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Framework of COPS-PR Policy Usage Feedback
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Abstract

Common Open Policy Services Protocol [[COPS](#)], [RFC 2748](#), defined the capability of reporting information to the PDP. The types of report information are success, failure and accounting of an installed state. This document focuses on the accounting report type and the necessary framework for the monitoring and reporting of usage feedback for an installed state.

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[1](#) Introduction

Policy usage reported by the PEP makes a richer set of information available to the PDP for decision-making. This report accounting information can impact future decisions made by the PDP and the resulting policy installed by the PDP at the PEP. For example, a PDP making policy for a SIP signaled multimedia session may need to base the decision in part on usage information related to previously installed QoS policy decisions. Furthermore, the PDP may coordinate this usage information with other external systems to determine the future policy such as the case with the PDP coordinating multimedia session QoS and clearinghouse authorizations [SIP-AAA-QOS.]

The scope of this document is to describe the framework for policy usage monitored and reported by the PEP and collected at the PDP. The charging, rating and billing models as well as other accounting or statistics gathering events detectable by the PDP are beyond the scope of this framework.

[2](#) Overview

There are two aspects to defining policies for usage feedback. One aspect is defining what to monitor and the second is defining what to report. The selection criteria policy specifies the conditions for the monitoring and recording of the associated usage policy. It is a PRID that defines an entity such as an IP filter or dropper. The usage criteria policy class defines what metrics are recorded and reported by the PEP to the PDP in the Report message. For example, a usage policy may be defined to provide counts of

packets received. The selection criteria policy may identify the filter on which to base the packet counts. A third policy may be used to associated, or link, the selection and usage policies. The linkage criteria associate what needs to be monitored to what needs to be reported. The valid combinations of selection PRCs for a usage PRC must be identified and well understood between the PDP and the PEP.

3 Requirements for Normal Operations

Per [[COPS](#)], the PDP specifies the minimum feedback interval in the Accounting Timer object that is included in the Client Accept message during connection establishment. This specifies the maximum frequency with which the PEP issues unsolicited accounting type reports. The purpose of this interval is to pace the number of report messages sent to the PDP. It is not the goal of the interval defined by the ACCT Timer value to provide precision synchronization or timing.

The selection and usage criteria for feedback reporting are defined by the PDP. Feedback policies, which define the necessary selection and usage criteria, are included by the PDP in a Decision message to the PEP. The usage is then periodically

reported by the PEP at intervals no more frequently than specified in the Accounting Timer object, except as noted in the following sections. (There are exceptions where reports containing feedback are provided prior the interval in several cases described in sections [6](#) and [7](#).) The PDP may also solicit usage feedback which is to be reported back immediately by the PEP. Usage information may be cleared upon reporting. This is specified in the usage policy criteria.

The PEP monitors and tracks the usage information. The PDP is the collection point for the policy usage information reported by the PEP clients within the administrative domain. The PDP may also collect other accounting event information that is outside the scope of this document.

4 Periodic Nature of Policy Usage Feedback

Generally the accounting policy is periodic in nature and the reporting is unsolicited. The unsolicited reports are supplied per the interval defined by the PDP. The periodic unsolicited reports are dictated by timer intervals and use a deterministic amount of

network resources.

The PDP informs the PEP of the minimal feedback interval during client connection establishment with the Accounting Timer object. The PDP may specify feedback intervals in the specific usage policies as well. The unsolicited monitoring and reporting by the PEP may be suspended and resumed at the direction of the PDP.

[4.1](#) Reporting Intervals

The generation of usage feedback by the PEP to the PDP is done under different conditions that include feedback on demand, periodic feedback or feedback when a defined threshold is reached. The periodic feedback for a usage policy can be further defined in terms of providing feedback if there is a change or providing feedback periodically regardless of a change in value.

The periodic interval is defined in terms of the Accounting Object, ACCT Timer value. A single interval is equal to the number of seconds specified by the ACCT Timer value. The PDP may define a specific number of intervals, which are to pass before the PEP provides the usage feedback for a specific policy in a report. When the ACCT Timer value is equal to zero there is no unsolicited usage feedback provided by the PEP. However, the PEP still monitors and tracks the usage per the PDP policy and reports it when the PDP solicits the feedback.

Reporting may be based on a defined threshold value in the usage PRC that is reached.

The PDP may solicit usage feedback in the middle of an interval. The PEP shall provide the requested usage information and clear the usage information if the usage policy requires that the

attribute be cleared after reporting. The PEP should continue to maintain the same interval schedule as defined by the PDP in the Accounting Timer object and established at client connection acceptance.

[5](#) Suspension, Resumption and Halting of Usage Monitoring and Reporting

The PDP may direct the PEP to suspend usage feedback report messages and then at a later time instruct the PEP to resume the reporting of feedback. The PDP may also instruct the PEP to

suspend the monitoring and tracking of usage which also results in the suppression of the feedback reports until the PDP later tells the PEP to resume the monitoring (and reporting). When the PDP suspends monitoring or suspends reporting, it also specifies whether the PEP is to provide an unsolicited feedback report of the current monitored usage of the affected usage policy. The PDP may suspend and resume monitoring and reporting for specific usage policies or for all usage policies.

Halting of usage monitoring and feedback is done by issuing a Decision Remove of the feedback usage policies. The PEP is to stop any monitoring and reporting associated with the policy immediately.

6 Solicited Feedback

There may be instances when it is useful for the PDP to control the feedback per an on-demand basis rather than a periodic basis. The PDP may solicit the PEP for usage feedback with a Decision. The PDP may solicit usage feedback at any time during the accounting interval defined by the ACCT Timer. The PEP responds immediately and reports the appropriate usage policies and should continue to follow the usage feedback interval schedule established during connection acceptance.

7 Usage reports on shared objects

While some objects in a context's namespace directly represent unique objects of the PEP's configuration, other COPS objects can be shared between multiple actual assignments in the PEP.

Whenever the PEP creates multiple actual configuration instances from the same COPS objects, these assignments can potentially collect their own statistics independently. Since the individual assignments do not have a direct representation as COPS objects, additional information must be provided to uniquely identify the assignment that generates the usage information. The feedback framework allows this information to be distributed between a Selection Criteria PRC and the corresponding Usage PRC, however both PRCs together always must contain sufficient information for the finest granularity of usage collection supported by the PEP.

Criteria PRC, all matching assignments are selected to collect usage information. The necessary data to differentiate these assignments is part of the Usage PRC.

Implementations based on the feedback framework should always provide a Selection Criteria PRC that contains a complete set of information to select a unique assignment, while underspecified Selection Criteria PRCs (together with extended Usage PRCs) are optional.

8 Context

The monitoring and recording of usage policies is subject to context switches in a manner similar to that of the enforcement policy. Usage policy is monitored, recorded and reported while the associated policy information context is active. When the context is deactivated a report containing the usage policies for that context is provided to the PDP. The PEP does not perform any monitoring, tracking or reporting of policy usage for a given context while the context is inactive.

9 Delete Request States

The PEP MUST send any outstanding usage data monitored during the feedback interval to the PDP via an unsolicited report immediately prior to issuing a Delete Request State. This is also the case when the PDP initiates the Delete Request State.

10 Failover

In the event the connection is lost between the PEP and PDP, the PEP continues to track usage information as long as it continues to enforce installed (cached) policy. When the locally installed policy at the PEP expires, the usage policy data also expires and is no longer monitored.

Upon successful reconnection where the PEP is still caching policy, the PDP indicates deterministically to the PEP that the PEP may resume usage feedback reporting. The PEP reports all cached usage and resumes periodic reporting making any needed adjustment to the interval schedule as specified in the reconnection acceptance ACCT Timer.

11 Security Considerations

The feedback information is sensitive and requires that authorized messaging occur between the PEP and the PDP. This protection can be accomplished with IPSEC between the PEP and the PDP or using the security mechanisms described in the base COPS protocol.

12 Authors' Addresses

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