



# **WiMAX FORUM® WiMAX™ ROAMING INTERFACE**

*based on WiMAX Forum Certified™ Products*

**Stage 2 Part 1: AAA Proxy Release 1.0 Version 2**

**WMF-T42-002-R010v02**

***WiMAX Forum Approved***

**(2009-06-24)**

**WiMAX Forum Proprietary**

**Copyright 2009 WiMAX Forum. All Rights Reserved.**

## **Copyright Notice, Use Restrictions, Disclaimer, and Limitation of Liability.**

Copyright 2009 WiMAX Forum. All rights reserved.

The WiMAX Forum® owns the copyright in this document and reserves all rights herein. This document is available for download from the WiMAX Forum and may be duplicated for internal use, provided that all copies contain all proprietary notices and disclaimers included herein. Except for the foregoing, this document may not be duplicated, in whole or in part, or distributed without the express written authorization of the WiMAX Forum.

Use of this document is subject to the disclaimers and limitations described below. Use of this document constitutes acceptance of the following terms and conditions:

**THIS DOCUMENT IS PROVIDED “AS IS” AND WITHOUT WARRANTY OF ANY KIND. TO THE GREATEST EXTENT PERMITTED BY LAW, THE WiMAX FORUM DISCLAIMS ALL EXPRESS, IMPLIED AND STATUTORY WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF TITLE, NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WiMAX FORUM DOES NOT WARRANT THAT THIS DOCUMENT IS COMPLETE OR WITHOUT ERROR AND DISCLAIMS ANY WARRANTIES TO THE CONTRARY.**

Any products or services provided using technology described in or implemented in connection with this document may be subject to various regulatory controls under the laws and regulations of various governments worldwide. The user is solely responsible for the compliance of its products and/or services with any such laws and regulations and for obtaining any and all required authorizations, permits, or licenses for its products and/or services as a result of such regulations within the applicable jurisdiction.

**NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES WHATSOEVER REGARDING THE APPLICABILITY OR NON-APPLICABILITY OF ANY SUCH LAWS OR REGULATIONS OR THE SUITABILITY OR NON-SUITABILITY OF ANY SUCH PRODUCT OR SERVICE FOR USE IN ANY JURISDICTION.**

**NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES WHATSOEVER REGARDING THE SUITABILITY OR NON-SUITABILITY OF A PRODUCT OR A SERVICE FOR CERTIFICATION UNDER ANY CERTIFICATION PROGRAM OF THE WiMAX FORUM OR ANY THIRD PARTY.**

The WiMAX Forum has not investigated or made an independent determination regarding title or noninfringement of any technologies that may be incorporated, described or referenced in this document. Use of this document or implementation of any technologies described or referenced herein may therefore infringe undisclosed third-party patent rights or other intellectual property rights. The user is solely responsible for making all assessments relating to title and noninfringement of any technology, standard, or specification referenced in this document and for obtaining appropriate authorization to use such technologies, technologies, standards, and specifications, including through the payment of any required license fees.

**NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES OF TITLE OR NONINFRINGEMENT WITH RESPECT TO ANY TECHNOLOGIES, STANDARDS OR SPECIFICATIONS REFERENCED OR INCORPORATED INTO THIS DOCUMENT.**

**IN NO EVENT SHALL THE WiMAX FORUM OR ANY MEMBER BE LIABLE TO THE USER OR TO A THIRD PARTY FOR ANY CLAIM ARISING FROM OR RELATING TO THE USE OF THIS DOCUMENT, INCLUDING, WITHOUT LIMITATION, A CLAIM THAT SUCH USE INFRINGES A THIRD PARTY’S INTELLECTUAL PROPERTY RIGHTS OR THAT IT FAILS TO COMPLY WITH APPLICABLE LAWS OR REGULATIONS. BY USE OF THIS DOCUMENT, THE USER WAIVES ANY SUCH CLAIM AGAINST THE WiMAX FORUM AND ITS MEMBERS RELATING TO THE USE OF THIS DOCUMENT.**

The WiMAX Forum reserves the right to modify or amend this document without notice and in its sole discretion. The user is solely responsible for determining whether this document has been superseded by a later version or a different document.

“WiMAX,” “Mobile WiMAX,” “Fixed WiMAX,” “WiMAX Forum,” “WiMAX Certified,” “WiMAX Forum Certified,” the WiMAX Forum logo and the WiMAX Forum Certified logo are trademarks of the WiMAX Forum. Third-party trademarks contained in this document are the property of their respective owners.

# CONTENTS

---

1	AAA Proxy Service .....	2
1.1	Scope.....	2
1.2	Public Reference Points .....	2
1.2.1	R5 Reference Point (Between AAA Proxy and NSPs).....	2
1.2.2	X2 Reference Point (Between AAA Proxy Service and Wholesale Rating Logical Functions).....	2
1.3	Private Reference Points .....	8
1.3.1	P1 Reference Point (Between RADIUS Device and Agreement Management Function) .....	8
1.4	System Functions .....	8
1.4.1	AAA Proxy.....	8
1.4.2	Agreement Validation.....	9
1.4.3	Aggregation.....	10
2	Revision History .....	12



# LIST OF FIGURES

---

Figure 1: Session Correlation .....	11
-------------------------------------	----

# 1 AAA Proxy Service

---

## 1.1 Scope

---

This document describes functions related to WRI AAA Proxy Services logical function and the X2 Reference Point defined in the WiMAX™ Roaming Interface (WRI) architecture specification. See WRI Stage 2: Part 0 for a high-level description of the WRI architecture and a list of commonly used references, acronyms, and terms.

AAA Proxy Services involve proxy of RADIUS messages, correlation and aggregation of session records, validating roaming agreements between the roaming partners and the transfer of aggregated session records to the WRI Wholesale Rating and Fraud Management logical functions. The WRI AAA Proxy Service will validate attributes which are present in the RADIUS records and will create files (aggregated sessions) to be sent to the WRI Wholesale Rating logical function via the X2 Reference Point. The document also defines the RADIUS attributes, elements, and rules to create X2 Reference Point files.

## 1.2 Public Reference Points

---

### 1.2.1 R5 Reference Point (Between AAA Proxy and NSPs)

---

Please refer to the WRI-Interconnect Stage 2: Part 5 specification for details.

### 1.2.2 X2 Reference Point (Between AAA Proxy Service and Wholesale Rating Logical Functions)

---

X2 Reference Point is between the WRI AAA Proxy Service and the WRI Wholesale Rating logical functions. This reference point represents the Subscriber Usage Record sent from the WRI AAA Proxy Service logical function to the WRI Wholesale Rating logical function. The WRI AAA Proxy Service logical function will aggregate the Subscriber session and create Subscriber Usage Records. Multiple subscriber usage records will be combined to create one X2 Reference Point file. The X2 Reference Point file will also contain a Header. Subsections below will provide X2 Reference Point file details such as file naming convention, file transmission, file Header and Detail contents and various other requirements. This section will help in creation and exchange of X2 Reference Point file.

#### 1.2.2.1 X2 Reference Point Information

---

This X2 Reference Point defines the raw and derived session elements shared with downstream Wholesale Rating applications.

R-[X2-S2-15] All date and time elements in a X2 Reference Point file SHALL be expressed in GMT.

R-[X2-S2-1] In order to facilitate Wholesale Rating, the RADIUS attributes listed in WRI Stage 2 Table 1 SHALL be provided by the Visited Operator over the WiMAX Forum NWG Network Architecture R5 Reference Point.

**Table 1: R5 RADIUS Attributes needed to create an X2 Reference Point File.  
(Based on NWG Stage 3 document referenced in WRI Stage 2 Part 0)**

RADIUS Attribute Name	Number	Description
User-Name	1	The identity and realm of the user used in the outer NAI during network access

<b>RADIUS Attribute Name</b>	<b>Number</b>	<b>Description</b>
		authentication and authorization
Calling-Station-Id	31	The MAC address in binary format of the MS
NAS-ID	32	The identifiers of the NAS generating this record.
Acct-Status-Type	40	Indicates the record type: Start, Stop, Interim
Acct-Input-Octets	42	The total number of octets in IP packets sent by the user, as received at the accounting agent from the IP network (i.e. prior to any compression and/or fragmentation).
Acct-Output-Octets	43	The total number of octets in IP packets sent to the user. Counted after de-compression and de-fragmentation at the accounting agent.
Acct-Session-Id	44	Used to match Starts, Stop, and Interim. It is generated by the accounting client and is unique per start/stop pair.
Acct-Session-Time	46	The number of seconds the flow or session was active.
Acct-Terminate-Cause	49	Indicates why the session stopped.
Acct-Multi-Session-Id	50	This identifier is set to the value of WiMAX-Session-Id which is generated by AAA after successful authentication and delivered to the NAS in an Access-Accept message. It is unique per CSN and is used to match all accounting records within a session.
Acct-Input-Gigawords	52	Incremented when attribute 42 overflows.
Acct-Output-Gigawords	53	Incremented when attribute 43 overflows.
Event-Timestamp	55	The time the event occurred (stop record).
CUI	89	Chargeable User Identity. It is a unique temporary handle to the user responsible for paying the bill.
CLASS	25	Opaque value set by the Server used to bind authentication to accounting. If more than one Class attribute is found in an Access-Accept message, the NAS SHALL only store the first one and discard the rest.
GMT-Time-Zone-Offset	26/3	The offset in seconds from GMT at the NAS or HA.
Session-Continue	26/21	True indicates that the stop is immediately followed by a start. If the attribute is missing or FALSE it means that this is the final stop.
IP technology	26/23	Proxy CMIPv4, CMIPv6, PMIPv4.
Active-Time	26/39	The time in which the MS is active as opposed to idle mode.
NAP-ID	26/45	An octet string that uniquely identifies the operator that generated this UDR. This value is configured at the Accounting Client and can be used for charging settlement between NSP and NAP.
BS-ID	26/46	An octet string that uniquely identifies the NAP-ID Base Station that is serving the MS at the time the UDR is generated.
Location	26/47	TBD
NSP-ID	26/57	The operator id of the NSP at the time the message was delivered

### 1.2.2.2 Elements

The session elements are based on values passed and/or derived from RADIUS attributes and Vendor Specific Attributes (VSAs) on the R5 Reference Point.

#### 1.2.2.2.1 Header (Mandatory)

Element Name	Element Description and Requirement	Mandatory or Optional Element
Sending Exchange Provider ID	R-[X2-S2-2] The Sending Exchange Provider ID field identifies the Sending Exchange Provider and SHALL be populated before the Clearing File is received by the Home or Home exchange provider, if applicable. This field is a unique code by which the sending CSN's exchange provider is identified. If there is no Sending Exchange Provider, this field is null. An Exchange Provider SHALL have a unique ID to identify themselves. This unique ID may not be the NSP-ID.	Mandatory
Receiving Exchange Provider ID	R-[X2-S2-3] The Receiving Exchange Provider ID field identifies the Receiving Exchange Provider and SHALL be populated before the Clearing File is received by the Home or Home exchange provider. This field is a unique code that identifies the receiving CSN's exchange provider. If there is no Receiving Exchange Provider, this field is null. An Exchange Provider SHALL have a unique ID to identify themselves. This unique ID may not be the NSP-ID.	Mandatory
Visited NSP ID	R-[X2-S2-4] The Visited NSP ID SHALL be populated before the file is received by the Home or Home exchange provider. This field is a unique code identifying the visited CSN.	Mandatory
Home NSP ID	R-[X2-S2-5] The Home NSP ID SHALL be populated before the file is received by the Home or Home exchange provider. The field is a unique code identifying the home CSN.	Mandatory
NAP ID	R-[X2-S2-6] The NAP ID SHALL be populated before the file is received by the Home or Home exchange provider. The field is a unique code identifying the visited NAP.	Mandatory
Session End Time	Session End Time is the time the sessions ended within the file. Time is recorded in GMT  R-[X2-S2-7] Session End Time SHALL be populated.	Mandatory
Release	R-[X2-S2-8] The Release SHALL be populated with the WRI Stage 3 AAA Proxy Specification Release used to create the X2 Reference Point file.	Mandatory
Version	R-[X2-S2-9] The Version SHALL be populated with the WRI Stage 3 AAA Proxy Specification Version used to create the X2 Reference Point file.	Mandatory
File Creation Timestamp	The File Creation Timestamp represents the time this file was created.	Mandatory

Element Name	Element Description and Requirement	Mandatory or Optional Element
	R-[X2-S2-16] The File Creation Timestamp SHALL be populated.	

**1.2.2.2.2 Subscriber Usage Record (Mandatory)**

A Subscriber Usage Record will be created for each IP session. The following mapping will be used to map from the associated RADIUS attribute(s).

**Table 2: Mapping of X2 elements and RADIUS attributes (RADIUS attributes defined by NWG specification referenced in Part 0)**

*Note: Detailed mapping of RADIUS attributes and X2 elements will be described in WRI Stage 3.*

X2 Element	RADIUS Attribute
Username	User-Name (1) of first Accounting Start message.
Subscriber Identity	CUI (89) or CLASS (25) of first Accounting Start message is used. If more then one Class attribute is found in an Access-Accept message, the NAS SHALL only store the first one and discard the rest.
Mobile Station identifier	Calling-Station-ID (31) of first Accounting Start message.
Session Start Time	Derived using Event-Timestamp (55) of first Accounting Start message potentially modified based on NAS support of Idle-Timeout period subtraction.
Session End Time	Event-Timestamp (55) of last Accounting Stop message.
Session Duration	Derived from Acct-Session-Time (46) from all Accounting Stop messages potentially modified based on NAS support of Idle-Timeout period
Session Active Time	Derived from Active-Time (26/39) from all Accounting Stop messages.
GMT Time-Zone Offset	GMT-Time-Zone-Offset (26/3) of first Accounting Start message.
IP Technology	IP Technology (26/23) of first Accounting Start message.
Base Station ID	BS-ID (26/46) of first Accounting Start message.
Location	Location (26/47) of first Accounting Start message.
NAS Identifier	NAS-ID (32) of first Accounting Start message.
NAP Identifier	NAP-ID (26/45) of first Accounting Start message.
Visited NSP	Derived from NSP-ID (26/57), NAS-ID (32), NAP-ID and/or BS-ID (26/46) of first Accounting Start message.
Home NSP	Derived from realm within User-Name (1) of first Accounting Start message.
Multi-Session ID	Acct-Multi-Session-ID (5) of first Accounting Start message.
Session ID	Acct-Session-ID (44) of first Accounting Start message.
Termination Cause	Acct-Terminate-Cause (49) of last Accounting Stop message.
Mobile Originated Volume	Derived from Acct-Input-Octets (42) and Acct-Input-Gigawords (52) from all Accounting Stop messages.
Mobile Terminated Volume	Derived from Acct-Output-Octets (43) and Acct-Output-Gigawords (53) from all Accounting Stop messages.

### 1.2.2.2.3 Trailer Information

The trailer information facilitates the validation and audit of the X2 Reference Point file. For more information, see business rules and validation.

Element Name	Element Description and Requirement	Mandatory or Optional Element
Total Records Transmitted	Total Records Transmitted is the sum of total sessions contained within the file.  R-[X2-S2-17] Total Records Transmitted SHALL be equal to the sum of total sessions contained within the X2 Reference Point file.	Mandatory
Total Duration	Total Duration is the sum of all Active-Time within the file.  R-[X2-S2-18] Total Duration SHALL be equal to sum of all Active-Time within the X2 Reference Point file.	Mandatory
Total Mobile Originated Volume	Total Mobile Originated Volume is the sum of all Mobile Originated values.  R-[X2-S2-19] Total Mobile Originated Volume SHALL be sum of all Mobile Originated Volume values within the X2 Reference Point file.	Mandatory
Total Mobile Terminated Volume	Total Mobile Terminated Volume is the sum of all Mobile Terminated values.  R-[X2-S2-20] Total Mobile Terminated Volume SHALL be sum of all Mobile Terminated Volume values within the X2 Reference Point file.	Mandatory

### 1.2.2.3 File Naming Convention

R-[X2-S2-10] An X2 Reference Point file SHALL contain only the information processed for a particular roaming pair of NSPs.

#### 1.2.2.3.1 Charge Files

Charge files must use the following naming convention.

Session Usage (Charge)

SUC\_<Sender><Recipient>\_<Seqno (999999)>

#### 1.2.2.3.2 Test Files

Test files must use the following naming convention.

Session Usage (Test)

SUT\_<Sender ><Recipient>\_<Seqno (999999)>

### **1.2.2.3.3 Delivery Mechanism**

---

#### **1.2.2.3.3.1 FTP**

---

R-[X2-S2-11] FTP and secure FTP SHALL be supported as default protocols unless otherwise agreed between the responsible entities exchanging X2 Reference Point files.

R-[X2-S2-12] The initial transmission of a X2 Reference Point file SHOULD use a temporary file name until the process is over.

R-[X2-S2-13] Once the X2 Reference Point file has been successfully transferred, it SHOULD be renamed following the agreed naming convention.

## 1.3 Private Reference Points

---

### 1.3.1 P1 Reference Point (Between RADIUS Device and Agreement Management Function)

---

This reference point is private and is beyond the scope of this specification.

## 1.4 System Functions

---

### 1.4.1 AAA Proxy

---

AAA Proxy is an agent that functions as an AAA server in one side and as an AAA client in other side, and exchanges AAA messages between the two sides with or without inserting, deleting, and modifying some attributes. The AAA Proxy is able to route the AAA messages originated in the visited AAA Server/Proxy to the home AAA Proxy/Server according to the realm information contained in the AAA packets, and vice versa.

#### 1.4.1.1 RADIUS

---

The RADIUS protocol is used for exchanging authentication, authorization, and accounting information as specified in WiMAX™ NWG Network Architecture specification referenced in the WRI Stage 2: Part 0 document, the RADIUS AAA Proxy offered by the AAA Proxy service provider as part of the WiMAX™ roaming services should ensure maximum interoperability among multiple RADIUS implementations, in accordance with the following requirements:

1. R-[R5-S2-1] The RADIUS AAA Proxy SHALL route all the RADIUS packets originated in the visited AAA to the home AAA based on the roaming agreement, and vice versa.
2. R-[R5-S2-2] The RADIUS AAA Proxy SHALL be able to route RADIUS packets to other RADIUS Proxies and accept RADIUS packets from other RADIUS Proxies.
3. R-[R5-S2-3] The RADIUS AAA Proxy SHOULD validate the roaming policy before routing to the destination. If no roaming agreement exists, the RADIUS Proxy SHALL deny the routing for both access and accounting packets by returning explicit reject response to avoid unnecessary retries.
4. R-[R5-S2-4] The RADIUS AAA Proxy SHALL conform to the WiMAX Forum NWG Network Architecture specification referenced in the WRI Stage 2 Part 0 document.
5. R-[R5-S2-5] The RADIUS AAA Proxy SHALL transparently forward any unrecognized RADIUS attributes to the destination if presented.
6. R-[R5-S2-6] The RADIUS AAA Proxy SHALL NOT modify, add, or delete any RADIUS attribute unless explicitly allowed by roaming partners. In addition, the RADIUS Proxy SHALL NOT add a new RADIUS Class attribute to any RADIUS message.
7. R-[R5-S2-7] The RADIUS AAA Proxy SHOULD add the originating and terminating information on a best effort basis in case such information is not available in the RADIUS packet it receives.

8. R-[R5-S2-8] The RADIUS AAA Proxy in the visited domain SHALL be able to be configured in such a way that AAA traffic can be routed directly or via intermediate WiMAX™ Roaming eXchanges (WRXs) from the visited to the home domain based on realm.

## 1.4.2 Agreement Validation

---

Agreement Validation is a function that will determine if a roaming agreement exists between the User's NSP (hNSP) and the vNSP. It is a table that contains a list of NSP pairs that have roaming agreements. This function may be able to identify Unilateral or Bilateral agreements. When a roaming user tries to access a vNSP, an "Access Request" message is sent to the hNSP. Prior to sending the "Access Request" to hNSP, this function will check to see if a roaming agreement exists between the vNSP and the hNSP. If a roaming agreement exists, the "Access Request" message will be forwarded to the hNSP. If a roaming agreement does not exist, the "Access Request" message will not be forwarded, an "Access Reject" message is sent back and the roaming user will not be granted access to the network.

In the case of direct connection between vNSP and hNSP, Agreement Validation is implied in the AAA configuration.

In the absence of a direct connection between vNSP and hNSP, WRX providers are required to provide Agreement Validation.

### Use Case Scenarios

*Use Case 1:* Direct connection between vNSP and hNSP (vNSP is responsible for the roaming agreement lookup and is implied in the AAA configuration):

- A. Roaming Agreement exists between vNSP and hNSP:
  1. MS tries to connect to the vNSP.
  2. MS sends the Authentication information to the vNSP.
  3. vNSP tries to find the hNSP based on the Authentication information received.
  4. vNSP finds hNSP and determines there is a roaming agreement between vNSP and hNSP.
  5. vNSP locates hNSP and forwards the authentication request to hNSP.
  6. hNSP provides authentication reply to vNSP.
  
- B. No Roaming Agreement exists between vNSP and hNSP:
  1. MS tries to connect to the vNSP.
  2. MS sends the Authentication information to the vNSP.
  3. vNSP tries to find the hNSP based in the Authentication information received.
  4. vNSP determines there is no roaming agreement or vNSP is unable to find hNSP. The vNSP may forward the AAA message to the WRX (see scenario below if WRX is used).
  5. If the vNSP does not use the WRX, vNSP rejects MS request to connect.

*Use Case 2:* Connection via WRX between vNSP and hNSP (WRX is responsible for roaming agreement lookup):

- A. Roaming Agreement exists between vNSP and hNSP:
  - 1. MS tries to connect to the vNSP.
  - 2. MS sends the Authentication information to the vNSP.
  - 3. vNSP forwards the request to WRX provider.
  - 4. WRX tries to find the hNSP based on the Authentication information received.
  - 5. WRX finds hNSP and determines there is a roaming agreement between vNSP and hNSP.
  - 6. WRX locates hNSP and forwards the authentication request to hNSP.
  - 7. hNSP provides authentication reply to WRX and WRX forwards the reply to vNSP.
  
- B. No Roaming Agreement exists between vNSP and hNSP:
  - 1. MS tries to connect to the vNSP.
  - 2. MS sends the Authentication information to the vNSP.
  - 3. vNSP forwards the request to WRX.
  - 4. WRX tries to find the HNSP based on the Authentication information received.
  - 5. WRX finds hNSP and determines there is no roaming agreement or WRX is unable to find hNSP.
  - 6. WRX replies back to vNSP with a reject\no agreement message.
  - 7. vNSP rejects MS request to connect.

### 1.4.3 Aggregation

---

#### 1.4.3.1 Session Correlation

---

For wholesale settlement purposes, the WRI AAA Proxy logical function must correlate and aggregate all associated accounting messages for a given accounting session. This is required because the single subscriber usage record passed on to the WRI Wholesale Rating logical function over the X2 Reference Point must represent the total amount of time and/or data volume that the subscriber consumed during a single accounting session.

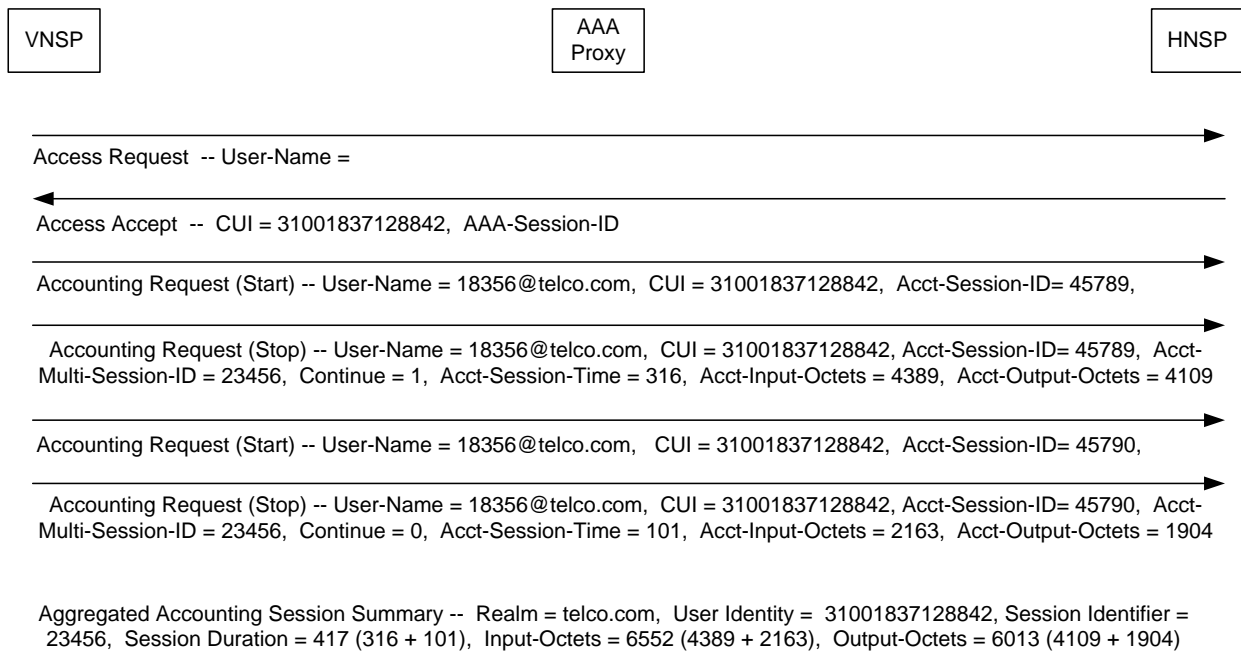
In order to accomplish this, all Accounting Stop messages for an accounting session need to be correlated and aggregated. In WiMAX networks, this is accomplished using the value of WiMAX-Session-ID VSA that is provided by the home AAA (hAAA) in the Access-Accept message after successful authentication. The ASN-GW then takes this value and includes it in the Acct-Multi-Session-ID attribute of all subsequent accounting messages for a given accounting session. In addition to the Acct-Multi-Session-ID, the Acct-Session-ID attribute can be used to match all individual Accounting Start and Stop record pairs for a single Acct-Multi-Session-ID. Interim accounting messages also contain the Acct-Multi-Session-ID and Acct-Session-ID attributes.

The end of an accounting session can be determined based on the value of the Session-Continue VSA in the Accounting Stop messages. If the value of the Session-Continue VSA is set to “True” in an Accounting Stop message, it is expected that the ASN-GW will generate a new Accounting Start message with the same Acct-Multi-Session-ID and a new Acct-Session-ID. When an Accounting Stop message is

received with the Session-Continue VSA set to “False”, it can be assumed that the accounting session has ended and correlation and aggregation of all the accounting messages for that accounting session can take place. Figure 1 below depicts the session correlation process described in this section.

In addition to aggregation and correlation, the WRI AAA Proxy logical function may be asked to perform an audit function to insure that all accounting messages received resulted from a previous subscriber authentication. This can be accomplished by matching the value the Acct-Multi-Session-ID in the Accounting Stop messages with the WiMAX-Session-ID of a previous Access-Accept message for a given Chargeable User ID and realm. If a match is not found, the subscriber usage record for that accounting session might be marked accordingly for processing by the WRI Wholesale Rating logical function, or set aside and not passed on the WRI Wholesale Rating logical function. This audit function is optional and all effected parties must mutually agree upon the specific requirements and resolution process.

**Figure 1: Session Correlation**



### 1.4.3.2 Transfer Timing

R-[X2-S2-14] A daily transfer time SHALL be configurable unless otherwise agreed by the involved parties. The recommended period is hourly in heavy traffic conditions.

## 2 Revision History

Revision	Changes	Date
1	Initial Publication	August 4, 2008
2	<p>Modifications to Align with WRI Release 1.0 Stage 3</p> <p>1) WRI_Stage_3_Rel_1_Part_1_AAA_Proxy_Consolidated_V_V Comment 1589, 1594, 1618, 1620, 1628, 1630 and 1631.</p> <p>Note: Comment 1589 is included if there are any difference beyond the renaming of AAA-Session-ID to WiMAX-Session-ID between NWG Network Architecture Release 1.0 version 1.2 and the latest revision of the NWG specification.</p> <p>2) Editorial changes:</p> <p>a) Add the letter S2 to all requirements.</p> <p>b) Change "Copyright ©" to "Copyright.</p> <p>c) Apply the recommended ® where appropriate.</p> <p>d) Renamed Radius to RADIUS.</p> <p>e) Changed 'interface' to 'reference point' where appropriate.</p> <p>f) Introduce the History section.</p>	March 16, 2009
2	<p>Modifications include:</p> <p>3) Editorial changes:</p> <p>a) Added the words WRI and logical in the text when describing a WRI logical function functionality.</p> <p>b) Changed 'X2 file' to 'X2 Reference Point file' o</p> <p>c) Added the words 'Reference Point' or 'X2 Reference Point file' to some requirements.</p> <p>d) Added the proposed TCC document number to the header.</p> <p>e) Changed 'RADIUS Proxy' to 'RADIUS AAA Proxy'.</p> <p>f) Assigned missing requirement numbers.</p> <p>g) Included the word Reference Point in some header titles.</p> <p>h) Updated the Version and Release to align with WRI Stage 3.</p> <p>i) Updated the Cover Page.</p>	May 3, 2009
2	Includes editorial modifications suggested during review on May 11, 2009 in Dublin	May 15, 2009
2	WiMAX Forum Board of Director Approved	June 24, 2009