from the former 30 second period.

This structure gives a generic framework upon which the actual performance statistics will be defined. Each specific statistical definition must address the specific significance, if any, given to each of the metric datum. While a specific metric definition should try to conform to the generic framework, it is acceptable for a metric datum to not be used, and to have no meaning, for a specific metric. In such cases the datum will default to a 0 value.

[4.2.](#) Statistics Analysis

The actual meaning of a specific statistical datum is determined by

the definition of the specific statistic. The following is a discussion of the operations and observations that can be performed on a generic metric. This means that the following may or may not apply and/or have meaning when applied to any specific metric.

The following observations and analysis techniques are not all inclusive. Rather these are the ones we have come up with at the time of writing this document.

- + Number.
- + Frequency.
- + The time interval is the time interval specified in the control table. It is not a metric datum, but it is associated with the metric sample.
- + Maximum
- + Minimum
- + Range

- + Arithmetic Mean
- + Root Mean Square
- + Variance
- + Standard Deviation
- + Slope of a least-squares line

These are accessible from the statistical datum provided by this MIB module.

[5.](#) Definitions

--

-- RMON2-MIB Extensions for the Monitoring metrics related to the

```

-- performance of transporting traffic in networks.
--
--     TPM Metric Collection
--         * Application-to-Protocol transaction linkage
--         * Metric-to-Protocol linkage
--         * Metric study control
--         * Metrics for Client/Server Conversations
--
TPM-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
    Counter32, Unsigned32                FROM SNMPv2-SMI    --[RFC2578]

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

    SnmpAdminString                    FROM SNMP-FRAMEWORK-MIB --[RFC3411]

    RowStatus, TEXTUAL-CONVENTION, TimeStamp,
    StorageType                        FROM SNMPv2-TC    --[RFC2579]

    rmon, OwnerString                  FROM RMON-MIB      --[RFC2819]

    protocolDirLocalIndex,
    ZeroBasedCounter32                FROM RMON2-MIB    --[RFC2021]

    ZeroBasedCounter64                FROM HCNM-TC      --[RFC2856]

```

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```

    AppLocalIndex, TransactionAggregationType,
    RmonClientID, DataSourceOrZero,
    apmAppDirAppLocalIndex, apmExceptionIndex,
    apmReportGroup, apmExceptionGroup,
    apmAppDirResponsivenessType      FROM APM-MIB    --[RFC3729]

    SspmClockSource, SspmClockMaxSkew,
    SspmMicroSeconds                FROM SSPM-MIB;  --[RFCXXX2]

-- Transaction Performance Monitoring MIB

```

tpmMIB MODULE-IDENTITY

LAST-UPDATED "200406281500Z" -- 28 June 2004

ORGANIZATION "IETF RMON MIB Working Group"

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DESCRIPTION

"This module defines extensions to the RMON2-MIB module for the collection of Performance Metrics related to application traffic in a network. In particular, it describes managed objects used for monitoring selectable performance metrics and statistics derived from the monitoring of network packets and sub-application level transactions.

In order to maintain the RMON 'look-and-feel', some of the text from the RMON2 [[RFC2021](#)] and HC-RMON [[RFC3273](#)]

MIBs by Steve Waldbusser have been used in this MIB module.

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full legal notices."

REVISION "200406281500Z" -- 28 June 2004
DESCRIPTION
 "The original version of this MIB module,
 published as RFCXXXX."
 -- RFC-Editor assigns XXXX
 ::= { rmon nn } -- To be assigned by IANA
 -- We suggest a value of 30 for nn

--
-- Object Identifier Assignments
--

tpmCapabilities OBJECT IDENTIFIER ::= { tpmMIB 1 }
tpmReports OBJECT IDENTIFIER ::= { tpmMIB 2 }
tpmConformance OBJECT IDENTIFIER ::= { tpmMIB 3 }

-- tpmAggrReportCntrlTable OBJECT IDENTIFIER ::= { tpmReports 1 }
-- tpmAggrReportTable OBJECT IDENTIFIER ::= { tpmReports 2 }
-- tpmCurReportTable OBJECT IDENTIFIER ::= { tpmReports 3 }
-- tpmCurReportSize OBJECT IDENTIFIER ::= { tpmReports 4 }
-- tpmExcpReportTable OBJECT IDENTIFIER ::= { tpmReports 5 }

--
-- Textual Conventions
--

TpmTransactionMetricIndex ::= TEXTUAL-CONVENTION
 DISPLAY-HINT "d"
 STATUS current
 DESCRIPTION
 "An index used to uniquely identify an entry in the
 tpmTransMetricDir table. Each such entry defines
 the protocol transaction and metric instance to be
 monitored for a specific application."
 SYNTAX Unsigned32 (1..65535)

TpmMetricDefID ::= TEXTUAL-CONVENTION
 DISPLAY-HINT "d"
 STATUS current

DESCRIPTION

"An index that identifies through reference to a specific performance metric. The metrics are referenced through their type (connect, delay, loss, etc.), their directional characteristics (one-way, round trip, etc.), their name, their reference to a documented definition."

SYNTAX Unsigned32 (1..2147483647)

--

-- The tpmCapabilitiesGroup

--

tpmClockResolution OBJECT-TYPE

SYNTAX SspmMicroSeconds

MAX-ACCESS read-only

STATUS current

-- UNITS Microseconds

DESCRIPTION

"A read only variable indicating the resolution of the measurements possible by this device."

::= { tpmCapabilities 1 }

tpmClockMaxSkew OBJECT-TYPE

SYNTAX SspmClockMaxSkew

MAX-ACCESS read-only

STATUS current

-- UNITS Seconds

DESCRIPTION

"A read only variable indicating the maximum offset error due to skew of the local clock over the time interval 86400 seconds, in seconds."

::= { tpmCapabilities 2 }

tpmClockSource OBJECT-TYPE

SYNTAX SspmClockSource

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read only variable indicating the source of the clock. This is provided to allow a user to determine how accurate the timing mechanism is compared with other devices."

::= { tpmCapabilities 3 }

tpmTransMetricDirLastChange OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

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DESCRIPTION

"The value of sysUpTime at the time the
tpmTransMetricDirTable was last modified, through
modifications of the tpmTransMetricDirConfig object."
 ::= { tpmCapabilities 4 }

tpmTransMetricDirTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmTransMetricDirEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table is used to describe and link sets of
performance metrics and protocols to an entry in
the application directory. This table, with the
tpmMetricDefTable, describes the capability of
the agent to collection sub-application level
data related to each entry in the
apmAppDirectoryTable.

This table lists the protocol transactions and their
corresponding performance metrics that this agent
has the capability to compute and collect, for the specified
application. There is one entry in this table for each such
application, protocol transaction and metric combination
supported by this agent. The entries in this
table represent the metrics that are collected for each
protocol transaction that comprise the application.
The agent should boot up with this table pre-configured
with those combinations of applications, protocol
transactions and metrics that it knows about and wishes to
monitor. Implementations must populate the table with all
possible application, protocol transaction and metric
combinations and have the default configuration
objects set to supportedOff(2). This table
does not support the creation of new
combinations by the management application.

The deletion of an entry in the apmAppDirectoryTable will cause
the removal of entries from this table. These entries must

be removed because the appLocalIndex value will no longer be visible in the apmAppDirectoryTable. When an entry is created in the apmAppDirectoryTable and the agent has the ability to support metrics for these protocol transactions, the appropriate entries must be made in the tpmTransMetricDefTable."

```
::= { tpmCapabilities 5 }
```

tpmTransMetricDirEntry OBJECT-TYPE

SYNTAX TpmTransMetricDirEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A conceptual row in the tpmTransMetricDirTable.

An example of the indexing of this entry is tpmTransMetricDirConfig.5.2 where 5 is the value of a valid and visible appLocalIndex object in in the appLocalDir table. The entries describe the the transaction and metric pairs monitored for this application. The tpmTransMetricProtocolIndex identifies the protocol transaction and the tpmMetricDefIndex describes the metric monitored."

INDEX { tpmTransMetricAppLocalIndex, -- Application Index
 tpmTransMetricIndex -- (Protocol,Metric) Index
 }

```
::= { tpmTransMetricDirTable 1 }
```

TpmTransMetricDirEntry ::= SEQUENCE {

tpmTransMetricAppLocalIndex AppLocalIndex,
tpmTransMetricIndex TpmTransactionMetricIndex,
tpmTransMetricProtocolIndex Unsigned32,
tpmTransMetricMetricIndex Unsigned32,
tpmTransMetricDirConfig INTEGER

}

tpmTransMetricAppLocalIndex OBJECT-TYPE

SYNTAX AppLocalIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index used to uniquely identify the application which the entries in the tpmTransMetricDir table are associated."
 ::= { tpmTransMetricDirEntry 1 }

tpmTransMetricIndex OBJECT-TYPE

SYNTAX TpmTransactionMetricIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index used to uniquely identify an entry in the tpmTransMetricDir table. Each such entry defines protocol transaction and metric instance to be monitored for a specific application."

::= { tpmTransMetricDirEntry 2 }

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tpmTransMetricProtocolIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The protocolDirLocalIndex of the particular transaction to be analyzed when computing and generating the selected metric for a specific application."

::= { tpmTransMetricDirEntry 3 }

tpmTransMetricMetricIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The tpmMetricDefinitionID of the particular metric to be generated."

::= { tpmTransMetricDirEntry 4 }

tpmTransMetricDirConfig OBJECT-TYPE

SYNTAX INTEGER {
notSupported(1),
supportedOff(2),
supportedOn(3)
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object describes and configures the probe's support for this performance metric in relationship to the specified transaction and application. The agent creates entries in this table for all metric and transaction combinations that it can generate. Because the probe will only populate this table with supported entries, and the table cannot have entries added, the notSupported(1) setting is only used to signify that other configuration parameters are causing the agent to currently not support the generation and collection of this metric for the specified protocol and application. Also, the status of this object will not change to notSupported(1) due to a change to supportedOff(2) in the tpmMetricDir table.

If the value of this object is notSupported(1), the probe will not perform computations for this performance metric and transaction combination and shall not allow this object to be changed to any other value. If the value of this object is supportedOn(3), the probe supports computations for this performance metric and protocol and is configured to perform

the computations for this performance metric and protocol combination for the application for all interfaces. If the value of this object is supportedOff(2), the probe supports computations for this performance metric for the specified protocol, but is configured to not perform the computations for this performance metric and protocol for the application for any interfaces. Whenever this value changes from supportedOn(3) to supportedOff(2), the probe shall cause the deletion of all entries in the tpmReportGroup tables, for all appropriate studies configured in the tpmAggrReportCntrlTable.

The value of this object must persist across reboots."
::= { tpmTransMetricDirEntry 5 }

--

-- TPM Metric Definitions Table

--

tpmMetricDefTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmMetricDefEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The tpmMetricDefTable describes the metrics available to the TPM-MIB. The tpmMetricDefTable can define metrics by referencing existing IETF, ITU and other standards organizations' documents, including enterprise specific documents.

Examples of appropriate references include the ITU-T Recommendation Y.1540 [[Y.1540](#)] on IP packet transfer performance metrics or the IETF documents from the IPPM WG, e.g., [RFC2681](#) on the round trip delay metric [[RFC2681](#)] or [RFC3393](#) on the delay variation metric [[RFC3393](#)] or others, including [RFC2679](#) [[RFC2679](#)], [RFC2680](#) [[RFC2680](#)], and [RFC3432](#) [[RFC3432](#)]. While no specific metric is mandatory, implementations should, at a minimum, support a round trip delay and a round trip loss metric.

This table contains one row per metric supported by this agent, and should be populated during system initialization."

::= { tpmCapabilities 6 }

tpmMetricDefEntry OBJECT-TYPE

SYNTAX TpmMetricDefEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a particular metric."

INDEX { tpmMetricDefinitionID }

::= { tpmMetricDefTable 1 }

TpmMetricDefEntry ::= SEQUENCE {

tpmMetricDefinitionID

tpmMetricDefType

TpmMetricDefID,

INTEGER,

```

        tpmMetricDefDirType          INTEGER,
        tpmMetricDefName             SnmpAdminString,
        tpmMetricDefReference        SnmpAdminString,
        tpmMetricDefGlobalID         OBJECT IDENTIFIER
    }

tpmMetricDefinitionID      OBJECT-TYPE
    SYNTAX      TpmMetricDefID
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index for this entry.  This object identifies the
        the particular metric in this MIB module."
    ::= { tpmMetricDefEntry 1 }

tpmMetricDefType          OBJECT-TYPE
    SYNTAX      INTEGER {
                                other(1),
                                connectMetric(2),
                                delayMetric(3),
                                lossMetric(4)
                            }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The basic type of metric indicated by this entry.

        The value 'other(1)' indicates that this metric cannot be
        characterized by any of the remaining enumerations specified
        for this object.

        The value 'connectMetric(2)' indicates that this metric
        measures connectivity characteristics.

        The value 'delayMetric(3)' indicates that this metric
        measures delay characteristics.

```

```

        The value 'lossMetric(4)' indicates that this metric
        measures loss characteristics."
    ::= { tpmMetricDefEntry 2 }

```

```

tpmMetricDefDirType      OBJECT-TYPE

```


SYNTAX INTEGER {
 oneWay(1),
 twoWay(2),
 multiWay(3)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The directional characteristics of the this metric.

The value 'oneWay(1)' indicates that this metric is measured with some sort of unidirectional test.

The value 'twoWay(2)' indicates that this metric is measured with some sort of bidirectional test.

The value 'multiWay(3)' indicates that this metric is measured with some combination of unidirectional and/or bidirectional tests."

::= { tpmMetricDefEntry 3 }

tpmMetricDefName OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The textual name of this metric. For example, if this tpmMetricDefEntry identified the IPPM metric for round trip delay, then this object should contain the value, e.g., 'Type-P-Round-Trip-Delay'."

::= { tpmMetricDefEntry 4 }

tpmMetricDefReference OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains a reference to the document which defines this metric. If this document is available online via electronic download, then a dereferencable URL should be specified in this object. The implementation must support an HTTP URL type and may support additional types of dereferencable URLs such as an FTP type.

For example, if this tpmMetricDefName identified the IPPM metric 'Type-P-Round-Trip-Delay', then this object should contain the value, e.g.,
'http://www.ietf.org/rfc/rfc2681.txt'.
 ::= { tpmMetricDefEntry 5 }

tpmMetricDefGlobalID OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains a reference to the Object ID in a metrics registration MIB being developed in the IPPM WG at the IETF, e.g., the IPPM-REGISTRY-MIB [[RFCXXX3](#)], which defines the metric. In the event that this metric has no corresponding OID or until the IPPM-REGISTRY-MIB is defined, then the value should be set to 0.0 for none."

::= { tpmMetricDefEntry 6 }

--

-- The tpmAggregateReportsGroup

--

tpmAggrReportCntrlTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmAggrReportCntrlEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The tpmAggrReportCntrlTable is the controlling entry to manage the population of studies in the Transport Aggregate Report for selected interfaces, metrics and transaction protocols and applications.

Note that this is not like the typical RMON controlTable and dataTable in which each entry creates its own data table. Each entry in this table enables the creation of multiple data tables on a study basis. For each interval, the study is updated in place and the current data content of the table becomes invalid.

The control table entries are persistent across system reboots."

::= { tpmReports 1 }

tpmAggrReportCntrlEntry OBJECT-TYPE

SYNTAX TpmAggrReportCntrlEntry

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MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A conceptual row in the tpmAggrReportCntrlTable.

An example of the indexing of this entry is

tpmAggrReportCntrlDataSource.1"

INDEX { tpmAggrReportCntrlIndex }

::= { tpmAggrReportCntrlTable 1 }

```
TpmAggrReportCntrlEntry ::= SEQUENCE {
    tpmAggrReportCntrlIndex                Unsigned32,
    tpmAggrReportCntrlApmCntrlIndex        Unsigned32,
    tpmAggrReportCntrlDataSource           DataSourceOrZero,
    tpmAggrReportCntrlAggrType             TransactionAggregationType,
    tpmAggrReportCntrlInterval             Unsigned32,
    tpmAggrReportCntrlReqSize              Unsigned32,
    tpmAggrReportCntrlGrantedSize          Unsigned32,
    tpmAggrReportCntrlReqReports           Unsigned32,
    tpmAggrReportCntrlGrantedReports       Unsigned32,
    tpmAggrReportCntrlStartTime            TimeStamp,
    tpmAggrReportCntrlReportNumber         Unsigned32,
    tpmAggrReportCntrlInsertsDenied        Counter32,
    tpmAggrReportCntrlDroppedFrames        Counter32,
    tpmAggrReportCntrlOwner                OwnerString,
    tpmAggrReportCntrlStorageType          StorageType,
    tpmAggrReportCntrlStatus               RowStatus
}
```

tpmAggrReportCntrlIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index that uniquely identifies an entry in the tpmAggrReportCntrlTable. Each such entry defines a unique report whose results are placed in the tpmAggrReportTable on behalf of this tpmAggrReportCntrlEntry."

::= { tpmAggrReportCntrlEntry 1 }

tpmAggrReportCntrlApmCntrlIndex OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This index associates this TpmAggrReportCntrlEntry directly with an existing ApmReportControlEntry. This link is used

to synchronize reports in the associated tpmAggrReportTable.

A value of 0 (zero) enables an independent control table that will report entries to tpmAggrReportTable based only on the other objects in this table.

A non-zero value indicates that this row is defined through the APM-MIB. In this case, all row objects are set to their corresponding values in the APM-MIB. In the event that a SET is issued to a row object, while the value of the tpmAggrReportCntrlApmCntrlIndex is non-zero, the agent MUST respond as if the object of the SET command had MAX-ACCESS of read-only.

This object may not be modified if the associated tpmAggrReportCntrlStatus object is equal to active(1)."

DEFVAL { 0 }

::= { tpmAggrReportCntrlEntry 2 }

tpmAggrReportCntrlDataSource OBJECT-TYPE

SYNTAX DataSourceOrZero

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The source of the data for TPM Reports generated on behalf of this tpmAggrReportCntrlEntry.

If the measurement is being performed by a probe, this should be set to interface or port where data was received for analysis. If the measurement isn't being performed by a probe, this should be set to the primary interface over which the measurement is being performed. If the measurement isn't being performed by a probe and there is no primary interface or this information isn't known, this object should be set to 0.0.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object is set to the corresponding apmReportControlTable object in the APM-MIB [[RFC3729](#)].

This object may not be modified if the associated tpmAggrReportCntrlStatus object is equal to active(1)."
::= { tpmAggrReportCntrlEntry 3 }

tpmAggrReportCntrlAggrType OBJECT-TYPE
SYNTAX TransactionAggregationType
-- INTEGER {
-- flows(1),
-- clients(2),

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-- servers(3),
-- applications(4)
-- }
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The type of aggregation being performed for this set of reports.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlAggregationType object.

This object may not be modified if the associated tpmAggrReportCntrlStatus object is equal to active(1)."
::= { tpmAggrReportCntrlEntry 4 }

tpmAggrReportCntrlInterval OBJECT-TYPE

SYNTAX Unsigned32
UNITS "Seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"The interval in seconds over which data is accumulated before being aggregated into a report in the tpmAggrReportTable. All reports with the same tpmAggrReportCntrlIndex will be based on the same interval.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlControlInterval object.

This object may not be modified if the associated tpmReportAggregateCntrlStatus object is equal to active(1)."
DEFVAL { 3600 }
::= { tpmAggrReportCntrlEntry 5 }

tpmAggrReportCntrlReqSize OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"The maximum number of Client and Server combination entries requested for this report.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlRequestedSize object.

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When this object is created or modified, the probe should set tpmReportCntrlGrantedSize as closely to this object as is possible for the particular probe implementation and available resources.

It is important to note that this value is the number of requested entries in the tpmAggrReportTable only. Since the probe can derive this table from the apmReportTable, the probe must make sure that sufficient resources exist to support the creation of the apmReportTable plus any additional resources required to convert or support this table.

This object may not be modified if the associated tpmReportAggregateCntrlStatus object is equal to active(1)."
::= { tpmAggrReportCntrlEntry 6 }

tpmAggrReportCntrlGrantedSize OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The maximum number of performance entries in this report.

When the associated tpmAggrReportCntrlReqSize object is created or modified, the probe should set this object as closely to the requested value as is possible for the particular implementation and available resources. The probe must not lower this value except as a result of a set to the associated tpmAggrReportCntrlReqSize object.

It is an implementation-specific matter as to whether or not zero-valued entries are available."

::= { tpmAggrReportCntrlEntry 7 }

tpmAggrReportCntrlReqReports OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of saved reports requested to be allocated on behalf of this entry.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlcwRequestedReportsDataSource object.

This object may not be modified if the associated

tpmReportAggregateCntrlStatus object is equal to active(1)."
::= { tpmAggrReportCntrlEntry 8 }

tpmAggrReportCntrlGrantedReports OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of saved reports the agent has allocated based on the requested amount in tpmAggrReportCntrlReqReports. Since each report can have many entries, the total number of entries allocated will be this number multiplied by the value of tpmAggrReportCntrlGrantedSize, or 1 if that object doesn't exist.

When the associated tpmAggrReportCntrlReqReports object is created or modified, the agent should set this object as closely to the requested value as is possible for the particular implementation and available resources. When considering resources available, the agent must consider its ability to allocate this many reports each with the number of entries represented by tpmAggrReportCntrlGrantedSize, or 1 if that object doesn't exist.

Note that while the storage required for each report may fluctuate due to changing conditions, the agent must continue to have storage available to satisfy the full report size for all reports when necessary. Further, the agent must not lower this value except as a result of a set to the associated tpmAggrReportCntrlReqSize object."

```
::= { tpmAggrReportCntrlEntry 9 }
```

tpmAggrReportCntrlStartTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime when the system began processing the report in progress. Note that the report in progress is not available.

This object may be used by the management station to figure out the start time for all previous reports saved for this tpmAggrReportCntrlEntry, as reports are started at fixed intervals.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object is set to the corresponding

apmReportControlTable object in the APM-MIB defined in the IETF's RMONMIB WG."

```
::= { tpmAggrReportCntrlEntry 10 }
```

tpmAggrReportCntrlReportNumber OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of the report in progress. When an tpmAggrReportCntrlEntry is activated, the first report will be numbered zero.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlReportNumber object."

::= { tpmAggrReportCntrlEntry 11 }

tpmAggrReportCntrlInsertsDenied OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of failed attempts to add an entry to reports for this TpmAggrReportCntrlEntry because the number of entries would have exceeded tpmAggrReportCntrlGrantedSize.

This number is valuable in determining if enough entries have been allocated for reports in light of fluctuating network usage. Note that an entry that is denied will often be attempted again, this number will not predict the exact number of additional entries needed, but can be used to understand the relative magnitude of the problem.

Also note that there is no ordering specified for the entries in the report, thus there are no rules for which entries will be omitted when not enough entries are available. As a consequence, the agent is not required to delete 'least valuable' entries first."

::= { tpmAggrReportCntrlEntry 12 }

tpmAggrReportCntrlDroppedFrames OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of frames which were received by the agent and therefore not accounted for in the *StatsDropEvents, but

for which the agent chose not to count for this entry for whatever reason. Most often, this event occurs when the agent is out of some resources and decides to shed load from this collection.

This count does not include packets that were not counted because they had MAC-layer errors.

Note that if the alMatrixTables are not implemented or are inactive because no protocols are enabled in the protocol directory, this value should be 0.

Note that, unlike the dropEvents counter, this number is the exact number of frames dropped."

```
::= { tpmAggrReportCntrlEntry 13 }
```

tpmAggrReportCntrlOwner OBJECT-TYPE

SYNTAX OwnerString

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The entity that configured this entry and is therefore using the resources assigned to it.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlReportNumber object.

This object may not be modified if the associated tpmReportAggregateCntrlStatus object is equal to active(1)."

```
::= { tpmAggrReportCntrlEntry 14 }
```

tpmAggrReportCntrlStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type of this tpmAggrReportCntrlEntry. If the value of this object is 'permanent', no objects in this row need to be writable."

```
::= { tpmAggrReportCntrlEntry 15 }
```

tpmAggrReportCntrlStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

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"The status of this performance control entry.

An entry may not exist in the active state unless all objects in the entry have an appropriate value.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object should be set by the agent to the value of the apmReportControlReportNumber object.

Once this object is set to active(1), no objects in the tpmAggrReportCntrlTable can be changed.

If this object is not equal to active(1), all associated entries in the tpmAggrReportTable shall be deleted."

::= { tpmAggrReportCntrlEntry 16 }

--

-- Transport Aggregate Report Table

--

tpmAggrReportTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmAggrReportEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains transport performance metric studies for each of the control table entries in tpmAggrReportCntrlTable. These studies are provided based on the selections and parameters found for the entry in the tpmAggregateReportCntrlTable.

The performance statistics are specified in the tpmTransMetricDirTable associated with the application in question and indexed by appLocalIndex and tpmTransMetricIndex."

::= { tpmReports 2 }

tpmAggrReportEntry OBJECT-TYPE

SYNTAX TpmAggrReportEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A conceptual row in the tpmAggrReportTable.

The tpmAggrReportCntrlIndex value in the index identifies the tpmAggrReportCntrlEntry on whose behalf this entry was created.

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The tpmAggrReportIndex value in the index identifies which report (in the series of reports) this entry is a part of. The tpmAggrReportAppLocalIndex value in the index identifies the application protocol that is being reported.

The tpmTransMetricIndex value in the index identifies the transaction protocol-metric pair for the traffic flows aggregated in this entry.

The protocolDirLocalIndex value in the index identifies the network layer protocol of the tpmAggrReportServerAddress. When the associated tpmAggrReportCntrlAggrType value is equal to applications(4) or clients(2), this value will equal 0.

The tpmAggrReportServerAddress value in the index identifies the network layer address of the server in traffic flows aggregated in this entry.

The tpmAggrReportApmNameClientID value in the index identifies the client in traffic flows aggregated in this entry. If the associated tpmAggrReportCntrlAggrType is equal to applications(4) or servers(3), then this object will be set to 0.

An example of the indexing of this entry is

tpmAggrReportStatN.3.15.34.262.18.4.128.2.6.7.3256521"

```
INDEX { tpmAggrReportCntrlIndex,
        tpmAggrReportIndex,
        tpmAggrReportAppLocalIndex,      -- Application Layer
        tpmAggrReportTransMetricIndex,   -- Metric and Protocol
        protocolDirLocalIndex,            -- Network Layer
        tpmAggrReportServerAddress,
        tpmAggrReportApmNameClientID
      }
 ::= { tpmAggrReportTable 1 }
```

```
TpmAggrReportEntry ::= SEQUENCE {
    tpmAggrReportIndex                Unsigned32,
    tpmAggrReportAppLocalIndex        AppLocalIndex,
    tpmAggrReportTransMetricIndex     TpmTransactionMetricIndex,
```

tpmAggrReportServerAddress	OCTET STRING,
tpmAggrReportApmNameClientID	RmonClientID,
tpmAggrReportStatN	ZeroBasedCounter32,
tpmAggrReportOverflowStatN	ZeroBasedCounter32,
tpmAggrReportHCStatN	ZeroBasedCounter64,
tpmAggrReportStatSumX	ZeroBasedCounter32,
tpmAggrReportOverflowStatSumX	ZeroBasedCounter32,
tpmAggrReportHCStatSumX	ZeroBasedCounter64,
tpmAggrReportStatMaximum	ZeroBasedCounter32,
tpmAggrReportStatMinimum	ZeroBasedCounter32,
tpmAggrReportStatSumSq	ZeroBasedCounter32,
tpmAggrReportOverflowStatSumSq	ZeroBasedCounter32,

tpmAggrReportHCStatSumSq	ZeroBasedCounter64,
tpmAggrReportStatSumIX	ZeroBasedCounter32,
tpmAggrReportOverflowStatSumIX	ZeroBasedCounter32,
tpmAggrReportHCStatSumIX	ZeroBasedCounter64,
tpmAggrReportStatSumIXSq	ZeroBasedCounter32,
tpmAggrReportOverflowStatSumIXSq	ZeroBasedCounter32,
tpmAggrReportHCStatSumIXSq	ZeroBasedCounter64

}

tpmAggrReportIndex OBJECT-TYPE
 SYNTAX Unsigned32 (1..2147483647)
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "The value of tpmAggrReportCntrlNumber for the report to
 which this entry belongs."
 ::= { tpmAggrReportEntry 1 }

tpmAggrReportAppLocalIndex OBJECT-TYPE
 SYNTAX AppLocalIndex
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "The common application of the transactions aggregated
 in this entry."
 ::= { tpmAggrReportEntry 2 }

tpmAggrReportTransMetricIndex OBJECT-TYPE

SYNTAX TpmTransactionMetricIndex
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A unique index that identifies the transaction and
 metric associated with the statistics reported here."
 ::= { tpmAggrReportEntry 3 }

tpmAggrReportServerAddress OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..108))
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The network layer address of the server host in this
 conversation."

This is represented as an octet string with
specific semantics and length as identified
by the protocolDirLocalIndex component of the index.

Since this object is an index variable, it is encoded in
the index according to the index encoding rules. For
example, if the protocolDirLocalIndex indicates an
encapsulation of IPv4, this object is encoded as a length
octet of 4, followed by the 4 octets of the IPv4 address,
in network byte order.

If the associated tpmAggrReportCntrlAggrType is equal to
application(4) or client(2), then this object will be a null
string and will be encoded simply as a length octet of 0."

::= { tpmAggrReportEntry 4 }

tpmAggrReportApmNameClientID OBJECT-TYPE

SYNTAX RmonClientID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A unique ID assigned to the machine represented by this
 mapping. This ID is assigned by the agent using an
 implementation-specific algorithm."
 ::= { tpmAggrReportEntry 5 }

tpmAggrReportStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The count of the total number of data points for the specified metric. This number always represents the total size of the statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results for one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmAggrReportEntry 6 }

tpmAggrReportOverflowStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmAggrReportStatN counter has overflowed. Note that this object will only be instantiated if the associated tpmAggrReportHCStatN object is also instantiated for a particular dataSource."

::= { tpmAggrReportEntry 7 }

tpmAggrReportHCStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmAggrReportStatN. Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmAggrReportEntry 8 }

tpmAggrReportStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sum of all the data point values for the specified metric. This number always represents the total values of the statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmAggrReportEntry 9 }

tpmAggrReportOverflowStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmAggrReportStatSumX counter has overflowed. Note that this object will only be instantiated if the associated tpmAggrReportHCStatSumX object is also instantiated for a particular dataSource."

::= { tpmAggrReportEntry 10 }

tpmAggrReportHCStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmAggrReportStatSumX. Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmAggrReportEntry 11 }

tpmAggrReportStatMaximum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single maximum data point value observed during the study period for the specified metric. This number always represents the maximum value of any single statistical

datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmAggrReportEntry 12 }

tpmAggrReportStatMinimum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single minimum data point value observed during the study period for the specified metric. This number always represents the minimum value of any single statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmAggrReportEntry 13 }

tpmAggrReportStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sum of all the squared data point values for the specified metric. This number always represents the total of the squared values of the statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmAggrReportEntry 14 }

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated
tpmAggrReportStatSumSq counter has overflowed.
Note that this object will only be instantiated if
the associated tpmAggrReportHCStatSumSq object
is also instantiated for a particular dataSource."

::= { tpmAggrReportEntry 15 }

tpmAggrReportHCStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmAggrReportStatSumSq.
Note that this object will only be instantiated if the
agent supports High Capacity monitoring for a particular
dataSource."

::= { tpmAggrReportEntry 16 }

tpmAggrReportStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For each interval, each data point is associated with a
value I, $I = 1..N$ where N is the number of data points,
tpmAggrReportStatN. IX is the multiplication of the
data point value with the current I. This value
along with the other statistics values allow the
calculation of the slope of the least-squares line
through the data points."

::= { tpmAggrReportEntry 17 }

tpmAggrReportOverflowStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated
tpmAggrReportStatSumIX counter has overflowed.
Note that this object will only be instantiated if the
associated tpmAggrReportHCStatSumIX object is also
instantiated for a particular dataSource."

::= { tpmAggrReportEntry 18 }

tpmAggrReportHCStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmAggrReportStatSumIX.
Note that this object will only be instantiated if the
agent supports High Capacity monitoring for a particular
dataSource."

::= { tpmAggrReportEntry 19 }

tpmAggrReportStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For each interval, each data point is associated with a
value I, $I = 1..N$ where N is the number of data points,
tpmAggrReportStatN. IX is the multiplication
of the data point value with the current I.
This value along with the other statistics
values allow the calculation of the slope of
the least-squares line through the data points."

::= { tpmAggrReportEntry 20 }

tpmAggrReportOverflowStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated
tpmAggrReportStatSumIXSq counter has overflowed.
Note that this object will only be instantiated if the
associated tpmAggrReportHCStatSumIXSq object is also
instantiated for a particular dataSource."

::= { tpmAggrReportEntry 21 }

tpmAggrReportHCStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of
tpmAggrReportStatSumIXSq.
Note that this object will only be instantiated if the
agent supports High Capacity monitoring for a particular

```
        dataSource."
 ::= { tpmAggrReportEntry 22 }
```

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```
--
-- The tpmCurrentReportsGroup
--
```

tpmCurReportTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmCurReportEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table will contain entries associated with an apmReportControlEntry which are a current 'snapshot' of the metrics being collected in association with a set of TPM related application transactions. This table contains all sub-flow metrics for transactions that have been started but have not yet finished, i.e., current, and a history of those that have finished, i.e., completed. It may not always be obvious from the context whether a transaction is currently in-progress or has completed. Therefore, the completion status of a transaction is indicated by the value of the tpmCurReportCompletion object."

```
::= { tpmReports 3 }
```

tpmCurReportEntry OBJECT-TYPE

SYNTAX TpmCurReportEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A conceptual row in the tpmCurReportTable.

The tpmAggrReportControlIndex value in the index identifies the tpmAggrReportCntrlEntry on whose behalf this entry was created. The tpmCurReportAppLocalIndex value in the index identifies the application protocol that is begin reported. The protocolDirLocalIndex value in the index identifies the network layer protocol of the tpmAggrReportServerAddress. When the associated tpmAggrReportCntrlAggrType value is

equal to applications(4), this value will equal 0.
The tpmCurReportServerAddress value in the
index identifies the network layer address of the
server in traffic flows aggregated in this entry.
The tpmCurReportCurrentApmNameClientID value in the
index identifies the network layer address of the
client in traffic flows aggregated in this entry.
The tpmCurReportCurrentMetricIndex value in the
index identifies the transported application protocol

of the traffic flows aggregated in this entry.

Note that the order of protocolDirLocalIndex variables is
the opposite of that in the RMON2 MIB (application.network
instead of network.application) so that the report entries are
sorted by application first, server second and client third.
The tpmCurReportCntrlIndex value in the index identifies
the tpmAggrReportCntrlEntry on whose behalf this entry was
created. The tpmCurReportMetricIndex value in the index
identifies the metric and protocol of the
tpmCurReportServerAddress, via the tpmTransMetricDir
table.

An example of the indexing of this table is

```
tpmCurReportStatisticN.3.34.262.18.4.128.2.6.6.3256521.29667"
INDEX { tpmAggrReportCntrlIndex,
        tpmCurReportAppLocalIndex,           -- Application Layer
        tpmCurReportTransMetricIndex,       -- Metric and Protocol
        protocolDirLocalIndex,               -- Network Layer
        tpmCurReportServerAddress,
        tpmCurReportApmNameClientID,
        tpmCurReportApmTransactionID
      }
 ::= { tpmCurReportTable 1 }
```

```
TpmCurReportEntry ::= SEQUENCE {
  tpmCurReportAppLocalIndex      AppLocalIndex,
  tpmCurReportTransMetricIndex   TpmTransactionMetricIndex,
  tpmCurReportServerAddress      OCTET STRING,
  tpmCurReportApmNameClientID    RmonClientID,
  tpmCurReportApmTransactionID   Unsigned32,
  tpmCurReportMetricValue        ZeroBasedCounter32,
```

```

    tpmCurReportCompletion          INTEGER
}

tpmCurReportAppLocalIndex OBJECT-TYPE
    SYNTAX      AppLocalIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The common application of the transactions reported
        in this entry."
    ::= { tpmCurReportEntry 1 }

tpmCurReportTransMetricIndex OBJECT-TYPE
    SYNTAX      TpmTransactionMetricIndex
    MAX-ACCESS  not-accessible
    STATUS      current

```

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DESCRIPTION

"A unique index that identifies the transaction and metric associated with the statistics reported here."
 ::= { tpmCurReportEntry 2 }

```

tpmCurReportServerAddress OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..108))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The network server address for this tpmCurReportEntry.

        This is represented as an octet string with
        specific semantics and length as identified
        by the protocolDirLocalIndex component of the index.

        For example, if the protocolDirLocalIndex indicates an
        encapsulation of IPv4, this object is encoded as a length
        octet of 4, followed by the 4 octets of the IPv4 address,
        in network byte order."
    ::= { tpmCurReportEntry 3 }

tpmCurReportApmNameClientID OBJECT-TYPE
    SYNTAX      RmonClientID
    MAX-ACCESS  not-accessible

```

STATUS current

DESCRIPTION

"A unique ID assigned to the machine represented by this mapping. This ID is assigned by the agent using an implementation-specific algorithm."

::= { tpmCurReportEntry 4 }

tpmCurReportApmTransactionID OBJECT-TYPE

SYNTAX Unsigned32 (0..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A unique value for this transaction amongst other transactions sharing the same application, transaction-layer protocol and metric and server and client addresses. Implementations may choose to use the value of the client's source port, when possible.

If the tpmAggrReportCntrlApmCntrlIndex is non-zero, then this object is set to the corresponding apmTransactionID object in the APM-MIB developed in the IETF's RMONMIB WG."

::= { tpmCurReportEntry 5 }

tpmCurReportMetricValue OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current value of the metric being evaluated. For some transaction types this value may be 0, e.g., the current round trip time for a DNS query. For other transaction types this will represent the current value of a continuously measured metric, e.g., the current throughput of an FTP transaction."

::= { tpmCurReportEntry 6 }

tpmCurReportCompletion OBJECT-TYPE

SYNTAX INTEGER {
current(1),
completed(2)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The status of this transaction. It is not always obvious from context whether a transaction is on-going or completed. E.g., an ftp-GET transaction may last several minutes or hours and a value found in the tpmCurReportMetricValue object lists to observed throughput for the transaction up to this point in time. The value of the tpmCurReportCompletion indicates whether the transaction has completed."

::= { tpmCurReportEntry 7 }

tpmCurReportSize OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The maximum number of completed transactions desired to be retained in the tpmCurReportTable. If the agent doesn't have enough resources to retain this many, it will retain as many as possible. Regardless of this value, the agent must attempt to keep records for all current transactions it is monitoring.

The agent should consider this value to give a hint as to how many transactions to save. This is not a hard limit, just a hint to a maximum value of interest. If this value is reduced by the management station, the agent can take note, it may free some records, or it may do nothing.

The value of this object must persist across reboots."

::= { tpmReports 4 }

--

-- The tpmExceptionReportsGroup

--

tpmExcpReportTable OBJECT-TYPE

SYNTAX SEQUENCE OF TpmExcpReportEntry

MAX-ACCESS not-accessible


```

STATUS      current
DESCRIPTION
    "This table contains all sub-flow metrics for transactions
    that have been tagged by the apmExceptionTable filter
    as having had poor performance."
 ::= { tpmReports 5 }

```

tpmExcpReportEntry OBJECT-TYPE

```
SYNTAX      TpmExcpReportEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

"A conceptual row in the tpmExcpReportTable. This table contains aggregated information associated with exceptions counted in the apmExceptionTable. The information is aggregated in a manner identical to the aggregation in the tpmAggrReportTable, with the exception that data only from transactions associated with a flagged application is included.

The indexing into this table follows the indexing in the APM-MIB but adds the tpmTransMetricIndex to identify the sub-application transaction and metric pair."

```

INDEX { apmAppDirAppLocalIndex,      -- Application
        apmAppDirResponsivenessType, -- Responsiveness Type
        apmExceptionIndex,          -- Linkage to ApmExceptions
        tpmExcpReportTransMetricIndex -- Metric and Protocol
      }

```

```
 ::= { tpmExcpReportTable 1 }
```

TpmExcpReportEntry ::= SEQUENCE {

tpmExcpReportTransMetricIndex	TpmTransactionMetricIndex,
tpmExcpReportStatN	ZeroBasedCounter32,
tpmExcpReportOverflowStatN	ZeroBasedCounter32,
tpmExcpReportHCStatN	ZeroBasedCounter64,
tpmExcpReportStatSumX	ZeroBasedCounter32,
tpmExcpReportOverflowStatSumX	ZeroBasedCounter32,

tpmExcpReportHCStatSumX	ZeroBasedCounter64,
tpmExcpReportStatMaximum	ZeroBasedCounter32,
tpmExcpReportStatMinimum	ZeroBasedCounter32,
tpmExcpReportStatSumSq	ZeroBasedCounter32,

tpmExcpReportOverflowStatSumSq	ZeroBasedCounter32,
tpmExcpReportHCStatSumSq	ZeroBasedCounter64,
tpmExcpReportStatSumIX	ZeroBasedCounter32,
tpmExcpReportOverflowStatSumIX	ZeroBasedCounter32,
tpmExcpReportHCStatSumIX	ZeroBasedCounter64,
tpmExcpReportStatSumIXSq	ZeroBasedCounter32,
tpmExcpReportOverflowStatSumIXSq	ZeroBasedCounter32,
tpmExcpReportHCStatSumIXSq	ZeroBasedCounter64

}

tpmExcpReportTransMetricIndex OBJECT-TYPE

SYNTAX TpmTransactionMetricIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A unique index that identifies the transaction and metric associated with the data reported here."

::= { tpmExcpReportEntry 1 }

tpmExcpReportStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The count of the total number of data points for the specified metric. This number always represents the total size of the statistical datum analyzed. Each metric specifies the exact meaning of this object."

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmExcpReportEntry 2 }

tpmExcpReportOverflowStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmExcpReportStatN counter has overflowed. Note that this object will only be instantiated if the associated tpmExcpReportHCStatN object is also instantiated for a particular dataSource."

::= { tpmExcpReportEntry 3 }

tpmExcpReportHCStatN OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmExcpReportStatN.

Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmExcpReportEntry 4 }

tpmExcpReportStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sum of all the data point values for the specified metric. This number always represents the total values of the statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmExcpReportEntry 5 }

tpmExcpReportOverflowStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmExcpReportStatSumX counter has overflowed.

Note that this object will only be instantiated if the associated tpmExcpReportHCStatSumX object is also instantiated for a particular dataSource."

::= { tpmExcpReportEntry 6 }

tpmExcpReportHCStatSumX OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmExcpReportStatSumX.

Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmExcpReportEntry 7 }

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tpmExcpReportStatMaximum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single maximum data point value observed during the study period for the specified metric. This number always represents the maximum value of any single statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmExcpReportEntry 8 }

tpmExcpReportStatMinimum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single minimum data point value observed during the study period for the specified metric. This number always represents the minimum value of any single statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmExcpReportEntry 9 }

tpmExcpReportStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sum of all the squared data point values for the specified metric. This number always represents the total of the squared values of the statistical datum

analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

::= { tpmExcptReportEntry 10 }

tpmExcptReportOverflowStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmExcptReportStatSumSq counter has overflowed. Note that this object will only be instantiated if the associated tpmExcptReportHCStatSumSq object is also instantiated for a particular dataSource."

::= { tpmExcptReportEntry 11 }

tpmExcptReportHCStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmExcptReportStatSumSq. Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmExcptReportEntry 12 }

tpmExcptReportStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For each interval, each data point is associated with a value I, I = 1..N where N is the number of data points, tpmExcptReportStatSumIX is the multiplication of the data point value with the current I. This value along with

the other statistics values allow the calculation of the slope of the least-squares line through the data points."
 ::= { tpmExcpReportEntry 13 }

tpmExcpReportOverflowStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated tpmExcpReportStatSumIX counter has overflowed. Note that this object will only be instantiated if the associated tpmExcpReportHCStatSumIX object is also instantiated for a particular dataSource."

::= { tpmExcpReportEntry 14 }

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tpmExcpReportHCStatSumIX OBJECT-TYPE

SYNTAX ZeroBasedCounter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The high-capacity version of tpmExcpReportStatSumIX. Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

::= { tpmExcpReportEntry 15 }

tpmExcpReportStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For each interval, each data point is associated with a value I, I = 1..N where N is the number of data points, tpmExcpReportStatN. IX is the multiplication of the data point value with the current I. This value along with the other statistics values allow the calculation of the slope of the least-squares line through the data points."

::= { tpmExcpReportEntry 16 }

tpmExcpReportOverflowStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of times the associated
 tpmExcptReportStatSumIXSq counter has overflowed.
 Note that this object will only be instantiated if the
 associated tpmExcptReportHCStatSumIXSq object is also
 instantiated for a particular dataSource."
 ::= { tpmExcptReportEntry 17 }

tpmExcptReportHCStatSumIXSq OBJECT-TYPE

SYNTAX ZeroBasedCounter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The high-capacity version of
 tpmExcptReportStatSumIXSq.
 Note that this object will only be instantiated if the
 agent supports High Capacity monitoring for a particular
 dataSource."
 ::= { tpmExcptReportEntry 18 }

--
-- TPM Conformance
--

tpmMIBCompliances OBJECT IDENTIFIER ::= { tpmConformance 1 }
tpmGroups OBJECT IDENTIFIER ::= { tpmConformance 2 }

--
-- TPM Compliance Statement
--

tpmMIBCompliance MODULE-COMPLIANCE

STATUS current
DESCRIPTION
 "Describes the requirements for conformance to
 the TPM-MIB.

 This compliance statement defines the following
 TPM-MIB implementation:

- tpmCapabilitiesGroup (minimum)
- tpmAggregateReportsGroup (minimum)
- tpmCurrentReportsGroup (optional)
- tpmExceptionReportsGroup (optional).

In order to implement the (optional) tpmExceptionReportsGroup, it is necessary to implement pieces of the APM-MIB as described in the tpmApmMIBCompliance MODULE below. Further, in the event that the TPM-MIB be used to provide a drill-down capability, which is the true value of this MIB, then the tpmApmReportControlGroup must be implemented."

MODULE -- this module

MANDATORY-GROUPS

```
{ tpmCapabilitiesGroup,
  tpmAggregateReportsGroup }
```

GROUP tpmCurrentReportsGroup

DESCRIPTION

"The implementation of this group is optional."

GROUP tpmExceptionReportsGroup

DESCRIPTION

"The implementation of this group is optional. However, because the control for this reporting group resides with the APM-MIB module, the apmReportGroup

and the apmExceptionGroup must also be implemented."

```
::= { tpmMIBCompliances 1 }
```

--

-- tpmCurrentReportsGroup Compliance

--

tpmCurrentReportsCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION


```

        "This defines the Current Reports compliance.
        This is useful when information on in-progress
        and historical transaction-level data is
        desired."
MODULE -- this module

MANDATORY-GROUPS
    { tpmCapabilitiesGroup,
      tpmAggregateReportsGroup,
      tpmCurrentReportsGroup }

 ::= { tpmMIBCompliances 2 }

--
-- tpmExceptionReportsGroup Compliance
--
tpmExceptionReportsCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "This defines the Exception Reports compliance.
        This is useful when information on
        transactions whose performance is deemed
        out-of-bounds."

MODULE -- this module

MANDATORY-GROUPS
    { tpmCapabilitiesGroup,
      tpmAggregateReportsGroup,
      tpmExceptionReportsGroup }

MODULE APM-MIB

MANDATORY-GROUPS
    { apmReportGroup,

```

```

        apmExceptionGroup }

 ::= { tpmMIBCompliances 3 }

```

--
--
--

TPM-MIB Groups

tpmCapabilitiesGroup OBJECT-GROUP

OBJECTS { tpmClockResolution,
tpmClockMaxSkew,
tpmClockSource,
tpmTransMetricDirLastChange,
tpmTransMetricProtocolIndex,
tpmTransMetricMetricIndex,
tpmTransMetricDirConfig,
tpmMetricDefType,
tpmMetricDefDirType,
tpmMetricDefName,
tpmMetricDefReference,
tpmMetricDefGlobalID }

STATUS current

DESCRIPTION

"The tpmCapabilitiesGroup specify various capabilities
associated with the monitoring agent."

::= { tpmGroups 1 }

tpmAggregateReportsGroup OBJECT-GROUP

OBJECTS { tpmAggrReportCntrlApmCntrlIndex,
tpmAggrReportCntrlDataSource,
tpmAggrReportCntrlAggrType,
tpmAggrReportCntrlInterval,
tpmAggrReportCntrlReqSize,
tpmAggrReportCntrlGrantedSize,
tpmAggrReportCntrlReqReports,
tpmAggrReportCntrlGrantedReports,
tpmAggrReportCntrlStartTime,
tpmAggrReportCntrlReportNumber,
tpmAggrReportCntrlInsertsDenied,
tpmAggrReportCntrlDroppedFrames,
tpmAggrReportCntrlOwner,
tpmAggrReportCntrlStorageType,
tpmAggrReportCntrlStatus,
tpmAggrReportStatN,
tpmAggrReportOverflowStatN,

```

        tpmAggrReportHCStatN,
        tpmAggrReportStatSumX,
        tpmAggrReportOverflowStatSumX,
        tpmAggrReportHCStatSumX,
        tpmAggrReportStatMaximum,
        tpmAggrReportStatMinimum,
        tpmAggrReportStatSumSq,
        tpmAggrReportOverflowStatSumSq,
        tpmAggrReportHCStatSumSq,
        tpmAggrReportStatSumIX,
        tpmAggrReportOverflowStatSumIX,
        tpmAggrReportHCStatSumIX,
        tpmAggrReportStatSumIXSq,
        tpmAggrReportOverflowStatSumIXSq,
        tpmAggrReportHCStatSumIXSq }
STATUS    current
DESCRIPTION
    "The tpmAggregateReportsGroup provides control
    and reporting of aggregate measurement
    statistics."
::= { tpmGroups 2 }

```

```

tpmCurrentReportsGroup  OBJECT-GROUP
    OBJECTS { tpmCurReportMetricValue,
               tpmCurReportCompletion,
               tpmCurReportSize }
STATUS    current
DESCRIPTION
    "The tpmCurrentReportsGroup contains metric
    information relating to on-going measurements
    as well as historical values."
::= { tpmGroups 3 }

```

```

tpmExceptionReportsGroup  OBJECT-GROUP
    OBJECTS { tpmExcpReportStatN,
               tpmExcpReportOverflowStatN,
               tpmExcpReportHCStatN,
               tpmExcpReportStatSumX,
               tpmExcpReportOverflowStatSumX,
               tpmExcpReportHCStatSumX,
               tpmExcpReportStatMaximum,
               tpmExcpReportStatMinimum,
               tpmExcpReportStatSumSq,
               tpmExcpReportOverflowStatSumSq,
               tpmExcpReportHCStatSumSq,
               tpmExcpReportStatSumIX,

```

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```
    tpmExcpReportOverflowStatSumIX,  
    tpmExcpReportHCStatSumIX,  
    tpmExcpReportStatSumIXSq,  
    tpmExcpReportOverflowStatSumIXSq,  
    tpmExcpReportHCStatSumIXSq }
```

STATUS current

DESCRIPTION

"The tpmExceptionReportsGroup reports
sub-application level statistics associated
with errant applications."

::= { tpmGroups 4 }

END

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[6.](#) Intellectual Property

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[7.](#) Acknowledgements

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8. Normative References

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10. Security Considerations

This MIB relates to a system which provides a passive monitoring capability of a broadcast subnet, a switched subnet or point-to-point subnets. As such, it collects information relating to network layer addresses, traffic statistics relating to conversations and to application-level activities. These statistics could be deemed sensitive in certain networking environments.

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:

- + The tpmTransMetricDirConfig object describes and configures the probe's support for a given performance metric in relationship to a specified transaction and application. The agent creates entries in this table for all metric and transaction combinations that it can generate and this object controls the on/off switch for this capability. If certain statistics for a supported transaction are deemed sensitive, then access to SET operations on this object should be protected.
- + The tpmAggrReportCntrlDataSource sets the interface on which the network addresses, conversational and application-level statistics will be collected.
- + The tpmAggrReportCntrlAggrType object controls the level of data aggregation implemented in the report tables. For example, this object could be set to allow client-level information to be exposed.

In order to implement this MIB module, an agent must make certain management information available about protocols and network addresses used within a managed system, which may be considered sensitive in some network environments. Therefore 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:

- + The tpmAggrReportTable contains the statistical studies which

the probe was configured to generate. These tables contain the historical, aggregated data providing information on the network address and traffic statistics related to their conversations.

- + The tpmCurReportTable contains information on current transaction flows. This table provides a view of the current activity on a subnet or a client machine.

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.

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*****
* Note to the RFC Editor (to be removed prior to publication) *
*
* 1) The reference to RFCXXX 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-rmonmib-sspm-mib-12.txt>. This *
* MIB module imports TCs from this draft. Once the SSPM MIB *
* draft is published as an RFC, then the RFCXXX2 references *
* need to be replaced with the SSPM MIB RFC number. *
*
* 3) The reference to RFCXXX3 throughout this document point *
* to the current <draft-ietf-ippm-metrics-registry-06.txt>. *
* This MIB module can reference OIDs from this draft. Once *
* published as an RFC, then the RFCXXX3 references *
* need to be replaced with the IPPM Metric Registry RFC *
* number. *
*
*****
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