

Network Working Group  
Request for Comments: 3571  
Category: Informational

D. Rawlins  
MCI  
A. Kulkarni  
Intel  
K. Chan  
Nortel Networks  
M. Bokaemper  
Juniper Networks  
D. Dutt  
Cisco  
August 2003

## **Framework Policy Information Base for Usage Feedback**

### Status of this Memo

This memo provides information for the Internet community. It does not specify an Internet standard of any kind. Distribution of this memo is unlimited.

### Copyright Notice

Copyright (C) The Internet Society (2003). All Rights Reserved.

### Abstract

This document describes a portion of the Policy Information Base (PIB) to control policy usage collection and reporting in a device.

The provisioning classes specified here allow a Policy Decision Point (PDP) to select which policy objects should collect usage information, what information should be collected and when it should be reported.

This PIB requires the presence of other PIBs (defined elsewhere) that provide the policy objects from which usage information is collected.

## Table of Contents

<a href="#">1.</a>	<a href="#">Introduction . . . . .</a>	<a href="#">2</a>
<a href="#">2.</a>	<a href="#">General Concepts . . . . .</a>	<a href="#">3</a>
<a href="#">2.1.</a>	<a href="#">Selection, Usage and Linkage Policies. . . . .</a>	<a href="#">3</a>
<a href="#">2.2.</a>	<a href="#">Normal Operations. . . . .</a>	<a href="#">4</a>
2.2.1.	Connection Establishment and Initial Configuration Request. . . . .	<a href="#">4</a>
<a href="#">2.2.2.</a>	<a href="#">Unsolicited Reports - Periodic Reporting . . . .</a>	<a href="#">5</a>
<a href="#">2.2.3.</a>	<a href="#">Unsolicited Reports - Reporting Conditions . . .</a>	<a href="#">5</a>
<a href="#">2.2.4.</a>	<a href="#">Solicited Reports. . . . .</a>	<a href="#">6</a>
2.2.5.	Resuming and Suspending Periodic Feedback Reporting. . . . .	<a href="#">6</a>
<a href="#">2.2.6.</a>	<a href="#">Failover . . . . .</a>	<a href="#">6</a>
<a href="#">2.3.</a>	<a href="#">Usage Policy and Under-specified Selection Criteria. . .</a>	<a href="#">7</a>
<a href="#">3.</a>	<a href="#">Summary of the Feedback Framework Policy Information Base. . .</a>	<a href="#">8</a>
<a href="#">3.1.</a>	<a href="#">SPPI ACCESS Clause Report-Only . . . . .</a>	<a href="#">8</a>
<a href="#">3.2.</a>	<a href="#">Usage32 and Usage64 Textual Conventions. . . . .</a>	<a href="#">8</a>
<a href="#">3.3.</a>	<a href="#">Feedback Groups and PRCs . . . . .</a>	<a href="#">9</a>
<a href="#">3.3.1.</a>	<a href="#">Feedback Action. . . . .</a>	<a href="#">9</a>
<a href="#">3.3.2.</a>	<a href="#">Feedback Action List . . . . .</a>	<a href="#">10</a>
<a href="#">3.3.3.</a>	<a href="#">Feedback Linkage Capability. . . . .</a>	<a href="#">10</a>
<a href="#">3.3.4.</a>	<a href="#">Feedback Linkage . . . . .</a>	<a href="#">10</a>
<a href="#">3.3.5.</a>	<a href="#">Feedback Traffic Statistics Threshold. . . . .</a>	<a href="#">10</a>
<a href="#">3.3.6.</a>	<a href="#">Feedback Traffic . . . . .</a>	<a href="#">10</a>
<a href="#">3.3.7.</a>	<a href="#">Feedback Interface Traffic . . . . .</a>	<a href="#">11</a>
<a href="#">3.3.8.</a>	<a href="#">Feedback RoleCombo Filter Selection. . . . .</a>	<a href="#">11</a>
<a href="#">4.</a>	<a href="#">The Feedback Framework PIB Module. . . . .</a>	<a href="#">11</a>
<a href="#">5.</a>	<a href="#">Security Considerations. . . . .</a>	<a href="#">31</a>
<a href="#">6.</a>	<a href="#">IANA Considerations. . . . .</a>	<a href="#">32</a>
<a href="#">7.</a>	<a href="#">Acknowledgements . . . . .</a>	<a href="#">32</a>
<a href="#">8.</a>	<a href="#">References . . . . .</a>	<a href="#">32</a>
<a href="#">8.1.</a>	<a href="#">Normative References . . . . .</a>	<a href="#">32</a>
<a href="#">8.2.</a>	<a href="#">Informational References . . . . .</a>	<a href="#">33</a>
<a href="#">9.</a>	<a href="#">Authors' Addresses . . . . .</a>	<a href="#">34</a>
<a href="#">10.</a>	<a href="#">Full Copyright Statement . . . . .</a>	<a href="#">35</a>

## [1.](#) Introduction

The Framework of Common Open Policy Service with Policy Provisioning (COPS-PR) Usage Feedback describes the overall approach to policy usage monitoring and reporting. This document defines the specific Policy Information Base (PIB) framework for policy usage feedback. The policy classes for monitoring and reporting policy usage feedback, as well as policy classes for controlling reporting intervals, suspension, resumption and solicitation are defined.



## Conventions Used in this Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

## **2. General Concepts**

### **2.1. Selection, Usage and Linkage Policies**

There are three basic types of policies used to define what the PEP is to monitor, record and report. These are the selection criteria policy, the usage policy and the feedback report linkage policy.

The selection criteria policy is installed by the PDP. It defines the conditions used by the PEP to monitor and record a usage policy. The selection criteria policy may only be used for defining usage feedback selection criteria. However, a more general case is a policy that already exists for policy enforcement that may also be used for specifying feedback usage selection criteria. An example of this is the frwkRoleCombo instance, which may be used in defining QoS enforcement policies, but may also be used to specify conditions on which to base usage - i.e. count the number of packets meeting the criterion of an interface capability set name and role combination.

The usage policy defines what attributes are recorded by the PEP. These policies have an ACCESS clause of 'report-only'. Generally, the usage policies specify counts related to a specific action such as a packet being dropped. The feedback framework PIB defines two usage policy classes, frwkFeedbackTraffic and frwkFeedbackIfTraffic. Usage PRCs may be generic, collecting basic statistics, or they may be specific to a particular usage. The PDP decides which PRC(s) best suit(s) its requirements. The PEP may support only one usage feedback PRC, in which case all statistics are gathered using instances of that PRC. Alternatively, the PEP may support multiple usage feedback PRCs. The PDP then decides which PRC to associate with a particular selection criterion.

A usage feedback policy and selection policy are tightly associated with one another. A third policy, the frwkFeedbackLinkTable, is used to associate, or provide a linkage for the selection and usage policies. The frwkFeedbackLinkTable also specifies when to report the usage feedback. The frwkFeedbackLinkTable entry permits the same selection criteria instance to be re-used for various usage feedback policies. The frwkFeedbackLinkTable contains the value of the selection criteria instance as well as the value of the usage feedback PRC.



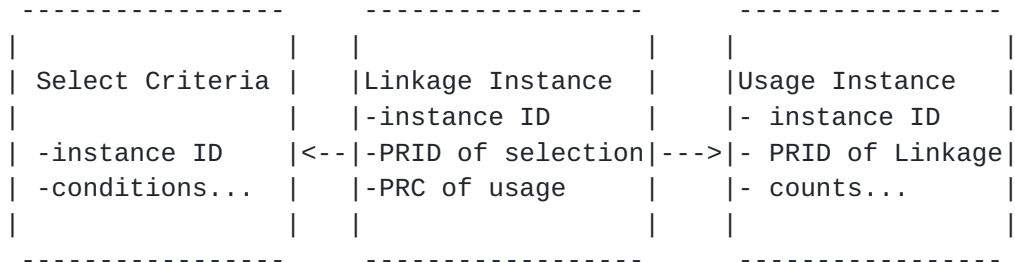


Figure 1

Figure 1 illustrates the relationship between the selection criteria, linkage and usage policies.

The PDP is not aware of the instance identifier of the usage feedback policy when installing the selection criteria and feedback linkage policies. The usage feedback policy is instantiated on the PEP by the installation of a feedback report linkage and the PEP designates the instance identifier. The usage feedback policy class always contains an attribute of type `ReferenceId` that contains the instance value of the associated `frwkFeedbackLinkTable` instance installed by the PDP. An example of this is the attribute `frwkFeedbackTrafficLinkRef`.

## 2.2. Normal Operations

### 2.2.1. Connection Establishment and Initial Configuration Request

The Accounting Timer object in the COPS Connection Accept message contains the minimum number of seconds between reporting intervals as described in [COPS] and [FEEDBACKFWK]. This is used as the basic unit of measurement in defining intervals for specific usage policies with the `frwkFeedbackLinkInterval` attribute.

The PEP notifies the PDP of the selection criteria policy classes and usage policy classes it supports during the initial request for configuration data using `frwkPRCSupport` instances [FR-PIB]. The PEP also indicates whether it supports the `frwkFeedbackLinkTable` as well.

The PDP responds to the initial request for configuration with a DECISION that installs policies. The PDP may also specify maximum reporting intervals associated with each of the usage policies. This is done with the `frwkFeedbackLinkInterval` attribute in the `frwkFeedbackLink` class. It may also specify reporting thresholds by including an instance of a threshold class (e.g. `frwkFeedbackTrafficThreshold`) in the decision. The PEP monitors and records the usage per the conditions defined by its associated selection criteria policy. Periodically the PEP reports the usage



with a REPORT message or provides a REPORT when solicited by the PDP. The PDP solicits usage feedback with the `frwkFeedbackActionIndicator` attribute of the `frwkFeedbackAction` class.

#### **2.2.2. Unsolicited Reports - Periodic Reporting**

Reporting may be periodic in nature and unsolicited. The intervals at which the unsolicited reports are provided by the PEP are defined in the specific Linkage policies. The defined intervals are based on the number of seconds specified by the PDP in the ACCT Timer value. The PDP may specify that the associated usage instance be included in a periodic unsolicited report only if the threshold is reached and/or if the usage value has changed from the previous reporting interval.

There are cases when the PEP must supply unsolicited feedback reports that may not fall on an interval boundary. The PEP MUST provide an unsolicited REPORT containing all defined usage instances just prior to the PEP issuing a Delete Request State and just prior to the PEP de-activating a PIB instance context.

#### **2.2.3. Unsolicited Reports - Reporting Conditions**

Periodic unsolicited reports for individual usage feedback instances can be suppressed by specifying additional conditions in the `frwkFeedbackLink` instances. Supported conditions are:

##### **ChangeOnly**

If this flag is set in the `frwkFeedbackLinkFlags` attribute, the associated usage instance is only included in a periodic unsolicited report if its value changed since the last unsolicited report.

##### **Threshold**

If this flag is set in the `frwkFeedbackLinkFlags` attribute, the associated usage instance is only included in a periodic unsolicited report if the threshold condition referenced in the `frwkLinkThreshold` field evaluates successfully for the associated usage instance.

Both conditions can be combined in one `frwkFeedbackLinkUsage` object. In this case, both conditions need to succeed for the usage instance to be reported.

Unsolicited reports triggered by a Delete Request State or the deactivation of a PIB instance are not subject to these conditions - all usage objects must be included in these cases.





#### **2.2.4. Solicited Reports**

The PDP may solicit policy usage feedback by issuing an unsolicited Decision containing the `frwkFeedbackActionIndicator` set to ``solicitReport'`. The PEP is to provide a solicited REPORT feedback containing usage feedback. The PEP shall continue to provide periodic feedback at the specified intervals established at client connection acceptance.

The reporting conditions (`ChangeOnly` and `Threshold`) do not affect solicited reports - all requested usage instances must be included.

#### **2.2.5. Resuming and Suspending Periodic Feedback Reporting**

The PDP may suspend usage monitoring and tracking at the PEP with the `frwkFeedbackActionIndicator` set to `'suspendMonitoringAndReports'`. The PEP must stop tracking usage information and must not issue any feedback reports. The PDP may only suspend feedback reporting by setting the `ActionIndicator` to `'suspendReports'`. The PEP must cease sending unsolicited reports but is to continue monitoring and tracking usage. The PDP may resume the sending of feedback reports and may resume usage monitoring by setting the `ActionIndicator` to `'resume'`.

The PDP may suspend or resume all usage instances or the PDP may specify one or more instances that are to be suspended or resumed. The `frwkFeedbackActionList` attribute contains a tag identifier that references a list of one or more `frwkFeedbackActionList` instances.

The PDP may halt usage monitoring, tracking and reporting of usage policies by removing the associated Linkage entry.

#### **2.2.6. Failover**

In the event that the connection is lost between the PEP and PDP, the PEP continues to track usage information as long as it continues to operate with the installed policy. When the locally installed policy at the PEP expires, the usage policy data also expires.

Upon successful reconnection where the PEP is still caching policy, the PDP indicates to the PEP that the PEP may resume sending of the COPS accounting type report messages. The PDP does this by issuing an unsolicited decision containing the `frwkFeedbackResumeIndicator` set to `'resume'`. The PEP should resume reporting at the next appropriate feedback interval established upon the acceptance of the re-connection. The PDP is aware of the request state `Handle(s)` and



the supported PRCs either through the state synchronization mechanism or because the PDP considers itself synchronized with the PEP upon reconnection.

### **2.3. Usage Policy and Under-specified Selection Criteria**

Some of the usage policy objects created in the PEP with COPS-PR can be used by the PEP multiple times - they effectively act as templates for the objects created by the PEP. COPS-PR only has the identity (OID) of the object that is shared between all the assignments the PEP created. However it is desirable to collect usage information for each of the derived objects individually.

This capability is achieved in the feedback framework PIB by distributing additional information to qualify a specific assignment of an object between the selection criteria PRC and the feedback usage PRC.

A selection criteria PRC that refers to a shared object, but contains no qualifying information, selects all of the object's assignments. Such a selection criteria PRC SHOULD be combined with a feedback usage PRC that includes all the necessary information to identify a specific assignment - a single selection criteria policy can then result in the generation of many feedback usage objects, one for each derived object.

If the selection criteria PRC contains all the required qualifying attributes for a specific assignment, it is combined with a feedback usage PRC that only contains the desired metrics but no additional attributes.

Example:

A `frwkRoleCombo` instance may be used as a selection criteria, identifying a set of interfaces through their role combination and capability set. If it is desired to get per-interface traffic statistics, the usage PRC has to include an additional attribute to qualify the specific interface.

This could be achieved by linking the `frwkFeedbackIfTraffic` class with a `frwkRoleCombo` instance in a `frwkFeedbackLink` instance. Multiple `frwkFeedbackIfTraffic` instances will be created by the PEP, one for each interface selected by the `frwkRoleCombo` instance. The `frwkFeedbackIfTraffic` class contains the `frwkFeedbackIfTrafficIfIndex` attribute that allows the PDP to identify each interface's individual counters when the PEP reports the `frwkFeedbackIfTraffic` instances.



If traffic usage collection is only desired for an individual interface, a selection criteria should be used that qualifies the interface completely, for example a `frwkIfRoleCombo` instance. In this case, it can be linked to the usage class that has no additional qualifying attributes, `frwkFeedbackTraffic`.

### **3. Summary of the Feedback Framework Policy Information Base**

#### **3.1. SPPI ACCESS Clause Report-Only**

The selection criteria and linkage policy classes follow the definitions specified by [SPPI]. This structure specifies well-defined policy classes and their instances residing in a common, virtual repository [[FR-PIB](#)]. The additional PIB-ACCESS clause attribute of "report-only" denotes the usage policy class reported by the PEP.

#### **3.2. Usage32 and Usage64 Textual Conventions**

The SPPI does not support the Counter32/64 textual conventions (TC) of SNMP - for feedback collection two similar textual conventions have been defined in this PIB: Usage32 and Usage64.

In addition to the differential functionality of 'Counter', where only the difference between two samples generally carries information, a single value of a 'Usage' attribute usually provides absolute information, since

- its initial value is known (0)
- no wrap-around events should occur
- the time or event when the initial value was set should be available directly or indirectly from other objects.

When 'Usage' attributes are defined in a PRC, events that could cause a reset of the attribute to its initial value should be defined in the description as well as the mechanism that allows the PDP to detect the time of the last reset.

No usual COPS activity however should cause the reset of a Usage attribute. In the case of a suspension of monitoring activity (`frwkFeedbackActionIndicator` set to 'suspendMonitoringAndReports'), 'Usage' attributes should keep their values and continue counting after monitoring is resumed.



### **3.3. Feedback Groups and PRCs**

These policy classes defined in this PIB are common to account type reporting for various technologies and apply to ALL SUBJECT-CATEGORIES. The policy classes are divided into three new groups, namely, The Feedback Report Group, The Feedback Usage Group and The Feedback Selection Group.

The policy classes in the Feedback Report Group are:

- Feedback Action
- Feedback Action List
- Feedback Selection Usage Combination Capability
- Feedback Linkage
- Feedback Traffic Statistics Threshold

The policy classes in the Feedback Usage Group are:

- Feedback Traffic
- Feedback Interface Traffic

The policy class in the Feedback Selection Group is:

- Feedback RoleCombo Filter Selection

#### **3.3.1. Feedback Action**

The Feedback Action class contains the attributes that specify action that the PEP is to take regarding policy usage, monitoring and tracking. The PDP may suspend usage monitoring and periodic reporting, suspend periodic reporting only, resume usage and periodic reporting or solicit immediate reporting. The action may affect all feedback policies or be associated with one or more frwkFeedbackLink instances.

The frwkFeedbackActionIndicator attribute defines the action. The frwkFeedbackActionPri attribute indicates whether the action applies to all of the usage policies or to a list. The frwkFeedbackActionList attribute is the identifier of the list of Linkage policy instances to which the action is to be applied.

The PDP can solicit the PEP for immediate usage feedback. The PEP shall respond with a solicited report containing the usage feedback.

The PDP can direct the resumption of usage monitoring and reporting per the defined intervals. For example, the PEP may have re-connected to a PDP and has cached usage policies. The PDP indicates to the PEP to resume usage tracking and monitoring and to send all





the cached usage policy. The PEP shall respond at the next appropriate interval with an unsolicited report containing the usage feedback.

The PDP can suspend the monitoring of usage policy. The PEP maintains the current usage that has been monitored, but discontinues any further monitoring until the PDP directs the PEP to resume monitoring in a subsequent Decision.

The PDP can also suspend just the reporting of usage, but not interrupt the monitoring and tracking of usage. The PEP shall discontinue sending Report messages with usage feedback until the PDP directs the PEP to resume. The PEP then begins reporting the usage feedback at the next interval.

#### **3.3.2. Feedback Action List**

This class defines sets of linkage instances that can be referred to from the frwkFeedbackActionList attribute.

#### **3.3.3. Feedback Linkage Capability**

This class defines the valid selection criteria PRC, usage PRC and threshold PRC combinations supported by the PEP.

#### **3.3.4. Feedback Linkage**

This class links the selection criteria instance with the usage class. This table permits the reuse of a selection criteria instance for multiple usage policies.

The linkage table also permits the definition of a maximum reporting interval to use when issuing the COPS accounting type reports for the usage instance. A value of 0 in this attribute indicates that the usage policy must be solicited.

#### **3.3.5. Feedback Traffic Statistics Threshold**

This class is used to provide threshold values for the attributes described in the traffic usage classes below.

#### **3.3.6. Feedback Traffic**

This class includes the packet counts, byte counts and a reference to the associated Linkage instance.



### **3.3.7. Feedback Interface Traffic**

This class is similar to the previous Feedback Traffic class, except that it includes an additional reference to an interface index. This class should be used with a selection criteria instance that matches an element that is assigned to multiple interfaces. The interface field can be used to associate the instances of this table with the specific element's assignment.

### **3.3.8. Feedback RoleCombo Filter Selection**

This class is used as selection criteria based on role combination, capability set and a filter instance.

## **4. The Feedback Framework PIB Module**

```
FRAMEWORK-FEEDBACK-PIB PIB-DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    pib, Unsigned32, Unsigned64, Integer32,
    MODULE-IDENTITY, OBJECT-TYPE, MODULE-COMPLIANCE, OBJECT-GROUP
        FROM COPS-PR-SPPI
    TruthValue, TEXTUAL-CONVENTION
        FROM SNMPv2-TC
    InstanceId, ReferenceId, Prid,
    TagId, TagReferenceId
        FROM COPS-PR-SPPI-TC
    PrcIdentifierOid, PrcIdentifierOidOrZero
        FROM FRAMEWORK-TC-PIB
    frwkRoleComboEntry
        FROM FRAMEWORK-PIB
    InterfaceIndex
        FROM IF-MIB;
```

```
frwkFeedbackPib MODULE-IDENTITY
    SUBJECT-CATEGORIES { all }
    LAST-UPDATED "200307140000Z" -- 14 July 2003
    ORGANIZATION "IETF RAP WG"
    CONTACT-INFO "IETF RAP WG
        Email: rap@ops.ietf.org
```

```
        Diana Rawlins
        MCI
        400 International Parkway
        Richardson, Texas 75081
        Phone: 972-729-4071
        Email: Diana.Rawlins@mci.com
```



Amol Kulkarni  
JF3-206  
2111 NE 25th Ave  
Hillsboro, Oregon 97124  
Phone: 503-712-1168  
Email: amol.kulkarni@intel.com

Kwok Ho Chan  
Nortel Networks  
600 Technology Park Drive  
Billerica, MA 01821 USA  
Phone: 978-288-8175  
Email: khchan@nortelnetworks.com

Martin Bokaemper  
Juniper Networks  
700 Silver Seven Road  
Kanata, ON, K2V 1C3, Canada  
Phone: 613-591-2735  
Email: mbokaemper@juniper.net

Dinesh G Dutt  
Cisco Systems, Inc.  
170 Tasman Dr.  
San Jose, CA 95134-1706  
Phone: 408-527-0955  
Email: ddutt@cisco.com"

#### DESCRIPTION

"The PIB module containing the base set of policy rule classes that are required for support of all policy usage monitoring, tracking and reporting policies.

Copyright (C) The Internet Society (2003). This version of this PIB module is part of [RFC 3571](#); see the RFC itself for full legal notices."

REVISION "200307140000Z"

#### DESCRIPTION

"Initial version, published in [RFC 3571](#)."

::= { pib 5 }

--

-- Textual Conventions

--

Usage32 ::= TEXTUAL-CONVENTION

STATUS current



## DESCRIPTION

"The Usage32 type represents a non-negative integer which monotonically increases.

Usage32 initial value is 0 and the object-type using Usage32 needs to specify when it is initialized.

The Usage32 type is intended to reflect the absolute number of counted events, so that even a new PDP after a COPS reconnect can use the value directly.

If there is the possibility that the maximum Usage32 value of  $2^{32}-1$  is exceeded during the lifetime of the Usage32 object, the larger Usage64 type should be used.

If conditions other than the reset of the COPS subsystem exist that disrupt the monotonic characteristics of Usage32, these conditions and a method how to detect their presence should be specified in the description of the object-type using Usage32 or its enclosing object-types (e.g. the Entry or Table object-type of the Usage32 object-type).

Whenever the monotonic increase of Usage32 is violated, it should be reset to 0 and the fact that this occurred should be indicated through an appropriate mechanism, for example a corresponding object of type TimeStamp or TimeAndDate."

## SYNTAX Unsigned32

Usage64 ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"The Usage64 type represents a non-negative integer which monotonically increases.

Usage64 initial value is 0 and the object-type using Usage64 needs to specify when it is initialized.

The Usage64 type is intended to reflect the absolute number of counted events, so that even a new PDP after a COPS reconnect can use the value directly.

The lifetime of the Usage64 object should be defined in a way that ensures the maximum Usage64 value of  $2^{64}-1$  is never exceeded.

If conditions other than the reset of the COPS





subsystem exist that disrupt the monotonic characteristics of Usage64, these conditions and a method how to detect their presence should be specified in the description of the object-type using Usage64 or its enclosing object-types (e.g. the Entry or Table object-type of the Usage64 object-type).

Whenever the monotonic increase of Usage64 is violated, it should be reset to 0 and the fact that this occurred should be indicated through an appropriate mechanism, for example a corresponding object of type TimeStamp or TimeAndDate."

SYNTAX Unsigned64

--

-- The feedback report group

--

frwkFeedbackGroupClasses

OBJECT IDENTIFIER ::= { frwkFeedbackPib 1 }

--

-- Feedback Action Table

--

frwkFeedbackActionTable OBJECT-TYPE

SYNTAX SEQUENCE OF FrwkFeedbackActionEntry

PIB-ACCESS install

STATUS current

DESCRIPTION

"This class represents commands that the PDP sends to suspend, resume or solicit collection or reporting of usage data."

::= { frwkFeedbackGroupClasses 1}

frwkFeedbackActionEntry OBJECT-TYPE

SYNTAX FrwkFeedbackActionEntry

STATUS current

DESCRIPTION

"Each frwkFeedbackActionEntry represents a command from the PDP. FrwkFeedbackActionIndicator specifies the command itself while frwkFeedbackActionSpecificPri indicates if all frwkFeedbackLink objects in the system are affected by the command, or just the set that is referenced by frwkFeedbackActionList."



```
PIB-INDEX { frwkFeedbackActionId}

::= { frwkFeedbackActionTable 1}

FrwkFeedbackActionEntry ::= SEQUENCE {
    frwkFeedbackActionId          InstanceId,
    frwkFeedbackActionIndicator   INTEGER,
    frwkFeedbackActionSpecificPri TruthValue,
    frwkFeedbackActionList        TagReferenceId
}

frwkFeedbackActionId OBJECT-TYPE
    SYNTAX      InstanceId
    STATUS      current
    DESCRIPTION
        "An arbitrary integer index that uniquely identifies an
        instance of the frwkFeedbackAction class."

    ::= { frwkFeedbackActionEntry 1}

frwkFeedbackActionIndicator OBJECT-TYPE
    SYNTAX  INTEGER {
        suspendMonitoringAndReports(1),
        suspendReports(2),
        resume(3),
        solicitReport(4)
    }
    STATUS  current
    DESCRIPTION
        "The value indicates if the PEP is to send cached
        usage policies via COPS accounting type report
        messages.
        The enumeration values are:
        (1) suspendMonitoringAndReports
        (2) suspendReports
        (3) resume
        (4) solicitReport "

    ::= { frwkFeedbackActionEntry 2 }

frwkFeedbackActionSpecificPri OBJECT-TYPE
    SYNTAX      TruthValue
    STATUS      current
    DESCRIPTION
        "A value of 0 indicates that the
        frwkFeedbackActionList attribute should be ignored,
        and the action applied to all policies. A value of
        1 indicates that the action entry has a specific
```



```

        list of policies to which it is to be applied."
 ::= { frwkFeedbackActionEntry 3}

frwkFeedbackActionList OBJECT-TYPE
    SYNTAX          TagReferenceId
    PIB-TAG          { frwkFeedbackActionListTag }
    STATUS           current
    DESCRIPTION
        "Identifies a group of frwkFeedbackLink instances
         that this action should affect. The group is
         identified through a tag reference in the
         frwkFeedbackList class."
 ::= { frwkFeedbackActionEntry 4}

--
-- Feedback Action List Table
--

frwkFeedbackActionListTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF FrwkFeedbackActionListEntry
    PIB-ACCESS       install
    STATUS           current
    DESCRIPTION
        "This class defines groups of linkage instances.
         Groups can be referenced by commands sent by the
         PDP in a frwkFeedbackActionEntry -in this case the
         command affects all linkage instances that are part
         of the group.
         A group can be referred to by its tag stored in
         frwkFeedbackActionListTag."
 ::= { frwkFeedbackGroupClasses 2}

frwkFeedbackActionListEntry OBJECT-TYPE
    SYNTAX          FrwkFeedbackActionListEntry
    STATUS           current
    DESCRIPTION
        "Each instance associates a linkage instance with a
         specific ActionListGroup."

    PIB-INDEX {frwkFeedbackActionListId }
    UNIQUENESS { frwkFeedbackActionListTag,
                  frwkFeedbackActionListRefID
                }
 ::= { frwkFeedbackActionListTable 1}

FrwkFeedbackActionListEntry ::= SEQUENCE {
    frwkFeedbackActionListId      InstanceId,
    frwkFeedbackActionListTag     TagId,
```



```

        frwkFeedbackActionListRefID      ReferenceId
    }

frwkFeedbackActionListId OBJECT-TYPE
    SYNTAX      InstanceId
    STATUS      current
    DESCRIPTION
        "Arbitrary integer index that uniquely
        identifies an instance of the class."

    ::= { frwkFeedbackActionListEntry 1 }

frwkFeedbackActionListTag OBJECT-TYPE
    SYNTAX      TagId
    STATUS      current
    DESCRIPTION
        "Identifies a group of linkage instances that can
        be referenced from the Action class."

    ::= { frwkFeedbackActionListEntry 2 }

frwkFeedbackActionListRefID  OBJECT-TYPE
    SYNTAX      ReferenceId
    PIB-REFERENCES { frwkFeedbackLinkEntry }
    STATUS      current
    DESCRIPTION
        "A frwkFeedbackLink instance that is referred to
        by this ReferenceId becomes part of the group,
        that is identified by the
        frwkFeedbackActionListTag."

    ::= { frwkFeedbackActionListEntry 3 }

--
-- The Feedback Link Capability Table
--

frwkFeedbackLinkCapsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF FrwkFeedbackLinkCapsEntry
    PIB-ACCESS   notify
    STATUS      current
    DESCRIPTION
        "Instances of the frwkFeedbackLink class reference
        instances of selection and threshold classes and a
        usage class.
        This class allows the PEP to communicate valid
        combinations of these three classes to the PDP."
    ::= { frwkFeedbackGroupClasses 3}

```





**frwkFeedbackLinkCapsEntry OBJECT-TYPE**

SYNTAX FrwkFeedbackLinkCapsEntry

STATUS current

## DESCRIPTION

"The attributes of this class identify valid combinations of selection criteria, usage and threshold classes for feedback."

PIB-INDEX { frwkFeedbackLinkCapsId }

UNIQUENESS {

frwkFeedbackLinkCapsSelection,

frwkFeedbackLinkCapsUsage,

frwkFeedbackLinkCapsThreshold

}

::= {frwkFeedbackLinkCapsTable 1}

FrwkFeedbackLinkCapsEntry ::= SEQUENCE {

frwkFeedbackLinkCapsId InstanceId,

frwkFeedbackLinkCapsSelection PrcIdentifierOid,

frwkFeedbackLinkCapsUsage PrcIdentifierOid,

frwkFeedbackLinkCapsThreshold PrcIdentifierOidOrZero

}

**frwkFeedbackLinkCapsId OBJECT-TYPE**

SYNTAX InstanceId

STATUS current

## DESCRIPTION

"An arbitrary integer index that uniquely identifies an instance of the frwkFeedbackLinkCaps class."

::= { frwkFeedbackLinkCapsEntry 1}

**frwkFeedbackLinkCapsSelection OBJECT-TYPE**

SYNTAX PrcIdentifierOid

STATUS current

## DESCRIPTION

"The identifier of a class that is supported by the device for feedback selection in combination with the usage and threshold classes referenced in this instance."

::= { frwkFeedbackLinkCapsEntry 2}

**frwkFeedbackLinkCapsUsage OBJECT-TYPE**

SYNTAX PrcIdentifierOid

STATUS current

## DESCRIPTION

"The identifier of the usage class that is supported by the PEP in combination with the selection and threshold classes referenced in this instance."



```
 ::= { frwkFeedbackLinkCapsEntry 3}
```

```
frwkFeedbackLinkCapsThreshold OBJECT-TYPE
```

```
    SYNTAX          PrcIdentifierOidOrZero
```

```
    STATUS          current
```

```
    DESCRIPTION
```

```
        "The identifier of the threshold class that is
        supported by the PEP in combination with the selection
        and usage classes referenced in this instance.
        0.0 is used if this combination does not allow a
        threshold."
```

```
 ::= { frwkFeedbackLinkCapsEntry 4}
```

```
--
```

```
-- The Feedback Report Linkage Table
```

```
--
```

```
frwkFeedbackLinkTable OBJECT-TYPE
```

```
    SYNTAX          SEQUENCE OF FrwkFeedbackLinkEntry
```

```
    PIB-ACCESS      install
```

```
    STATUS          current
```

```
    DESCRIPTION
```

```
        "This class associates the selection criteria with the
        usage policy. It also permits the defining of the max
        interval used for reporting the usage instance."
```

```
 ::= { frwkFeedbackGroupClasses 4}
```

```
frwkFeedbackLinkEntry OBJECT-TYPE
```

```
    SYNTAX          FrwkFeedbackLinkEntry
```

```
    STATUS          current
```

```
    DESCRIPTION
```

```
        "This class associates the selection criteria with the
        usage policy. It also permits the defining of the max
        interval used for reporting the usage instance."
```

```
    PIB-INDEX { frwkFeedbackLinkId }
```

```
    UNIQUENESS {frwkFeedbackLinkSel,
                frwkFeedbackLinkUsage }
```

```
 ::= {frwkFeedbackLinkTable 1}
```

```
FrwkFeedbackLinkEntry ::= SEQUENCE {
```

```
    frwkFeedbackLinkId      InstanceId,
```

```
    frwkFeedbackLinkSel      Prid,
```

```
    frwkFeedbackLinkUsage    PrcIdentifierOid,
```

```
    frwkFeedbackLinkInterval Integer32,
```

```
    frwkFeedbackLinkThreshold Prid,
```

```
    frwkFeedbackLinkFlags    BITS
```



```
}
```

```
frwkFeedbackLinkId OBJECT-TYPE
```

```
    SYNTAX      InstanceId
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "An arbitrary integer index that uniquely identifies an  
        instance of the frwkFeedbackLinkTable class."
```

```
    ::= { frwkFeedbackLinkEntry 1}
```

```
frwkFeedbackLinkSel OBJECT-TYPE
```

```
    SYNTAX      Prid
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The PRID of the Policy Class instance as the monitoring  
        point, or the PRID of the selection criteria instance that  
        defines the conditions for monitoring, to be use by the  
        PEP for usage reporting."
```

```
    ::= { frwkFeedbackLinkEntry 2}
```

```
frwkFeedbackLinkUsage OBJECT-TYPE
```

```
    SYNTAX      PrcIdentifierOid
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The identifier of the usage class that the PEP uses to  
        monitor, record and report."
```

```
    ::= { frwkFeedbackLinkEntry 3}
```

```
frwkFeedbackLinkInterval OBJECT-TYPE
```

```
    SYNTAX      Integer32
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "Maximum interval in units of the value of the  
        Accounting Timer specified by the PDP in the client  
        accept message. A frwkFeedbackLinkInterval of 1 is  
        equal to the value of the Accounting Timer. This value  
        must be 1 or greater. "
```

```
    ::= { frwkFeedbackLinkEntry 4}
```

```
frwkFeedbackLinkThreshold OBJECT-TYPE
```

```
    SYNTAX      Prid
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The PRID of a threshold class instance. This instance  
        specifies the threshold values for the usage policy."
```



```
::= { frwkFeedbackLinkEntry 5}
```

```
frwkFeedbackLinkFlags OBJECT-TYPE
```

```
SYNTAX BITS {
    periodic(0),
    threshold(1),
    changeOnly(2)
}
```

```
STATUS current
```

```
DESCRIPTION
```

"This value indicates the reporting basis of the usage policy. The feed back may be generated on demand, on a periodic basis regardless of a change in value from the previous report, on a periodic basis if a change in value has occurred, or the usage is reported when an identified threshold value in the usage instance has been reached.

If the 'periodic' flag is set, the PEP will provide unsolicited reports at the rate specified in frwkFeedbackLinkInterval.

If the 'periodic' flag is not set, reports will only be generated when solicited by the PDP.

The 'threshold' and 'changeOnly' flags make the periodic reports conditional - these flags only make sense in combination with the 'periodic' flag."

```
::= { frwkFeedbackLinkEntry 6}
```

```
--
```

```
-- The Threshold class that accompanies the above Usage PRCs
```

```
--
```

```
frwkFeedbackTrafficThresTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF FrwkFeedbackTrafficThresEntry
```

```
PIB-ACCESS install
```

```
STATUS current
```

```
DESCRIPTION
```

"This class defines the threshold attributes corresponding to usage attributes specified in frwkFeedbackTrafficTable, frwkFeedbackIfTrafficTable and other similar usage classes.

The usage object is considered to match the threshold condition if at least one of the packet or byte threshold conditions match.

The byte and packet thresholds are considered to match, if the threshold is present (not ASN1 NULL)





and the corresponding usage value exceeds the threshold."

::= { frwkFeedbackGroupClasses 5 }

frwkFeedbackTrafficThresEntry OBJECT-TYPE

SYNTAX FrwkFeedbackTrafficThresEntry

STATUS current

DESCRIPTION

"Defines the attributes to hold threshold values."

PIB-INDEX {frwkFeedbackTrafficThresId}

::= {frwkFeedbackTrafficThresTable 1}

FrwkFeedbackTrafficThresEntry ::= SEQUENCE {

frwkFeedbackTrafficThresId InstanceId,

frwkFeedbackTrafficThresPackets Unsigned64,

frwkFeedbackTrafficThresBytes Unsigned64

}

frwkFeedbackTrafficThresId OBJECT-TYPE

SYNTAX InstanceId

STATUS current

DESCRIPTION

"Arbitrary integer index that uniquely identifies an instance of the class."

::= { frwkFeedbackTrafficThresEntry 1 }

frwkFeedbackTrafficThresPackets OBJECT-TYPE

SYNTAX Unsigned64

STATUS current

DESCRIPTION

"The threshold, in terms of packets, that must be matched or exceeded to trigger a report in the next reporting interval."

::= { frwkFeedbackTrafficThresEntry 2 }

frwkFeedbackTrafficThresBytes OBJECT-TYPE

SYNTAX Unsigned64

STATUS current

DESCRIPTION

"The threshold, in terms of bytes, that must be exceeded to trigger a report in the next reporting interval."

::= { frwkFeedbackTrafficThresEntry 3 }

--



```
-- All actual usage classes are in the separate
-- frwkFeedbackUsageClasses group
--
```

```
frwkFeedbackUsageClasses
```

```
    OBJECT IDENTIFIER ::= { frwkFeedbackPib 2 }
```

```
--
-- The generic traffic (byte & packet count) usage class
--
```

```
frwkFeedbackTrafficTable OBJECT-TYPE
```

```
    SYNTAX          SEQUENCE OF FrwkFeedbackTrafficEntry
```

```
    PIB-ACCESS      report-only
```

```
    STATUS          current
```

```
    DESCRIPTION
```

```
        "This class defines the usage attributes that the PEP
        is to monitor for plain traffic handling elements
        like filters. All packets and the bytes contained in
        these packets are counted. It also contains the PRID
        of the linkage instance associating the selection
        criteria instance with the usage instance."
```

```
    ::= { frwkFeedbackUsageClasses 1 }
```

```
frwkFeedbackTrafficEntry OBJECT-TYPE
```

```
    SYNTAX          FrwkFeedbackTrafficEntry
```

```
    STATUS          current
```

```
    DESCRIPTION
```

```
        "Defines the attributes the PEP is to monitor,
        record and report."
```

```
    PIB-INDEX {frwkFeedbackTrafficId}
```

```
    UNIQUENESS { frwkFeedbackTrafficLinkRefID }
```

```
    ::= {frwkFeedbackTrafficTable 1}
```

```
FrwkFeedbackTrafficEntry ::= SEQUENCE {
```

```
    frwkFeedbackTrafficId      InstanceId,
    frwkFeedbackTrafficLinkRefID ReferenceId,
    frwkFeedbackTrafficPacketCount Usage64,
    frwkFeedbackTrafficByteCount Usage64
```

```
}
```

```
frwkFeedbackTrafficId OBJECT-TYPE
```

```
    SYNTAX          InstanceId
```

```
    STATUS          current
```



## DESCRIPTION

"Arbitrary integer index that uniquely identifies an instance of the class."

::= { frwkFeedbackTrafficEntry 1 }

frwkFeedbackTrafficLinkRefID OBJECT-TYPE

SYNTAX ReferenceId

PIB-REFERENCES { frwkFeedbackLinkEntry }

STATUS current

## DESCRIPTION

"The ReferenceId of the Linkage policy instance used to base this usage policy instance upon."

::= { frwkFeedbackTrafficEntry 2 }

frwkFeedbackTrafficPacketCount OBJECT-TYPE

SYNTAX Usage64

STATUS current

## DESCRIPTION

"The count of packets handled by the associated element. The initial value of 0 is set when the frwkFeedbackTraffic instance is created, for example triggered through the creation of a frwkFeedbackLink instance."

::= {frwkFeedbackTrafficEntry 3}

frwkFeedbackTrafficByteCount OBJECT-TYPE

SYNTAX Usage64

STATUS current

## DESCRIPTION

"The byte count of packets handled by the associated element. The initial value of 0 is set when the frwkFeedbackTraffic instance is created."

::= { frwkFeedbackTrafficEntry 4}

--

-- The traffic usage class, qualified for an interface

--

frwkFeedbackIfTrafficTable OBJECT-TYPE

SYNTAX SEQUENCE OF FrwkFeedbackIfTrafficEntry

PIB-ACCESS report-only

STATUS current

## DESCRIPTION

"A usage class similar to the basic Traffic class that also contains a reference to an interface index. This



class should be used with an underspecified selection criteria entry from the frwkRoleComboTable that matches an element that can be assigned to multiple interface indices. The interface field can be used to associate the instances of this class with the specific element's assignment."

```
::= { frwkFeedbackUsageClasses 2 }
```

```
frwkFeedbackIfTrafficEntry OBJECT-TYPE
```

```
SYNTAX          FrwkFeedbackIfTrafficEntry
```

```
STATUS          current
```

```
DESCRIPTION
```

```
"Defines the attributes the PEP is to monitor,
record and report."
```

```
PIB-INDEX {frwkFeedbackIfTrafficId}
```

```
UNIQUENESS { frwkFeedbackIfTrafficLinkRefID,
              frwkFeedbackIfTrafficIfIndex }
```

```
::= {frwkFeedbackIfTrafficTable 1}
```

```
FrwkFeedbackIfTrafficEntry ::= SEQUENCE {
```

```
    frwkFeedbackIfTrafficId          InstanceId,
    frwkFeedbackIfTrafficLinkRefID    ReferenceId,
    frwkFeedbackIfTrafficIfIndex      InterfaceIndex,
    frwkFeedbackIfTrafficPacketCount  Usage64,
    frwkFeedbackIfTrafficByteCount    Usage64
```

```
}
```

```
frwkFeedbackIfTrafficId OBJECT-TYPE
```

```
SYNTAX          InstanceId
```

```
STATUS          current
```

```
DESCRIPTION
```

```
"Arbitrary integer index that uniquely identifies
an instance of the class."
```

```
::= { frwkFeedbackIfTrafficEntry 1 }
```

```
frwkFeedbackIfTrafficLinkRefID OBJECT-TYPE
```

```
SYNTAX          ReferenceId
```

```
PIB-REFERENCES { frwkFeedbackLinkEntry }
```

```
STATUS          current
```

```
DESCRIPTION
```

```
"The ReferenceId of the Linkage policy instance used
to base this usage policy instance upon."
```

```
::= { frwkFeedbackIfTrafficEntry 2 }
```

```
frwkFeedbackIfTrafficIfIndex OBJECT-TYPE
```

```
SYNTAX          InterfaceIndex
```





```
STATUS          current
DESCRIPTION
    "The value of this attribute is the ifIndex which is
    associated with the specified RoleCombination and
    interface capability set name."

 ::= { frwkFeedbackIfTrafficEntry 3 }

frwkFeedbackIfTrafficPacketCount OBJECT-TYPE
SYNTAX          Usage64
STATUS          current
DESCRIPTION
    "The count of packets handled by the associated
    element. The initial value of 0 is set when the
    frwkFeedbackIfTraffic instance is created."
 ::= { frwkFeedbackIfTrafficEntry 4 }

frwkFeedbackIfTrafficByteCount OBJECT-TYPE
SYNTAX          Usage64
STATUS          current
DESCRIPTION
    "The byte count of packets handled by the associated
    element. The initial value of 0 is set when the
    frwkFeedbackIfTraffic instance is created."
 ::= { frwkFeedbackIfTrafficEntry 5 }

--
-- All Selection classes are in the separate
-- FrwkFeedbackSelectionClasses group
--

frwkFeedbackSelectionClasses
    OBJECT IDENTIFIER ::= { frwkFeedbackPib 3 }

--
-- The Role Combination Filter Selection Table
--

frwkFeedbackRoleFilterSelTable OBJECT-TYPE
SYNTAX          SEQUENCE OF FrwkFeedbackRoleFilterSelEntry
PIB-ACCESS      install
STATUS          current
DESCRIPTION
    "A selection class that defines selection of objects
    for monitoring based on the role combination,
    capability set and a filter."
 ::= { frwkFeedbackSelectionClasses 1 }
```



```
frwkFeedbackRoleFilterSelEntry OBJECT-TYPE
    SYNTAX          FrwkFeedbackRoleFilterSelEntry
    STATUS          current
    DESCRIPTION
        "Each instance selects a filter on multiple interfaces
        that share the same frwkRoleCombo instance."
    PIB-INDEX { frwkFeedbackRoleFilterSelId}
    UNIQUENESS { frwkFeedbackRoleFilterSelRCombo,
                 frwkFeedbackRoleFilterSelFilter
                }

    ::= { frwkFeedbackRoleFilterSelTable 1}

FrwkFeedbackRoleFilterSelEntry ::= SEQUENCE {
    frwkFeedbackRoleFilterSelId      InstanceId,
    frwkFeedbackRoleFilterSelRCombo  ReferenceId,
    frwkFeedbackRoleFilterSelFilter  Prid
}

frwkFeedbackRoleFilterSelId  OBJECT-TYPE
    SYNTAX          InstanceId
    STATUS          current
    DESCRIPTION
        "Arbitrary integer index that uniquely identifies
        an instance of the class."
    ::= { frwkFeedbackRoleFilterSelEntry 1 }

frwkFeedbackRoleFilterSelRCombo  OBJECT-TYPE
    SYNTAX          ReferenceId
    PIB-REFERENCES { frwkRoleComboEntry }
    STATUS          current
    DESCRIPTION
        "The ReferenceId of the frwkRoleComboTable policy
        instance used for selection."
    ::= { frwkFeedbackRoleFilterSelEntry 2 }

frwkFeedbackRoleFilterSelFilter  OBJECT-TYPE
    SYNTAX          Prid
    STATUS          current
    DESCRIPTION
        "The identifier of a filter instance. Valid classes
        are the subclasses of frwkBaseFilter:
        - frwkIpFilter
        - frwk802Filter
        - frwkILabelFilter"
    ::= { frwkFeedbackRoleFilterSelEntry 3 }
```



```
--
-- Compliance Section
--

frwkFeedbackPibConformance
    OBJECT IDENTIFIER ::= { frwkFeedbackPib 4 }

frwkFeedbackPibCompliances
    OBJECT IDENTIFIER ::= { frwkFeedbackPibConformance 1 }

frwkFeedbackPibGroups
    OBJECT IDENTIFIER ::= { frwkFeedbackPibConformance 2 }

frwkFeedbackPibCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the requirements for conformance to the feedback
        framework PIB"

    MODULE -- this module
        MANDATORY-GROUPS { frwkFeedbackLinkCapsGroup,
                           frwkFeedbackLinkGroup,
                           frwkFeedbackActionGroup }

    GROUP frwkFeedbackActionListGroup
        DESCRIPTION
            "The frwkFeedbackActionListGroup is mandatory if
            actions on subsets linkEntries are to be
            supported."

    GROUP frwkFeedbackTrafficGroup
        DESCRIPTION
            "The frwkFeedbackTrafficGroup is mandatory if
            monitoring of traffic data is to be supported."

    GROUP frwkFeedbackTrafficThresGroup
        DESCRIPTION
            "The frwkFeedbackTrafficThresGroup is mandatory
            if conditional reporting of traffic usage
            thresholds is to be supported."

    GROUP frwkFeedbackIfTrafficGroup
        DESCRIPTION
            "The frwkFeedbackIfTrafficGroup is mandatory if
            per-interface usage collection of traffic data is
            to be supported."
```



GROUP frwkFeedbackRoleFilterSelGroup

DESCRIPTION

"The frwkFeedbackRoleFilterSelGroup is mandatory if monitoring of filters referenced through the frwkRoleCombo class is to be supported."

::= { frwkFeedbackPibCompliances 1 }

frwkFeedbackLinkCapsGroup OBJECT-GROUP

OBJECTS {  
    frwkFeedbackLinkCapsId,  
    frwkFeedbackLinkCapsSelection,  
    frwkFeedbackLinkCapsUsage,  
    frwkFeedbackLinkCapsThreshold }

STATUS current

DESCRIPTION

"Objects from the frwkFeedbackLinkCapsTable."

::= { frwkFeedbackPibGroups 1 }

frwkFeedbackLinkGroup OBJECT-GROUP

OBJECTS {  
    frwkFeedbackLinkId,  
    frwkFeedbackLinkSel,  
    frwkFeedbackLinkUsage,  
    frwkFeedbackLinkInterval,  
    frwkFeedbackLinkThreshold,  
    frwkFeedbackLinkFlags }

STATUS current

DESCRIPTION

"Objects from the frwkFeedbackLinkTable."

::= { frwkFeedbackPibGroups 2 }

frwkFeedbackActionGroup OBJECT-GROUP

OBJECTS {  
    frwkFeedbackActionId,  
    frwkFeedbackActionIndicator,  
    frwkFeedbackActionSpecificPri,  
    frwkFeedbackActionList }

STATUS current

DESCRIPTION

"Objects from the frwkFeedbackActionTable."

::= { frwkFeedbackPibGroups 3 }

frwkFeedbackActionListGroup OBJECT-GROUP

OBJECTS {





```
        frwkFeedbackActionListId,
        frwkFeedbackActionListTag,
        frwkFeedbackActionListRefID }
STATUS    current
DESCRIPTION
    "Objects from the frwkFeedbackActionListTable."

 ::= { frwkFeedbackPibGroups 4 }

frwkFeedbackTrafficGroup OBJECT-GROUP
OBJECTS {
    frwkFeedbackTrafficId,
    frwkFeedbackTrafficLinkRefID,
    frwkFeedbackTrafficPacketCount,
    frwkFeedbackTrafficByteCount }
STATUS    current
DESCRIPTION
    "Objects from the frwkFeedbackTrafficTable."

 ::= { frwkFeedbackPibGroups 5 }

frwkFeedbackTrafficThresGroup OBJECT-GROUP
OBJECTS {
    frwkFeedbackTrafficThresId,
    frwkFeedbackTrafficThresPackets,
    frwkFeedbackTrafficThresBytes }
STATUS    current
DESCRIPTION
    "Objects from the frwkFeedbackTrafficThresTable."

 ::= { frwkFeedbackPibGroups 6 }

frwkFeedbackIfTrafficGroup OBJECT-GROUP
OBJECTS {
    frwkFeedbackIfTrafficId,
    frwkFeedbackIfTrafficLinkRefID,
    frwkFeedbackIfTrafficIfIndex,
    frwkFeedbackIfTrafficPacketCount,
    frwkFeedbackIfTrafficByteCount }
STATUS    current
DESCRIPTION
    "Objects from the frwkFeedbackIfTrafficTable."

 ::= { frwkFeedbackPibGroups 7 }

frwkFeedbackRoleFilterSelGroup OBJECT-GROUP
OBJECTS {
    frwkFeedbackRoleFilterSelId,
```



```
        frwkFeedbackRoleFilterSelRCombo,
        frwkFeedbackRoleFilterSelFilter }
STATUS    current
DESCRIPTION
    "Objects from the frwkFeedbackRoleFilterSelTable."

::= { frwkFeedbackPibGroups 8 }

END
```

## 5. Security Considerations

This PIB defines structured information that may be sensitive when transported by the COPS protocol [[COPS-PR](#)].

This PIB does not contain classes that directly contain security relevant information like passwords or monetary amounts. However, unauthorized access or changes to information defined in this PIB could compromise network operations or reveal sensitive business or personal information.

Specifically for the classes:

frwkFeedbackLinkCaps

This class has the ACCESS clause 'notify'. Access to this information reveals feedback collection capabilities of the COPS client and malicious changes could affect feedback operation by misleading the server to generate corrupt feedback configuration.

frwkFeedbackLinkTable, frwkFeedbackAction, frwkFeedbackActionList,  
frwkFeedbackTrafficThres, frwkFeedbackRoleFilterSel

These classes have the ACCESS clause 'install' and allow the COPS server to control feedback collection and reporting on the client. Access to this information exposes the client's configuration; malicious changes could disrupt network or business operations and raise privacy issues.

frwkFeedbackTraffic, frwkFeedbackIfTraffic

These classes have the ACCESS clause 'report-only' and contain the usage information delivered from the COPS client to the server. Unauthorized access to this information may reveal detailed information on the network and its users. Malicious changes may affect network and business operations.



[COPS] and [[COPS-PR](#)] define mechanisms to secure the COPS protocol communication and implementations of COPS servers or clients supporting this PIB MUST follow the security guidelines specified there.

## 6. IANA Considerations

This document describes the frwkFeedbackPib Policy Information Base (PIB) module for registration under the "pib" branch registered with IANA. The IANA has assigned PIB number 5.

This PIB uses "all" in the SUBJECT-CATEGORY clause, so it applies to all COPS client types. No new COPS client type is requested for this PIB.

## 7. Acknowledgements

The authors would like to thank Dave Durham, Ravi Sahita, and Russell Fenger of Intel and John K. Gallant of WorldCom for their contribution to this document.

## 8. References

### 8.1. Normative References

- |               |   |
|---------------|---|
| [COPS]        | Durham, D., Boyle, J., Cohen, R., Herzog, S., Rajan, R. and A. Sastry, "The COPS (Common Open Policy Service) Protocol", <a href="#">RFC 2748</a> , January 2000.                                     |
| [COPS-PR]     | Chan, K., Seligson, J., Durham, D., Gai, S., McCloghrie, K., Herzog, S., Reichmeyer, F., Yavatkar, R. and A. Smith, "COPS Usage for Policy Provisioning", <a href="#">RFC 3084</a> , May 2001.        |
| [IFMIB]       | McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", <a href="#">RFC 2863</a> , June 2000.   |
| [FR-PIB]      | Sahita, R., Hahn, S., Chan, K. and K. McCloghrie, "Framework Policy Information Base", <a href="#">RFC 3318</a> , March 2003.   |
| [FEEDBACKFWK] | Rawlins, D., Kulkarni, A., Bokaemper, M. and K. Chan, "Framework for Policy Usage Feedback for Common Open Policy Service with Policy Provisioning (COPS-PR)", <a href="#">RFC 3483</a> , March 2003. |



- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.
- [RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.

## **8.2. Informational References**

- [COPS-TLS], Walker, J., Kulkarni, A., "COPS Over TLS", Work in Progress.
- [DIFFSERV-PIB] Chan, K., Sahita, R., Hahn, S. and K. McCloghrie, "Differentiated Services Quality of Service Policy Information Base", [RFC 3317](#), March 2003.





## **9. Authors' Addresses**

Diana Rawlins  
MCI  
400 International Parkway  
Richardson, Texas 75081

Phone: 972-729-4071  
EMail: [Diana.Rawlins@mci.com](mailto:Diana.Rawlins@mci.com)

Amol Kulkarni  
JF3-206  
2111 NE 25th Ave  
Hillsboro, Oregon 97124

Phone: 503-712-1168  
EMail: [amol.kulkarni@intel.com](mailto:amol.kulkarni@intel.com)

Kwok Ho Chan  
Nortel Networks  
600 Technology Park Drive  
Billerica, MA 01821 USA

Phone: 978-288-8175  
EMail: [khchan@nortelnetworks.com](mailto:khchan@nortelnetworks.com)

Martin Bokaemper  
Juniper Networks  
700 Silver Seven Road  
Kanata, ON, K2V 1C3, Canada

Phone: 613-591-2735  
EMail: [mbokaemper@juniper.net](mailto:mbokaemper@juniper.net)

Dinesh G Dutt  
Cisco Systems, Inc.  
170 Tasman Dr.  
San Jose, CA 95134-1706

Phone: 408-527-0955  
EMail: [ddutt@cisco.com](mailto:ddutt@cisco.com)



## **10. Full Copyright Statement**

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assignees.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

### Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

