



## **WiMAX Forum<sup>®</sup> Network Architecture**

(Stage 2: Architecture Tenets, Reference Model and Reference Points)

[Part 0]

Release 1.0 Version 4

WiMAX Forum APPROVED

WiMAX Forum Document Number

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## 1 Document Structure

- 2 **Note:** See §3.0 References in *WiMAX Forum Network Architecture [Part 1]* for references cited in this document.
- 3 This document is the first part of *WiMAX Forum Network Architecture*, which includes the following parts:

<b>Part 0</b>	<ul style="list-style-type: none"> <li>• <b>Document Structure</b></li> <li>• <b>Revision History</b></li> </ul>
<b>Part 1</b>	<ul style="list-style-type: none"> <li>• <b>Section 1 - Document Scope</b></li> <li>• <b>Section 3 - References</b> used in the document</li> <li>• <b>Section 4 - Tenets for WiMAX Network System Architecture</b></li> <li>• <b>Section 5 - Identifiers: List of identifiers used in a WiMAX network</b></li> <li>• <b>Section 6 - Network Reference Model</b>, a logical representation of the network architecture.</li> </ul>
<b>Part 2</b>	<ul style="list-style-type: none"> <li>• <b>Section 7 - Functional Design and Decomposition</b></li> <li>• <b>Section 8 - ASN Profile Introduction</b></li> </ul>
<b>Part 3</b>	<p><b>Informative Annexes for Stage 2</b></p> <ul style="list-style-type: none"> <li>• <b>Annex A:</b> WiMAX Reference Architecture Deployment Scenarios</li> <li>• <b>Annex B:</b> MS Movement with FA change, no PC change</li> <li>• <b>Annex C:</b> ASN-GW Selection Protocol</li> <li>• <b>Annex D:</b> ‘RRM’: Spare Capacity Report per QoS Profiles</li> <li>• <b>Annex E:</b> Ethernet Operational Behavior</li> <li>• <b>Annex F:</b> TECHNICAL ANNEX: SUPPORT OF REAL TIME SERVICES</li> </ul>
<b>Stage 2 Abbreviations</b>	<ul style="list-style-type: none"> <li>• <b>Section 1-</b> Abbreviations, Acronyms, Definitions and Conventions used in the document</li> </ul>
<b>3GPP</b>	<ul style="list-style-type: none"> <li>• <b>WiMAX Interworking</b></li> </ul>
<b>3GPP2</b>	<ul style="list-style-type: none"> <li>• <b>WiMAX Interworking</b></li> </ul>
<b>WiMAX Interworking with DSL</b>	<ul style="list-style-type: none"> <li>• <b>WiMAX Interworking with DSL</b></li> </ul>

## 4 Revision History

<b>Date</b>	<b>Revision</b>
February 18, 2005	Accepted contributions/changes from F2F meeting in NJ. File name changed from “050130_NWG_BaselineSubmission_01r1_TenetsRef_Model” to “050218_NWG_STAGE2.doc” (Using web site revision management).
March 14, 2005	Incorporated changes from 050309_NWG_03_AAA.doc, Section 2 Updates, Stage 2 Tenets update, and Basic IP address management – 01r3.
April 20, 2005	Added RRM changes from file “050418_RRM_1r6.doc” Approved at the Malaga Spain meeting.

Date	Revision
June 17, 2005	Added the following contributions (file names): <ul style="list-style-type: none"> <li>• 050602_NWG_05_Client_MIP_Architecture-accepted;</li> <li>• 050605_NWG_07_EAP_Arch_Accepted;</li> <li>• 050607_NWG_01r8_PMIP-Inter-ASN-mobility-accepted;</li> <li>• 050607_NWG_NRM-Accepted;</li> <li>• 050609_NWG_01-Intra-ASN-mobility_R6_v03_accepted;</li> <li>• 050609_NWG_Intra-ASN_R4_03_accepted;</li> <li>• 050610_NWG-QoS_accepted.</li> </ul>
June 22, 2005	Added the table of figures and the following contribution (file name): 050606_NWG_R3MM_PMIP-Security.
July 5, 2005	Added contribution 050629_NWG_RRM-Stage2-updates-accepted.
July 6, 2005	RRM corrections and missing text from previous RRM contribution.
August 8, 2005	Added the following contributions (file names): <ul style="list-style-type: none"> <li>• 050609_NDS-r2 Huawei edits meeting edits;</li> <li>• 050627_NWG_FranceTelecom_02_3GPPInterworking;</li> <li>• 050701_NWG_Sprint_01_IPv6_Address_Management_Section_632-Revision 1;</li> <li>• 050701_NWG_Sprint_02_Ipv6_Address_Management_Section_7 3 2;</li> <li>• 050703_NWG_02_EAP_Arch_modif_proposal(sm)2accepted;</li> <li>• 050706_NWG_Sprint_02_3GPP2_Interworking-Revision_2;</li> <li>• 050706_NWG_Sprint_03_Mobile_Ipv6_Architecture;</li> <li>• 050707_NWG_Huawei_Comments_(Intra_ASN_R4_03_accepted)_v1;</li> <li>• 050707_NWG_Huawei_Comments_(Intra_ASN_R4_R6_v03)_v1_accepted;</li> <li>• 050707-NWG-QoS-Framework-Accepted;</li> <li>• 050708_NWG_Stage2_rev4c PMN-AAA Key(Lucent);</li> <li>• 050712_NWG_siem_STAGE2-6-10(RRM)corr-accepted;</li> <li>• 050714_NWG_DLS_Interworking-v14;</li> <li>• 050714_NWG_Emergency_Service_v1;</li> <li>• 070805-eth-cs-specification_stage2r2;</li> <li>• 050714_NWG_Inter-NAP-Mobility-harmonized;</li> <li>• 050223_NWG_IP Address Management-1r6;</li> <li>• 050805_NWG_Functional_Decomposition_Paging-1r5.</li> </ul>
September 5, 2005	Added the following contributions (file names): <ul style="list-style-type: none"> <li>• 050824_NWG_Huawei_Comments_Intra_ASN_Data path modify proposal.doc;</li> <li>• 050822_NWG_Huawei_Intra_ASN_R4_HO_flow_proposal.doc;</li> <li>• 08-16-05_NWG_WiMAX Stage 2 – Text for NRM functional</li> </ul>

Date	Revision
	decomposition; <ul style="list-style-type: none"> <li>• 08-16-05_NWG_Sprint Nextel_New Section 4_v05;</li> <li>• 050823_NWG_Sprint_01_MIPv6 Section 7.22 Updates;</li> <li>• 050812_NWG_Sprint_01_ Additional MIPv6 Changes to Section 6 of Stage-2 Text – R02;</li> <li>• 05-08-16_NWG_Changes_to_section_6.18.2;</li> <li>• 050822_NWG_Huawei_Inter-NAP-Mobility_Multiple IP address comments.doc;</li> <li>• 050827_NWG_Siemens_10_STAGE2-DSL-Interworking.doc;</li> <li>• 050830 R1-NWG-AAA-RADIUS-Stage-2.doc;</li> <li>• 08-16-05_NWG_Sprint Nextel_New Section 4_v05;</li> <li>• 050826_NWG_VoIP_v2.doc;</li> <li>• 050826-NWG-IMS_WiMAX_integration.doc;</li> <li>• 050826-NWG-QoS Messages r3.doc;</li> <li>• 082505 WiMAX Key Transfer Correction – LU.doc;</li> <li>• 08-16-05_NWG_Sprint Nextel_New Section 4_v05;</li> <li>• 050831_NWG-Fn-Decomp_Ch6.doc;</li> <li>• 050825_NWG_SuggestedTextForIntraASNmobilitySec7_v01;</li> <li>• 050825_NWG_Siemens_Identifiers-List_r1.doc;</li> <li>• 050826_NWG_Motorola_10_PMN_Migration_r3.doc;</li> <li>• 050826_NWG_Motorola_PMIPKey_r1.doc.</li> </ul>
September 9, 2005	<ul style="list-style-type: none"> <li>• 050818_NWG_Huawei_Comments for Secure Location Update of Paging-r4.doc;</li> <li>• 050905_NWG_Siemens_channelbinding_r1.doc;</li> <li>• 050826-NWG-ND&amp;S-Revised-Huawei.doc;</li> <li>• 050822_NWG_Huawei_Inter-NAP-Mobility_PMIP connection setup comment.doc;</li> <li>• Added Table List.</li> </ul>
September 11, 2005	<ul style="list-style-type: none"> <li>• 050826-NWG-ND&amp;S-Revised-Huawei_r1.doc;</li> <li>• 050825_NWG_Siemens_Identifiers-List_r2.doc.</li> </ul>
September 12, 2005	Reformatted As Agreed in 050906_NWG_02_STAGE2-document-structure.
September 13, 2005	Re-applied contribution 050816_NWG_WiMAX Stage 2 – Text for NRM functional decomposition_v3; <ul style="list-style-type: none"> <li>• 050826_NWG_Sprint_01_MIPv6 Inter-NAP Mobility-R02;</li> <li>• 050912 wimax accounting stage 2;</li> <li>• 050912_NWG_STAGE2 – Navini Siemens Ethernet edits;</li> <li>• 050908_NWG_Huawei_EAP_Arch_modify proposal-r4_sanjay;</li> <li>• 050907_NWG-R3MM-function-5.</li> </ul>

Date	Revision
September 14, 2005	<p>Removed duplicate text on CMIP per Surest email showing the duplications.                      Provided missed edits per Bala email.                      Cleaned up figure 7-55 per Peretz email.                      Corrected figures and edits per Achim’s email.                      Cleaned up formatting in the Accounting Section (7.13).                      Cleaned up formatting in the Hot-lining Section (7.14).  <b>Note:</b> Was not able to Identify DSL Updates per Max’s email This still needs addressing.</p>
September 15, 2005	<p>Corrected Figures 7-35, 7-105, A-8, and A-8.                      Accepted all changes.                      First Ballot Version.</p>
November 29, 2005	<p>Updated to address all initial round ballot comments as documented in 051122_Stage2_Comment_Tracking.xls.</p>
December 12, 2005	<p>Updated to address all the quality review comments as defined in 051211_Stage2_QR_Comment_Tracking.xls. EXCEPT:</p> <ul style="list-style-type: none"> <li>9 – 11</li> <li>14</li> <li>23</li> <li>28</li> <li>33 – 34</li> <li>36 – 38</li> <li>41 – 43</li> <li>46 – 47</li> <li>49 – 68</li> <li>73 – 75</li> <li>77</li> <li>80 – 81</li> <li>84 – 85</li> <li>87 – 88</li> <li>91</li> <li>104-105</li> </ul> <p>These are all deferred for various reasons and need more input based on this version of the Stage-2.</p>
December 14, 2005	<p>Corrected section numbering addressed additional Quality Review Comments. Open Comments to be addressed are:                      9, 10, 11, 14, 36, 52, 53, 54, 55, 56, 58, 59, 60, 62, 63, 64, and 65.                      Note that comment 36 has a resolution, but the file cannot be located at this time.</p>
December 15, 2005	<p>Address comment QR36 and cleaned up some minor formatting issues.                      There are still 3 open issue that need resolving.</p>

Date	Revision
	<ol style="list-style-type: none"> <li>1. Section 4.1.2 the NAI Identifier has an un-resolved [ref] needs resolving.</li> <li>2. Section 7.2.1.4 there is a large “Editors Note” that I am not sure I should remove or not.</li> <li>3. QR9 regarding the 3GPP2 reference of the MIPv6 text needs to be addressed. Sprint is leading an effort to get reuse permission from 3GPP2 which should not be an issue since they have done this in the past.</li> </ol>
February 6, 2006	<p>No technical changes to document.</p> <p>This version simply broke the December 15, 2005 version into 4 separate parts to reduce the size of the document to keep it more manageable. The sections are as follows:</p> <p>Part 0 – This document – It contains to overall cover sheet, revision history, and document definitions;</p> <ul style="list-style-type: none"> <li>• Part 1 – Contains sections 1 through 6 and associated Table of Contents;</li> <li>• Part 2 – Contains section 7 and associated Table of Contents;</li> <li>• Part 3 – Contains all the Annexes and associated Table of Contents.</li> </ul>
March 3, 2006	<p>Incorporated the following agreed contributions:</p> <ul style="list-style-type: none"> <li>• 060106_NWG_Huawei_Requirements for Supporting MIPv6 Proxy DAD on the MS's CoA-r2.doc;</li> <li>• 051104_NWG_Huawei_Change Stage2 HO Function Primitives_r2.doc;</li> <li>• 051104_NWG_Huawei_CATR_Add Accounting Trigger_r2.doc;</li> <li>• 051104_NWG_Huawei_CATR_Add New Action for Charging_accepted.doc;</li> <li>• 051104_NWG_Huawei_CATR_Clarify In Prepaid of Charging_r2.doc;</li> <li>• 051106_NWG_Huawei_CATR_Accounting proposal for Volume Count Stage 2-r2.doc;</li> <li>• 051104_NWG_Huawei_Stage2 CMIP session termination-r1.doc;</li> <li>• 051104_NWG_Huawei_CATR_Change Stage2 Data Path Primitives_r1.doc;</li> <li>• 060118_NWG_Siemens&amp;Alcatel_QoS-ArchModifProposal.doc;</li> <li>• 060131_NWG_stage2_paging_modifications_final.doc;</li> <li>• ASN Profiles Text Proposed Baseline v2.doc;</li> <li>• 051205_NWG_Intel_stage2pagingchanges_tosupport_stage3r2.doc.</li> </ul>
April 14, 2006	<p>Incorporated the following agreed contributions:</p> <ul style="list-style-type: none"> <li>• 060125_NWG_stage2_paging_modifications.doc;</li> <li>• 060224_NWG_Siemens_stage2_annexA_update_r1.doc;</li> <li>• 060321_NWG_Samsung_RefSec_r1.doc.</li> </ul>
April 20, 2006	<p>Incorporated the following agreed contributions:</p> <ul style="list-style-type: none"> <li>• 060321_NWG_Siemens_stage2_AAA_update_r1.doc.</li> </ul>
August 08, 2006	<p>Incorporate comments resolution from V&amp;V readiness ballot' in Stage 2 Part 0 and Stage 3.</p>

Date	Revision
August 9, 2006	Final V&V readiness draft.
February 24, 2007	All accepted contributions from V&V implemented.
July 11, 2007	Implemented all Stage 2 accepted contributions from 00000_r016_NWG-Rel-1[1].0.0-CR-Tracking-Spreadsheet.xls.
September 14, 2007	Implemented all Stage 2 accepted contributions from 00000_r041_NWG-Rel-1[1].0.0-CR-Tracking-Spreadsheet.xls.
November 08, 2007	Implemented all Stage 2 accepted contributions from 00000_r055_NWG-Rel-1.0.0-CR-Tracking-Spreadsheet.xls.
January 11, 2008	Implemented all Stage 2 accepted contributions from 00000_r069_NWG-Rel-1[1].0.0-CR-Tracking-Spreadsheet.xls.
March 21, 2008	Implemented all Stage 2 accepted contributions from 00000_r084_NWG-Rel-1[1].0.0-CR-Tracking-Spreadsheet.xls.

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