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Definitions of Managed Objects for IP Traffic Flow Security
draft-fedyk-ipsecme-mib-iptfs-00

Abstract

This document describes managed objects for the the management of IP Traffic Flow Security additions to IKEv2 and IPsec. This document provides a read only version of the objects defined in the YANG module for the same purpose.

This is an unpublished work in progress.

Status of This Memo

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[1.](#) Introduction

This document defines a Management Information Base (MIB) module for use with network management protocols in the Internet community. Traffic Flow Security (IP-TFS) extensions as defined in [\[I-D.ietf-ipsecme-iptfs\]](#). IP-TFS provides enhancements to an IPsec tunnel Security Association to provide improved traffic confidentiality.

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of \[RFC3410\]](#).

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, [\[RFC2578\]](#), STD 58, [\[RFC2579\]](#) and STD 58, [\[RFC2580\]](#).

The objects defined here are the same as [\[I-D.draft-fedyk-ipsecme-yang-iptfs\]](#) with the exception that only operational data is supported. This module uses the YANG model as a reference point for managed objects. Note an IETF MIB model for IPsec was never standardized however the structures here could be adapted to existing MIB implementations.

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[2.](#) Terminology & Concepts

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [\[RFC2119\]](#) [\[RFC8174\]](#) when, and only when, they appear in all capitals, as shown here.

[3.](#) Overview

This document defines configuration and operational parameters of IP traffic flow security (IP-TFS). IP-TFS, defined in [\[I-D.ietf-ipsecme-iptfs\]](#), configures a security association for tunnel mode IPsec with characteristics that improve traffic confidentiality and reduce bandwidth efficiency loss.

This document is based on the concepts and management model defined in [\[I-D.draft-fedyk-ipsecme-yang-iptfs\]](#). This document assumes familiarity with IP security concepts described in [\[RFC4301\]](#), IP-TFS as described in [\[I-D.ietf-ipsecme-iptfs\]](#) and the IP-TFS management model described in [\[I-D.draft-fedyk-ipsecme-yang-iptfs\]](#).

This document specifies an extensible operational model for IP-TFS. It reuses the management model defined in [\[I-D.draft-fedyk-ipsecme-yang-iptfs\]](#).

[4.](#) Management Objects

[4.1.](#) MIB Tree

The following is the MIB registration tree diagram for the IP-TFS extensions.

```
# IETF-IPTFS-MIB registration tree (generated by smidump 0.5.0)
```

```
---- iptfsMIB(1.3.6.1.3.500)
```

```

+---- iptfsMIBObjects(1)
| +---- iptfsGroup(1)
| | +---- iptfsConfigTable(1)
| | | +---- iptfsConfigTableEntry(1) [iptfsConfigSaIndex]
| | | +---- iptfsConfigSaIndex(1) Integer32
| | | +--r- congestionControl(2) TruthValue
| | | +--r- usePathMtu(3) TruthValue
| | | +--r- outerPacketSize(4) UnsignedShort
| | | +--r- l2FixedRate(5) Counter64
| | | +--r- l3FixedRate(6) Counter64
| | | +--r- dontFragment(7) TruthValue
| | | +--r- maxAggregationTime(8) NanoSeconds

```

```

| +---- ipsecStatsGroup(2)
| | +---- ipsecStatsTable(1)
| | | +---- ipsecStatsTableEntry(1) [ipsecSaIndex]
| | | +---- ipsecSaIndex(1) Integer32
| | | +--r- txPackets(2) Counter64
| | | +--r- txOctets(3) Counter64
| | | +--r- txDropPackets(4) Counter64
| | | +--r- rxPackets(5) Counter64
| | | +--r- rxOctets(6) Counter64
| | | +--r- rxDropPackets(7) Counter64
| +---- iptfsInnerStatsGroup(3)
| | +---- iptfsInnerStatsTable(1)
| | | +---- iptfsInnerStatsTableEntry(1) [iptfsInnerSaIndex]
| | | +---- iptfsInnerSaIndex(1) Integer32
| | | +--r- txInnerPackets(2) Counter64
| | | +--r- txInnerOctets(3) Counter64
| | | +--r- rxInnerPackets(4) Counter64
| | | +--r- rxInnerOctets(5) Counter64
| | | +--r- rxIncompleteInnerPackets(6) Counter64
| +---- iptfsOuterStatsGroup(4)
| | +---- iptfsOuterStatsTable(1)
| | | +---- iptfsOuterStatsTableEntry(1) [iptfsSaIndex]
| | | +---- iptfsSaIndex(1) Integer32
| | | +--r- txExtraPadPackets(2) Counter64
| | | +--r- txExtraPadOctets(3) Counter64
| | | +--r- txAllPadPackets(4) Counter64
| | | +--r- txAllPadOctets(5) Counter64
| | | +--r- rxExtraPadPackets(6) Counter64
| | | +--r- rxExtraPadOctets(7) Counter64

```

```

|           +--r- rxAllPadPackets(8)   Counter64
|           +--r- rxAllPadOctets(9)   Counter64
|           +--r- rxErroredPackets(10) Counter64
|           +--r- rxMissedPackets(11) Counter64
+----- iptfsMIBConformance(2)
  +----- iptfsMIBConformances(1)
    | +----- iptfsMIBCompliance(1)
    +----- iptfsMIBGroups(2)
      +----- iptfsMIBConfGroup(1)
      +----- ipsecStatsConfGroup(2)
      +----- iptfsInnerStatsConfGroup(3)
      +----- iptfsOuterStatsConfGroup(4)

```

[4.2.](#) SNMP

The following is the MIB for IP-TFS.

```

-- *-----
-- *

```

```

-- *-----

```

IETF-IPTFS-MIB DEFINITIONS ::= BEGIN

IMPORTS

```

    MODULE-IDENTITY, OBJECT-TYPE,
    Integer32, Unsigned32, Counter64, experimental
    FROM SNMPv2-SMI
    MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
    TEXTUAL-CONVENTION,
    TruthValue
    FROM SNMPv2-TC;

```

iptfsMIB MODULE-IDENTITY

```

    LAST-UPDATED "202011130000Z"
    ORGANIZATION "IETF IPsecme Working Group"
    CONTACT-INFO
    "

```

```

        Author: Don Fedyk
                <mailto:dfedyk@labn.net>

```

```

        Author: Christian Hopps

```

<mailto:chopps@chopps.org>"

DESCRIPTION

"This module defines the configuration and operational state for managing the IP Traffic Flow Security functionality [RFC XXXX]. Copyright (c) 2020 IETF Trust and the persons identified as authors of the code. All rights reserved.

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This version of this SNMP MIB module is part of RFC XXXX (<https://tools.ietf.org/html/rfcXXXX>); see the RFC itself for full legal notices."

REVISION "202011130000Z"

DESCRIPTION

"Initial revision. Derived from the IPTFS Yang Model."
 ::= { experimental 500 }

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--
-- Textual Conventions
--

UnsignedShort ::= TEXTUAL-CONVENTION
 DISPLAY-HINT "d"
 STATUS current
 DESCRIPTION "xs:unsignedShort"
 SYNTAX Unsigned32 (0 .. 65535)

NanoSeconds ::= TEXTUAL-CONVENTION
 DISPLAY-HINT "d"
 STATUS current
 DESCRIPTION

"Represents time unit value in nanoseconds."
SYNTAX Counter64

-- Objects, Notifications & Conformances

iptfsMIBObjects OBJECT IDENTIFIER
 ::= { iptfsMIB 1 }
iptfsMIBConformance OBJECT IDENTIFIER
 ::= { iptfsMIB 2 }

--

-- IPTFS MIB Object Groups

--

iptfsGroup OBJECT IDENTIFIER
 ::= { iptfsMIBObjects 1 }

ipsecStatsGroup OBJECT IDENTIFIER
 ::= { iptfsMIBObjects 2 }

iptfsInnerStatsGroup OBJECT IDENTIFIER
 ::= { iptfsMIBObjects 3 }

iptfsOuterStatsGroup OBJECT IDENTIFIER
 ::= { iptfsMIBObjects 4 }

iptfsConfigTable OBJECT-TYPE
 SYNTAX SEQUENCE OF IptfsConfigTableEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "The table containing configuration information for
 IPTFS."

::= { iptfsGroup 1 }

iptfsConfigTableEntry OBJECT-TYPE
 SYNTAX IptfsConfigTableEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "An entry (conceptual row) containing the information on

```

    a particular IPTFS SA."
INDEX      { iptfsConfigSaIndex }
 ::= { iptfsConfigTable 1 }

IptfsConfigTableEntry ::= SEQUENCE {
    iptfsConfigSaIndex      Integer32,

-- identifier information
    congestionControl      TruthValue,
    usePathMtu             TruthValue,
    outerPacketSize        UnsignedShort,
    l2FixedRate            Counter64,
    l3FixedRate            Counter64,
    dontFragment           TruthValue,
    maxAggregationTime     NanoSeconds
}

iptfsConfigSaIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..16777215)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A unique value, greater than zero, for each SA.
        It is recommended that values are assigned contiguously
        starting from 1.

        The value for each entry must remain constant at least
        from one re-initialization of entity's network management
        system to the next re-initialization."
    ::= { iptfsConfigTableEntry 1 }

congestionControl OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Congestion Control With the congestion controlled
        mode, IP-TFS adapts to network congestion by lowering
        the packet send rate to accommodate the congestion, as
        well as raising the rate when congestion subsides."

```

```
::= { iptfsConfigTableEntry 2 }
```

usePathMtu OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Packet size is either auto-discovered or manually configured. If usePathMtu is true the system utilizes path-mtu to determine maximum IPTFS packet size. If the packet size is explicitly configured then it will only be adjusted downward if use-path-mtu is set."

```
::= { iptfsConfigTableEntry 3 }
```

outerPacketSize OBJECT-TYPE

SYNTAX UnsignedShort

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The size of the outer encapsulating tunnel packet (i.e., the IP packet containing the ESP payload)."

```
::= { iptfsConfigTableEntry 4 }
```

l2FixedRate OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"TFS bit rate may be specified at layer 2 wire rate. Target bandwidth/bit rate in bps for iptfs tunnel. This rate is the nominal timing for the fixed size packet. If congestion control is enabled the rate may be adjusted down (or up if unset)."

```
::= { iptfsConfigTableEntry 5 }
```

l3FixedRate OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"TFS bit rate may be specified at layer 3 packet rate. Target bandwidth/bit rate in bps for iptfs tunnel. this rate is the nominal timing for the fixed size packet. If congestion control is enabled the rate may be adjusted down (or up if unset)."

```
::= { iptfsConfigTableEntry 6 }
```

```
dontFragment OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Disable packet fragmentation across consecutive iptfs
        tunnel packets when set to true."
    ::= { iptfsConfigTableEntry 7 }

maxAggregationTime OBJECT-TYPE
    SYNTAX      NanoSeconds
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Maximum Aggregation Time in nanoseconds."
    ::= { iptfsConfigTableEntry 8 }

ipsecStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IpsecStatsTableEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table containing basic statistics on IPsec."
    ::= { ipsecStatsGroup 1 }

ipsecStatsTableEntry OBJECT-TYPE
    SYNTAX      IpsecStatsTableEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry (conceptual row) containing the information on
        a particular IKE SA."
    INDEX      { ipsecSaIndex }
    ::= { ipsecStatsTable 1 }

IpsecStatsTableEntry ::= SEQUENCE {
    ipsecSaIndex          Integer32,
-- packet statistics information
    txPackets            Counter64,
    txOctets             Counter64,
    txDropPackets       Counter64,
    rxPackets            Counter64,
    rxOctets             Counter64,
    rxDropPackets       Counter64
}
```

ipsecSaIndex OBJECT-TYPE

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SYNTAX Integer32 (1..16777215)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A unique value, greater than zero, for each SA.

It is recommended that values are assigned contiguously starting from 1.

The value for each entry must remain constant at least from one re-initialization of entity's network management system to the next re-initialization."

::= { ipsecStatsTableEntry 1 }

txPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Outbound Packet count."

::= { ipsecStatsTableEntry 2 }

txOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Outbound Packet bytes."

::= { ipsecStatsTableEntry 3 }

txDropPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Outbound dropped packets count."

::= { ipsecStatsTableEntry 4 }

rxPackets OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Inbound Packet count."
::= { ipsecStatsTableEntry 5 }

rxOctets OBJECT-TYPE
SYNTAX Counter64

MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Inbound Packet bytes."
::= { ipsecStatsTableEntry 6 }

rxDropPackets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Inbound Dropped packets"
::= { ipsecStatsTableEntry 7 }

iptfsInnerStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF IptfsInnerSaEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The table containing information on IPTFS
Inner Packets."
::= { iptfsInnerStatsGroup 1 }

iptfsInnerStatsTableEntry OBJECT-TYPE
SYNTAX IptfsInnerSaEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry containing the information on
a particular tfs SA."
INDEX { iptfsInnerSaIndex }
::= { iptfsInnerStatsTable 1 }

```

IptfsInnerSaEntry ::= SEQUENCE {
  iptfsInnerSaIndex      Integer32,

  txInnerPackets         Counter64,
  txInnerOctets          Counter64,
  rxInnerPackets         Counter64,
  rxInnerOctets          Counter64,
  rxIncompleteInnerPackets Counter64
}

```

```

iptfsInnerSaIndex OBJECT-TYPE
  SYNTAX      Integer32 (1..16777215)
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION

```

"A unique value, greater than zero, for each SA.
It is recommended that values are assigned contiguously
starting from 1.

The value for each entry must remain constant at least
from one re-initialization of entity's network management
system to the next re-initialization."

```
 ::= { iptfsInnerStatsTableEntry 1 }
```

```
txInnerPackets OBJECT-TYPE
```

```

  SYNTAX      Counter64
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION

```

"Total number of IP-TFS inner packets sent. This count
is whole packets only. A fragmented packet counts as
one packet."

```
 ::= { iptfsInnerStatsTableEntry 2 }
```

```
txInnerOctets OBJECT-TYPE
```

```

  SYNTAX      Counter64
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION

```

"Total number of IP-TFS inner octets sent. This is

inner packet octets only. Does not count padding."
 ::= { iptfsInnerStatsTableEntry 3 }

rxInnerPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Total number of IP-TFS inner packets received."

::= { iptfsInnerStatsTableEntry 4 }

rxInnerOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Total number of IP-TFS inner octets received. Does not include padding or overhead."

::= { iptfsInnerStatsTableEntry 5 }

rxIncompleteInnerPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Total number of IP-TFS inner packets that were incomplete. Usually this is due to fragments not received. Also, this may be due to misordering or errors in received outer packets."

::= { iptfsInnerStatsTableEntry 6 }

iptfsOuterStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF IptfsOuterSaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table containing information on IPTFS."

::= { iptfsOuterStatsGroup 1 }

iptfsOuterStatsTableEntry OBJECT-TYPE

SYNTAX IptfsOuterSaEntry

```

MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "An entry containing the information on
    a particular tfs SA."
INDEX { iptfsSaIndex }
 ::= { iptfsOuterStatsTable 1 }

IptfsOuterSaEntry ::= SEQUENCE {
iptfsSaIndex Integer32,

-- iptfs packet statistics information
txExtraPadPackets Counter64,
txExtraPadOctets Counter64,
txAllPadPackets Counter64,
txAllPadOctets Counter64,
rxExtraPadPackets Counter64,
rxExtraPadOctets Counter64,
rxAllPadPackets Counter64,
rxAllPadOctets Counter64,
rxErroredPackets Counter64,
rxMissedPackets Counter64
}

```

```

iptfsSaIndex OBJECT-TYPE
SYNTAX Integer32 (1..16777215)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

```

"A unique value, greater than zero, for each SA.
It is recommended that values are assigned contiguously
starting from 1.

The value for each entry must remain constant at least
from one re-initialization of entity's network management
system to the next re-initialization."

```
 ::= { iptfsOuterStatsTableEntry 1 }
```

```

txExtraPadPackets OBJECT-TYPE
SYNTAX Counter64

```

MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of transmitted outer IP-TFS packets that
included some padding."
::= { iptfsOuterStatsTableEntry 2 }

txExtraPadOctets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of transmitted octets of padding added to
outer IP-TFS packets with data."
::= { iptfsOuterStatsTableEntry 3 }

txAllPadPackets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of transmitted IP-TFS packets that were
all padding with no inner packet data."
::= { iptfsOuterStatsTableEntry 4 }

txAllPadOctets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number transmitted octets of padding added to
IP-TFS packets with no inner packet data."
::= { iptfsOuterStatsTableEntry 5 }

rxExtraPadPackets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only

STATUS current
DESCRIPTION
"Total number of received outer IP-TFS packets that
included some padding."

```

 ::= { iptfsOuterStatsTableEntry 6 }

rxExtraPadOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of received octets of padding added to
        outer IP-TFS packets with data."
    ::= { iptfsOuterStatsTableEntry 7 }

rxAllPadPackets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of received IP-TFS packets that were all
        padding with no inner packet data."
    ::= { iptfsOuterStatsTableEntry 8 }

rxAllPadOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number received octets of padding added to
        IP-TFS packets with no inner packet data."
    ::= { iptfsOuterStatsTableEntry 9 }

rxErroredPackets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of IP-TFS outer packets dropped due to
        errors."
    ::= { iptfsOuterStatsTableEntry 10 }

rxMissedPackets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Total number of IP-TFS outer packets missing indicated

```

```
        by missing sequence number."
 ::= { iptfsOuterStatsTableEntry 11 }

--
-- Iptfs Module Compliance
--

iptfsMIBConformances OBJECT IDENTIFIER
    ::= { iptfsMIBConformance 1 }

iptfsMIBGroups OBJECT IDENTIFIER
    ::= { iptfsMIBConformance 2 }

iptfsMIBCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for entities which implement
        the IPTFS MIB"
    MODULE -- this module
        MANDATORY-GROUPS {
            iptfsMIBConfGroup,
            ipsecStatsConfGroup,
            iptfsInnerStatsConfGroup,
            iptfsOuterStatsConfGroup
        }

    ::= { iptfsMIBConformances 1 }

--
-- MIB Groups (Units of Conformance)
--

iptfsMIBConfGroup OBJECT-GROUP
    OBJECTS {
        congestionControl,
        usePathMtu,
        outerPacketSize ,
        l2FixedRate ,
        l3FixedRate ,
        dontFragment,
        maxAggregationTime
    }
    STATUS current
    DESCRIPTION
        "A collection of objects providing per SA IPTFS
        Configuration."
    ::= { iptfsMIBGroups 1 }
```

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```
ipsecStatsConfGroup OBJECT-GROUP
  OBJECTS {
    txPackets,
    txOctets,
    txDropPackets,
    rxPackets,
    rxOctets,
    rxDropPackets
  }
  STATUS current
  DESCRIPTION
    "A collection of objects providing per SA Basic
    Stats."
  ::= { iptfsMIBGroups 2 }
```

```
iptfsInnerStatsConfGroup OBJECT-GROUP
  OBJECTS {
    txInnerPackets,
    txInnerOctets,
    rxInnerPackets,
    rxInnerOctets,
    rxIncompleteInnerPackets
  }
  STATUS current
  DESCRIPTION
    "A collection of objects providing per SA IPTFS
    Inner Packet Statistics."
  ::= { iptfsMIBGroups 3 }
```

```
iptfsOuterStatsConfGroup OBJECT-GROUP
  OBJECTS {
    txExtraPadPackets,
    txExtraPadOctets,
    txAllPadPackets,
    txAllPadOctets,
    rxExtraPadPackets,
    rxExtraPadOctets,
    rxAllPadPackets,
    rxAllPadOctets,
```

```
        rxErroredPackets,
        rxMissedPackets
    }
    STATUS current
    DESCRIPTION
        "A collection of objects providing per SA IPTFS
        Outer Packet Statistics."
    ::= { iptfsMIBGroups 4 }
```

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END

[5.](#) Security Considerations

The MIB specified in this document can enable, disable and modify the behavior of IP traffic flow security, for the implications regarding these types of changes consult the [[I-D.ietf-ipsecme-iptfs](#)] which defines the functionality.

[6.](#) Acknowledgements

The authors would like to thank Eric Kinzie for his help and feedback on the MIB model.

[7.](#) Normative References

[I-D.[draft-fedyk-ipsecme-yang-iptfs](#)]

Fedyk, D. and C. Hopps, "IP Traffic Flow Security YANG Module", [draft-fedyk-ipsecme-yang-iptfs-01](#) (work in progress), November 2020.

[I-D.[ietf-ipsecme-iptfs](#)]

Hopps, C., "IP-TFS: IP Traffic Flow Security Using Aggregation and Fragmentation", [draft-ietf-ipsecme-iptfs-06](#) (work in progress), January 2021.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.

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