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Title	Service Primitives for Accounting	
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Re:	Call for Comment on P802.16g Baseline Document	
Abstract	This contribution proposes service primitives for accounting.	
Purpose	The document should be considered during the resolution of comments on the baseline document.	
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Service Primitives for Accounting

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ETRI

1. Problem Statement

Accounting for Internet service has been defined by IETF AAA Working Group, and Remote Authentication Dial In User Service (RADIUS) and Diameter protocols define accounting protocol between Access Network Node and Authentication, Authorization, and Accounting (AAA) Server. In order to provide accounting for Wireless Access Network based on IEEE 802.16 WMAN standard, either RADIUS or Diameter can be used, where a BS gathers Accounting information and this information should be delivered to an AAA server through either RADIUS or Diameter protocol. Contrary to the conventional wired network or WLAN, however, a mobile user in IEEE 802.16 WMAN can generate various service flows with different bandwidth requirements simultaneously, and accounting for each service flow should be supported. In this contribution, we propose service primitives for accounting which are exchanged through Management Service Access Point (M-SAP) of Management Plane specified in IEEE 802.16g baseline document, where accounting information for each service flow is gathered at a BS for each user or MSS.

2. Summary of the Proposed Remedy

In this contribution, we define two primitives for supporting accounting between BS and NCMS, which are summarized briefly in the following table.

Primitive	Direction	Primitive Contents
Accounting request	BS <-> NCMS	MSS MAC Address, Service Flow Identifier, Accounting Record Type, Accounting Record Number, Accounting Input Octets, Accounting Output Octets, Accounting Input Packets, Accounting Output Packets, Service Class Name, Service Flow Scheduling Type, Minimum Reserved Traffic Rate
Accounting response	BS <-> NCMS	MSS MAC Address, Service Flow Identifier, Result Code, Accounting Record Type, Accounting Record Number, Accounting Input Octets, Accounting Output Octets, Accounting Input Packets, Accounting Output Packets, Service Class Name, Service Flow Scheduling Type, Minimum Reserved Traffic Rate,

Figure 1 shows an example procedure for accounting message transfer. Accounting for a mobile user is initiated after Network Entry procedure and Accounting request message is delivered to an NCMS in order to inform the start of accounting information gathering. Accounting for service flows is initiated after Dynamic Service Addition (DSA) and Accounting request message is delivered to an NCMS in order to inform the start of accounting information gathering, too. If Dynamic Service Deletion (DSD) is performed, accounting information gathering for the service flow is terminated and the gathered accounting information is transferred to the NCMS. If a mobile user or an MSS deregisters, accounting

information gathering for the mobile user or MSS is terminated and the gathered accounting information is transferred to an NCMS, too. At the start of accounting information gathering, Interim Timer value is downloaded from the NCMS, and accounting information is periodically gathered based on the Interim Timer value. Thus, multiple Interim Records can be generated between the start and the termination of accounting.

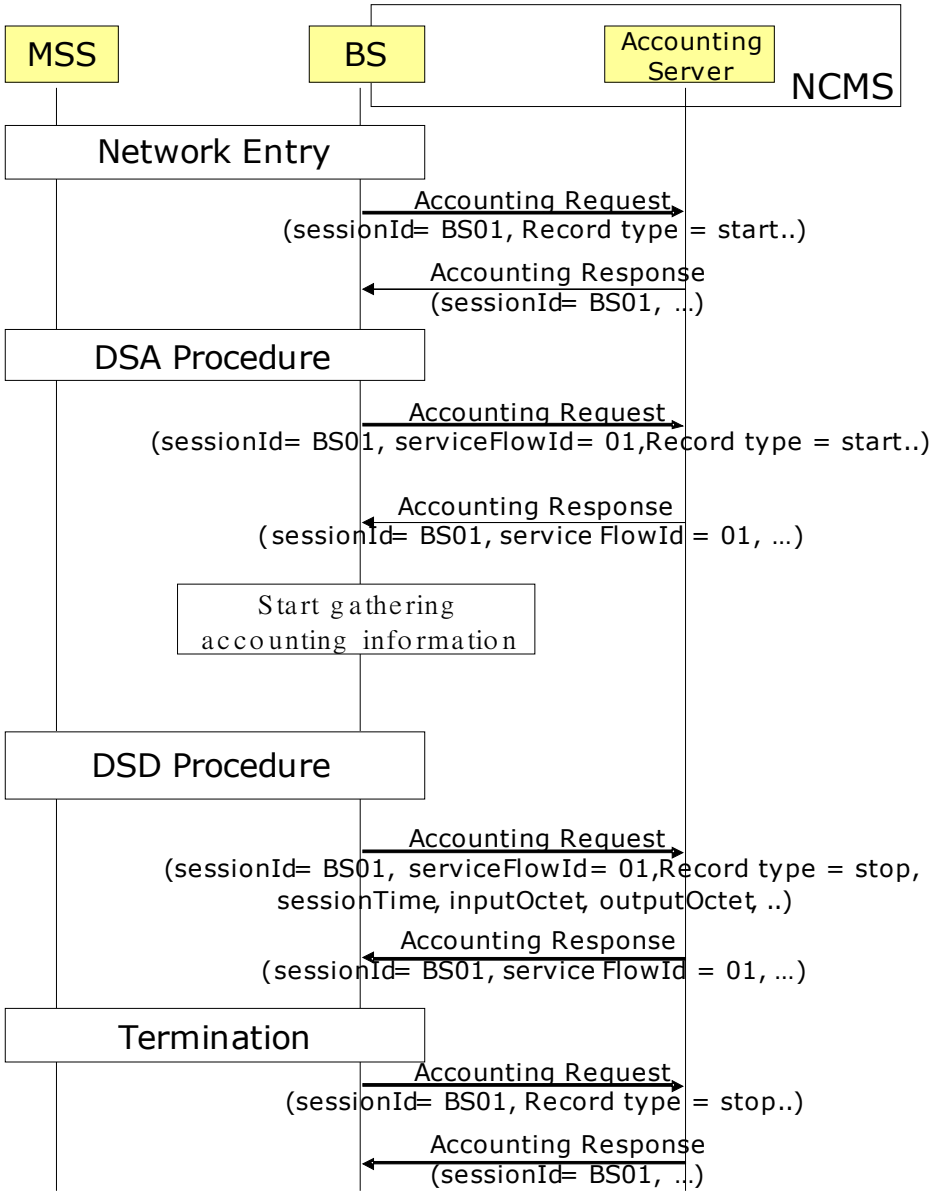

Fig. 1 - An Example Procedure for Accounting Message Transfer

In this contribution, we define Accounting request and Accounting response primitives in order to perform Accounting, and illustrate the usage of the primitives initiated by both BS and NCMS, as shown in Figs. 2 and 3.

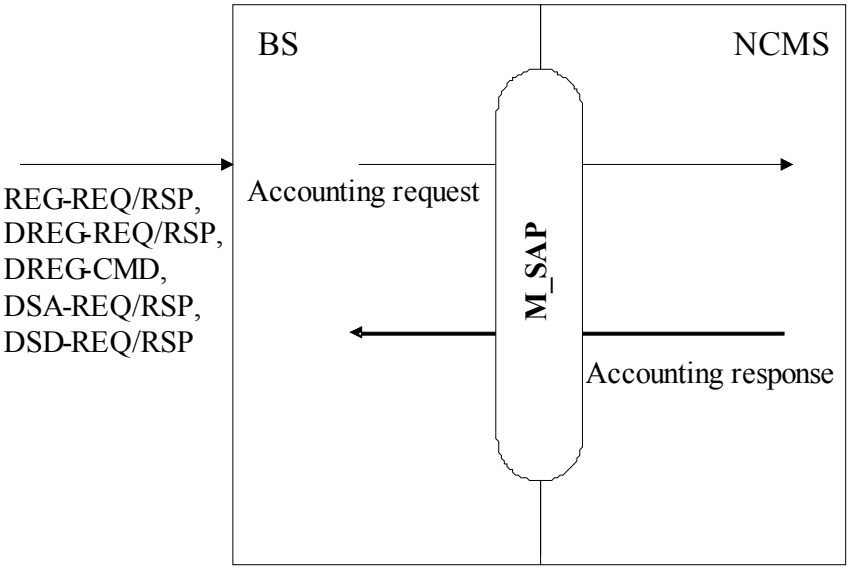

Fig. 2 - Accounting Primitive Initiated by BS

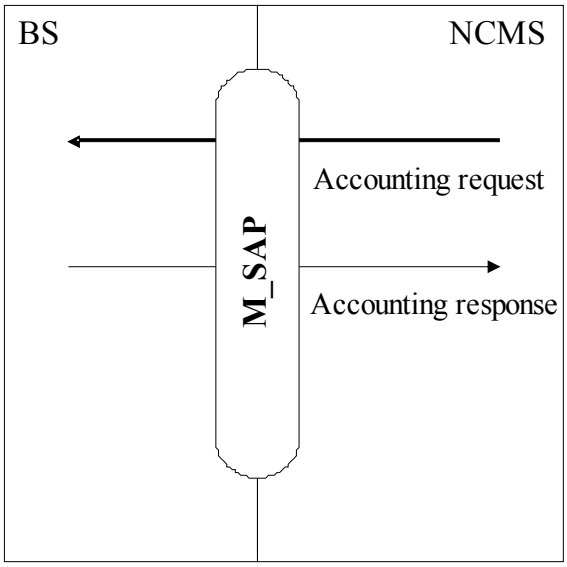

Fig. 3 - Accounting Primitive Initiated by NCMS

Accounting attributes in Accounting request and Accounting response are basically based on the attributes defined in RADIUS or Diameter, and new accounting attributes such as Service Flow Identifier, Service Class Name, Service Flow Scheduling Type, and Minimum Reserved Traffic Rate are additionally defined for IEEE802.16 WMAN specific application. Thus, the proposed accounting can accommodate various services characteristics of IEEE 802.16 WMAN.

Proposed Text Changes

[Modify section 14.5.3 as follow]

14.5.3 Accounting Management

Accounting in IEEE 802.16g is basically based on IETF RADIUS and Diameter protocols. Accounting information can be gathered for each user first. Since each user can have multiple connections at the same time, accounting information for each connection for a user should be gathered for more appropriate accounting. Thus, IEEE 802.16 based WMAN standard recommends accounting for both basic user connection and services used. Accounting for basic user connection is initiated when the user registers at the network and terminated when the user deregisters from the network. On the other hand, accounting for service is initiated at the dynamic service addition (DSA) instant of a service and terminated at the dynamic service deletion (DSD) instant of the service. Accounting attributes for a user connection can use currently defined accounting attributes in either RADIUS or Diameter protocol.

14.5.3.1 Accounting Procedure

Accounting primitives consists of Accounting request and Accounting response, as shown in Figs. 4 and 5. Accounting attributes in Accounting request and Accounting response are basically based on the attributes defined in RADIUS or Diameter, and new accounting attributes such as Service Flow Identifier, Service Class Name, Service Flow Scheduling Type, and Minimum Reserved Traffic Rate are additionally defined for IEEE802.16 WMAN specific application. Thus, the proposed accounting can accommodate various services characteristics of IEEE 802.16 WMAN.

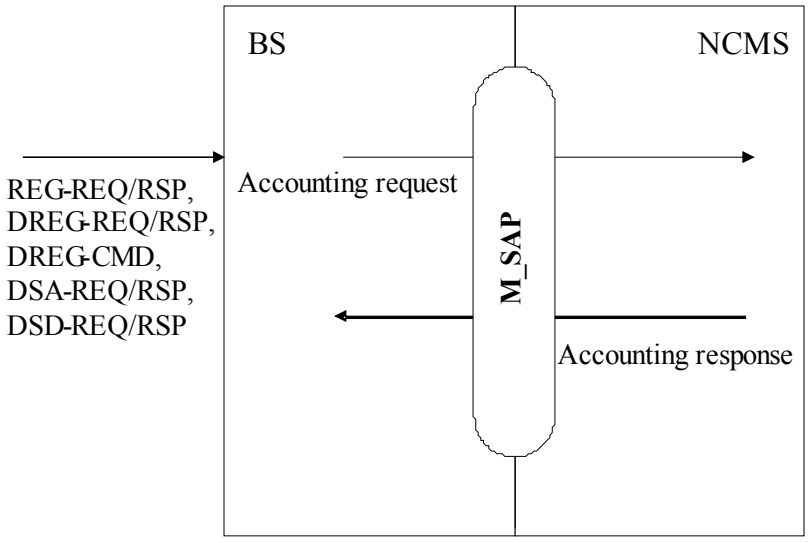

Fig.4 - Accounting Primitive Initiated by BS

Fig.5 - Accounting Primitive Initiated by NCMS

14.5.3.2 Service Primitives for Accounting Management

14.5.3.2.1 Accounting request

14.5.3.2.1.1 Function

This primitive is issued by a BS to inform an NCMS of accounting information for user connection after Registration request/response (REG-REQ/RSP) or Deregistration command (DREG-CMD) of an MSS. Also, it is issued by a BS to inform an NCMS of accounting information for service of a user after DSA or DSD procedure. This primitive may be generated periodically for each interim interval value by an NCMS, where the interim interval is downloaded from authentication, authorization, and accounting (AAA) server when the service is initiated when if an NCMS, acting as AAA server, requires to do so.

14.5.3.2.1.2 Semantics of the service primitive

The parameters of the primitives are as follows:

Accounting request
(
MSS MAC Address
Service Flow Identifier
Accounting Record Type
Accounting Record Number

Accounting Input Octets
Accounting Output Octets
Accounting Input Packets
Accounting Output Packets
Accounting Session Time
Service Class Name
Service Flow Scheduling Type
Minimum Reserved Traffic Rate
)

MSS MAC Address
48-bit MAC address which will identify MSS

Service Flow identifier
32-bit service flow identifier which will identify service flows of MSS

Accounting Record Type
The type of accounting record being sent and EVENT_RECORD, START_RECORD, INTERIM_RECORD, and STOP_RECORD are currently defined. An Event Record is used to indicate that a one-time event has occurred (meaning that the start and end of the event are simultaneous). A Start Record is used to initiate an accounting session and contains accounting information that is relevant to the initiation of the session. An Interim Record contains cumulative accounting information for an existing accounting session. A Stop Record is sent to terminate an accounting session and contains cumulative accounting information relevant to the existing session.

Accounting Record Number
Identifies accounting record within one session

Accounting Input Octets
The number of octets received from the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Accounting Output Octets
The number of octets sent to the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Accounting Input Packets
The number of packets received from the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD.

Accounting Output Packets
The number of packets sent to the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Service Class Name
2 ~ 128 Byte ASCII character which is given by DSA-REQ/RSP

Service Flow Scheduling Type
Scheduling type of service flow (i.e., BE, nrtPS, rtPS, UGS) given after DSA procedure

Minimum Reserved Traffic Rate
32-bit minimum reserved traffic rate given after DSA procedure

14.5.3.2.1.3 When generated

This primitive is generated at a BS when an MSS enters a network or terminates to access a network, or when an MSS starts or stops dynamic services. Also, it is generated at an NCMS periodically based on interim interval.

14.5.3.2.1.4 Effect of receipt

If this primitive is generated by a BS, it is transformed into either RADIUS or Diameter message and sent to an Accounting Server. On the other hand, if this primitive is generated by an NCMS, the BS transfers gathered accounting information to the NCMS using Accounting response primitive.

14.5.3.2.1 Accounting response

14.5.3.2.1.1 Function

This primitive is issued by an NCMS or a BS to respond to Account request .

14.5.3.2.1.2 Semantics of the service primitive
The parameters of the primitives are as follows:

Accounting response
(
MSS MAC Address
Service Flow Identifier
Result Code
Accounting Record Type
Accounting Record Number
Accounting Input Octets
Accounting Output Octets
Accounting Input Packets
Accounting Output Packets
Accounting Session Time
Service Class Name
Service Flow Scheduling Type
Minimum Reserved Traffic Rate

)
MSS MAC Address
48-bit MAC address which will identify MSS
MSS IP Address
Either 32-bit or 128-bit IP address which is allocated to MSS
Service Flow identifier
32-bit service flow identifier which will identify service flows of MSS
Result Code
The result of accounting request
Accounting Record Type
The type of accounting record being sent and EVENT_RECORD, START_RECORD, INTERIM_RECORD, and STOP_RECORD are currently defined. An Event Record is used to indicate that a one-time event has occurred (meaning that the start and end of the event are simultaneous). A Start Record is used to initiate an accounting session and contains accounting information that is relevant to the initiation of the session. An Interim Record contains

cumulative accounting information for an existing accounting session. A Stop Record is sent to terminate an accounting session and contains cumulative accounting information relevant to the existing session.

Accounting Record Number

Identifies accounting record within one session

Accounting Input Octets

The number of octets received from the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Accounting Output Octets

The number of octets sent to the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Accounting Input Packets

The number of packets received from the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD.

Accounting Output Packets

The number of packets sent to the MSS during the session and can only be present with an Accounting Record Type of INTERIM_RECORD or STOP_RECORD

Service Class Name

2 ~ 128 Byte ASCII character which is given by DSA-REQ/RSP

Service Flow Scheduling Type

Scheduling type of service flow (i.e., BE, nrtPS, rtPS, UGS) given after DSA procedure

Minimum Reserved Traffic Rate

32-bit minimum reserved traffic rate given after DSA procedure

14.5.3.2.1.3 When generated

This primitive is generated at either an NCMS or a BS to respond Account request.

14.5.3.2.1.4 Effect of receipt

Either a BS or NCMS receives the Accounting response. If an NCMS receives the Accounting response, it transforms this primitive into either RADIUS or Diameter message and sends it to Accounting Server.

References

[1] IEEE 802.16e/D9

[2] IEEE 802.16g-04/03r2, “Baseline Document – P802.16g Management Plane Procedures and Services”

[3] IEEE Std 802-16-2004

[4] IETF RFC 2865, “RADIUS,” June 2000

[4] IETF RFC 2866, “RADIUS Accounting,” June 2000

[5] IETF RFC 3588, “Diameter Base Protocol,” Sep. 2003.