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Technical Specification

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Mobility between 3GPP Wireless Local Area Network (WLAN) interworking (I-WLAN) and 3GPP systems;
General Packet Radio System (GPRS) and 3GPP I-WLAN aspects;
Stage 3
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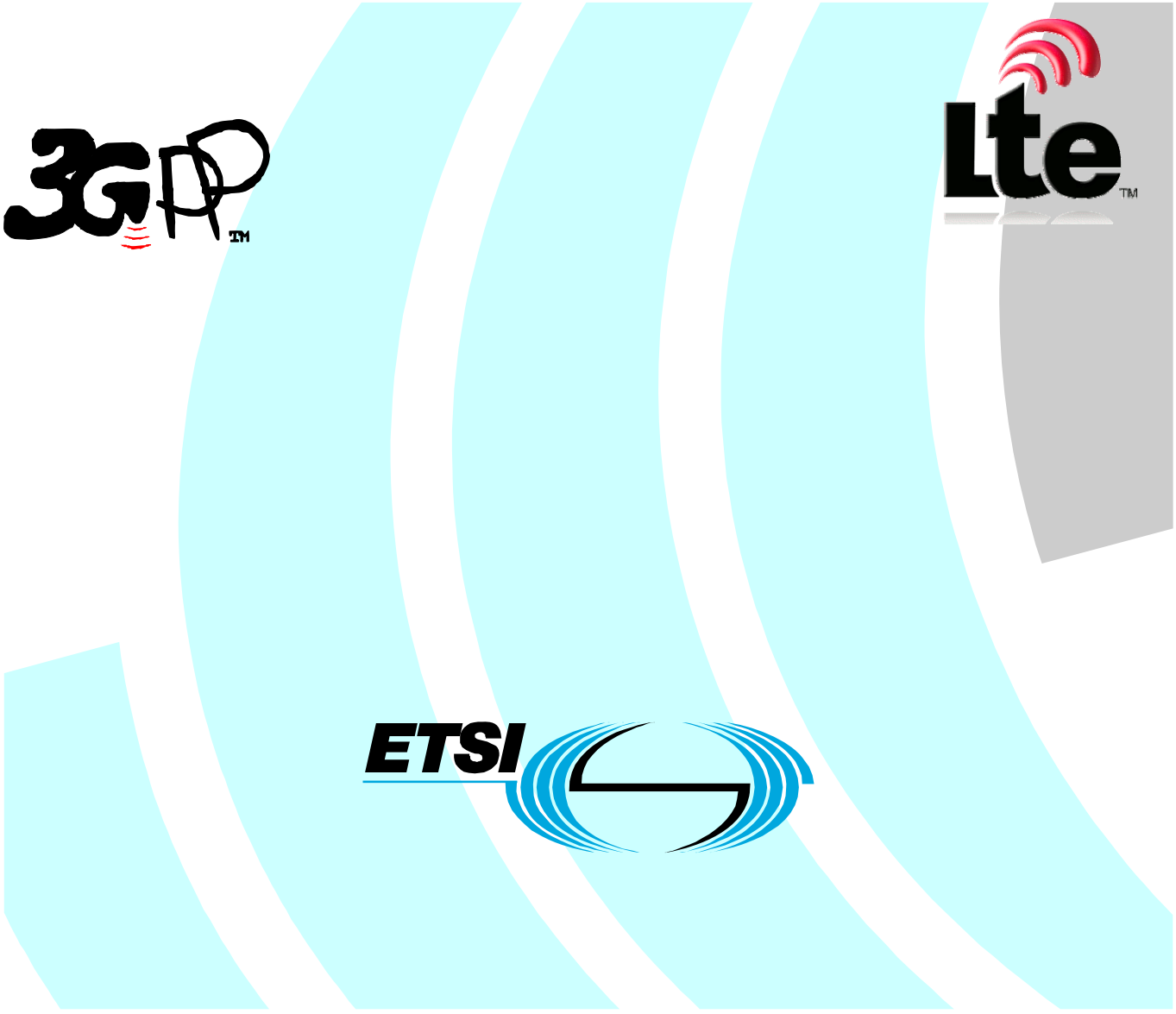

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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

This document specifies the signalling procedures for handling the mobility of a UE between 3GPP Wireless Local Area Network Interworking (I-WLAN) and GPRS systems.

The present document is applicable to the User Equipment (UE) and the network nodes supporting mobility between 3GPP I-WLAN and GPRS systems.

In addition, the present document specifies the procedures used between the UE and the network nodes for the attach and the detach cases. It also specifies how the UE performs handover when moving from 3GPP I-WLAN to GPRS systems and vice-versa.

This document is based on DSMIPv6 procedures specified in 3GPP TS 24.303 [3] and will specify additional details specific to the 3GPP I-WLAN and GPRS systems in the context of mobility.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.327: "Mobility between 3GPP-Wireless Local Area Network (WLAN) Interworking and 3GPP Systems".

[3] 3GPP TS 24.303: "Mobility management based on Dual-Stack Mobile IPv6".

[4] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core network protocols".

[5] 3GPP TS 24.234: "3GPP system to Wireless Local Area Network (WLAN) interworking; WLAN User Equipment (WLAN UE) to network protocols".

[6] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".

[7] 3GPP TS 29.161: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services with Wireless Local Area Network (WLAN) Access and Packet Data Networks (PDN)".

[8] IETF RFC 4877 (April 2007): "Mobile IPv6 Operation with IKEv2 and the Revised IPsec Architecture".

[9] IETF RFC 4306 (December 2005): "Internet Key Exchange (IKEv2) Protocol".

[10] IETF RFC 5555 (June 2009): "Mobile IPv6 Support for Dual Stack Hosts and Routers".

[11] IETF RFC 3776 (June 2004): "Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents".

[12] IETF RFC 3775 (June 2004): "Mobility Support in IPv6".

[13] Void.

[14] 3GPP TS 33.402: "3GPP System Architecture Evolution (SAE); Security aspects of non-3GPP accesses".

[15] Void.

[16] 3GPP TS 29.282: "Mobile IPv6 vendor specific option format and usage within 3GPP".

[17] 3GPP TS 24.302: "Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks; Stage 3".

[18] IETF RFC 5026 (October 2007): "Mobile IPv6 Bootstrapping in Split Scenario".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply.

Home Agent: The HA functionality consists in the DSMIPv6 anchor point functionality described in IETF RFC 5555 [10] and IETF RFC 4877 [8]. Based on 3GPP TS 23.327 [2] the HA functionality may be implemented as a stand-alone entity, or collocated with the GGSN or the PDG.

H1: This is the reference point for signalling and user data transfer between UE and HA.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.303 [3] apply:

Home Network Prefix

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

DSMIPv6	Dual-Stack MIPv6
HA	Home Agent
HNP	Home Network Prefix
IKEv2	Internet Key Exchange version 2
PDG	Packet Data Gateway

4 General

4.1 Overview

This specification defines the solution to handle the mobility between 3GPP I-WLAN and GPRS systems. Such solution relies on DSMIPv6 protocol which is specified in IETF RFC 5555 [10] and IETF RFC 3775 [12] and is used to model the H1 reference point between the UE and the HA function. The H1 reference point enables the UE to handover from 3GPP I-WLAN towards GPRS systems, and vice-versa, and granting session continuity by means of a DSMIPv6 signalling and an IP tunnel between UE and HA functions. This specification specifies only the procedures which are specific to I-WLAN mobility scenarios and relies on 3GPP TS 24.303 [3] for DSMIPv6 procedures. In this specification, DSMIPv6 signalling is secured as specified in IETF RFC 4877 [8]: IKEv2 exchange is performed by the UE with the HA before tunnel establishment. The details of the security aspects are specified in 3GPP TS 33.402 [14].

4.2 Identities

As identification towards the HA, the UE shall use the same identities as described in 3GPP TS 24.303 [3]. To identify the desired HA, the UE shall use the HA-APN as specified in 3GPP TS 24.303 [3].

The UE shall use the same identities as specified in 3GPP TS 24.008 [4] to access GPRS systems.

The UE shall use the same identities as specified in 3GPP TS 24.234 [5] to access 3GPP I-WLAN.

5 I-WLAN mobility procedures

5.1 Initial attach

5.1.1 General

The attach procedure is performed by the UE when connecting to GPRS systems or to 3GPP I-WLAN. After completion of the attach procedure, H1 PDN attach may be performed. Through H1 PDN attach, the UE receives all the required parameters and information enabling the continuity of the session. The information is retrieved through the following procedures:

- **Discovery of the home agent address:** the UE needs to discover the IPv6 address and eventually the IPv4 address of the HA.
- **Security association establishment:** if not on its home link, the UE needs to establish IPsec security associations with the HA in order to secure the DSMIPv6 signalling as specified in 3GPP TS 33.402 [14]. IKEv2, defined in IETF RFC 4877 [8], is used to establish IPsec security association.
- **IPv6 home network prefix assignment and home link detection:** the UE needs to be assigned an IPv6 Network Prefix of its home network in order to configure a global unicast home address to be used in DSMIPv6 and to perform the home link detection.
- **IPv4 home address assignment:** optionally, a dual-stack UE can also request to be assigned an IPv4 home address to be used for example for IPv4-only applications.
- **Initial binding registration:** unless the home link detection procedure indicates the UE is at home, the UE sends a Binding Update message to perform its initial registration with the HA.

5.1.2 UE procedures

5.1.2.1 General

When connecting to GPRS systems, the UE shall perform the GPRS attach procedure and establish a PDP context as described in 3GPP TS 24.008 [4]. During the PDP context activation procedure, the UE may request the HA IP address(es) and the Home Network Prefix. If the home network prefix is pre-configured or obtained from the GGSN, the UE shall perform the home link detection procedure as described in subclause 5.1.2.4. If the UE is on its home link, the UE shall not perform the H1 PDN attach. If the UE is not on the home link or does not have a HNP yet, the UE shall discover the HA address as described in subclause 5.1.2.2 if the UE does not have the HA address, and then shall perform the H1 PDN attach procedure.

When connecting to the 3GPP I-WLAN, the UE shall perform the I-WLAN attach procedure as described in 3GPP TS 24.234 [5]. During the tunnel setup to the PDG, the UE may request a HA IP address or a HNP, or both, as described in annex B. If the home network prefix is pre-configured in the UE or obtained from the PDG as described in annex B, the UE shall perform the home link detection procedure as described in subclause 5.1.2.4. If the UE is on its home link, the UE shall not perform the H1 PDN attach. If the UE is not on the home link or does not have a HNP yet, the UE shall discover the HA address as described in subclause 5.1.2.2 if the UE does not already have the HA address, and then perform the H1 PDN attach procedure.

The H1 PDN attach procedure involves the following tasks:

- IPsec security associations' establishment and IPv6 home network prefix assignment;
- home link detection, if this procedure was not performed during the attachment; and
- initial binding registration if the UE is not at its home link.

5.1.2.2 Discovery of the Home Agent address

The first procedure the UE needs to perform for DSMIPv6 initial attach is the discovery of the node acting as the HA.

The UE discovers the IPv6 address and optionally the IPv4 address of the HA in one of the three following ways:

- via DNS as defined in 3GPP TS 24.303 [3];
- during the PDP context activation procedure in GERAN or UTRAN accesses via the Protocol Configuration Options as defined in 3GPP TS 24.008 [4] if the HA IP address is available in the GGSN; or
- via IKEv2 during tunnel setup with PDG for 3GPP I-WLAN as defined in annex B if the HA IP address is available in the PDG.

If the HA IP address(es) are available in the GGSN, the GGSN shall return the HA IP address(es) in the Protocol Configuration Options during the PDP context activation procedure when attaching to the GERAN or UTRAN accesses. If the HA IP address(es) are not available in the GGSN, the UE shall discover the HA IP address(es) by DNS if the UE wants to perform the handover to 3GPP I-WLAN.

If the UE requests the HA IP address(es) during the IPsec tunnel setup to PDG in 3GPP I-WLAN connection and if the HA IP address(es) are available in the PDG, the PDG shall return the HA IP address(es) in IKEv2 configuration payload attributes as defined in annex B. If the HA IP address(es) are not available in the PDG, the UE shall discover the HA IP address(es) by DNS before performing the H1 PDN attach.

The UE shall support the HA discovery based on DNS and on Protocol Configuration Options. The UE may support the HA discovery based on IKEv2.

The HA IP address(es) may also be pre-configured in the UE.

5.1.2.3 Security association establishment and IPv6 home network prefix assignment

The UE shall perform the security association establishment with the HA as specified in 3GPP TS 24.303 [3]. For this procedure the UE shall support IKEv2 protocol and EAP over IKEv2 as described in IETF RFC 4306 [9]. The detailed procedure and supported extensions for this step are specified in 3GPP TS 24.303 [3]. The UE may use either EAP-SIM or EAP-AKA for authentication purposes.

During the IKEv2 exchange, the UE shall request an IPv6 home network prefix as specified in 3GPP TS 24.303 [3]. The UE shall then auto-configure an IPv6 home address from the received prefix and create child SA as specified in 3GPP TS 24.303 [3].

In the IKEv2 signalling the UE should indicate the target PDN the UE wants to connect to in the IDr payload as specified in 3GPP TS 24.303 [3].

5.1.2.4 Home link detection

The DSMIPv6 home link detection function is used by the UE to detect if, for a specific PDN, an access interface is on the home link from DSMIPv6 perspective. The home link detection function for a specific PDN connection shall be performed whenever the UE receives a new IPv6 prefix, either at initial attach or after a handover.

The UE is informed of the IPv6 prefix associated with a specific access interface. If the UE is connected to GPRS systems, the UE knows the IPv6 prefix via the IPv6 address autoconfiguration as described in 3GPP TS 29.061 [6]. If UE is connected to the 3GPP I-WLAN, it knows the IPv6 prefix via IPv6 address autoconfiguration as described in 3GPP TS 29.161 [7].

In the scenarios considered in this specification, the Home Network Prefix associated to the PDN connection can be assigned:

- via Protocol Configuration Options from the GGSN in GPRS systems as specified in 3GPP TS 24.008 [4];

- via IPsec security associations bootstrap with the PDG in I-WLAN as specified in annex B;
- via the establishment of IPsec security associations with the HA as specified in 3GPP TS 24.303 [3] subclause 5.1.2.2; or
- the HNP may also be pre-configured in the UE.

The home link detection procedure performed by the UE is specified in 3GPP TS 24.303 [3].

If the UE detects it is in the home link for this specific PDN over the access interface, the UE shall not perform the H1 PDN attach. If the UE detects it is not on the home link, the UE shall perform IKEv2 procedure for security associations setup and IPv6 prefix and optionally IPv4 HA assignment if the UE does not have a valid security association with the HA, and then the UE shall send a Binding Update as specified in 3GPP TS 24.303 [3].

5.1.2.5 Initial binding registration and IPv4 home address assignment

After establishing the security association and obtaining the IPv6 home network prefix and after performing the home link detection, if not on the home link, the UE shall send a Binding Update message as specified in 3GPP TS 24.303 [3] to register its IPv6 home address with its care-of address.

The UE may also request in the Binding Update an IPv4 home address based on the procedure specified in 3GPP TS 24.303 [3].

5.1.3 Network procedures

5.1.3.1 GPRS systems aspects

During the PDP context activation procedure in GERAN or UTRAN accesses, if the HA IP address(es) and the HNP are available in the GGSN, the GGSN shall provide them to the UE via the Protocol Configuration Options as defined in 3GPP TS 24.008 [4].

5.1.3.2 3GPP I-WLAN aspects

During the IPsec tunnel establishment, if the UE requests the HA IP address(es) or the HNP, or both, and if they are available in the PDG, the PDG shall provide them to the UE via the dedicated IKEv2 attributes as defined in annex B. The HA IP address(es) are referred to the W-APN for which the IPsec tunnel is set-up and which was inserted in the "IDr" payload of the IKE_AUTH request message to the PDG.

5.1.3.3 HA procedures

5.1.3.3.1 Security association establishment and IPv6 home network prefix assignment

The HA shall support the IKEv2 protocol and EAP over IKEv2 as described in IETF RFC 4306 [9]. The HA procedures for security association establishment and IPv6 home network prefix assignment are specified in 3GPP TS 24.303 [3].

5.1.3.3.2 Initial binding registration and IPv4 home address assignment

The HA procedures for initial binding registration and IPv4 home address assignment are specified in 3GPP TS 24.303 [3].

In addition, if the HA has the GGSN APN information, the HA shall send the APN to the UE in the Binding Acknowledgement message using the 3GPP Vendor-Specific Access Point Name as specified in annex A.

5.2 Handover

5.2.1 General

The handover procedure is performed by the UE when it is moving from GERAN or UTRAN accesses to 3GPP I-WLAN and vice-versa.

5.2.2 Handover from GPRS systems to 3GPP I-WLAN

5.2.2.1 UE procedures

When the UE is connected to the GPRS systems and wants to move to 3GPP I-WLAN, the UE shall initiate the tunnel establishment procedure towards the PDG as described in 3GPP TS 24.234 [5] and shall then perform the home link detection as described in subclause 5.1.2.4:

- If the UE is not on the home link and does not know the HA IP address, it shall perform the HA discovery procedure as specified in subclause 5.1.2.2 and then perform the H1 PDN attach procedure with the HA. If the UE already knows the HA IP address but has not established security associations with the HA, the UE shall perform the H1 PDN attach with the HA after the attachment to the 3GPP I-WLAN. If available, the UE shall provide its IPv6 Home Address to the HA during the IKE_AUTH request message in the configuration payload INTERNAL_IP6_ADDRESS as described in IETF RFC 5026 [18]. If the UE has already a valid binding at the HA, the UE shall send a Binding Update message to inform the HA of its new Care-of-Address, as specified in 3GPP TS 24.303 [3]. During the handover, the UE keeps using the GERAN or UTRAN accesses.

- If the UE is on the home link, the UE shall send a Binding Update with lifetime set to 0 to remove the binding at the HA as specified in 3GPP TS 24.303 [3].

Once the handover is completed, the UE should deactivate the PDP context and may initiated a detach procedure in the GPRS system.

5.2.2.2 Network procedures

5.2.2.2.1 3GPP I-WLAN aspects

Once the UE is connected to the 3GPP I-WLAN and if the UE is on the home link for the PDN connection, the 3GPP I-WLAN shall ensure that the UE obtains the IP address, which is the same as the Home Address, during the establishment of the IPsec tunnel with the PDG.

5.2.2.2.2 HA aspects

Upon receiving of the Binding Update message from the UE, the HA shall behave as described in 3GPP TS 24.303 [3].

5.2.3 Handover from 3GPP I-WLAN to GPRS systems

5.2.3.1 UE procedures

When the UE is connected to the 3GPP I-WLAN and wants to move to GPRS systems, the UE shall perform the attach and PDP context activation procedures as described in 3GPP TS 24.008 [4]. The APN provided by the UE in the PDP context activation procedure is used by the SGSN to allocate the GGSN. When the HA and the GGSN are collocated, the UE shall be connected to the GGSN that contains the HA function allocated in 3GPP I-WLAN. For that purpose, the UE shall use the received APN in the Binding Acknowledgement message during H1 PDN attach for performing the PDP context activation procedure. If no APN is received in the Binding Acknowledgement message during H1 PDN attach, the UE shall use the pre-configured APN, if available, for performing the PDP context activation procedure.

Once the UE is attached to the GPRS system and after performing the PDP context activation procedure, it will receive a new PDP address as a Care-of-Address. The UE shall then perform the home link detection procedure as specified in subclause 5.1.2.4:

- If the UE is not in the home link and does not know the HA address, the UE shall perform the HA address discovery procedure as specified in subclause 5.1.2.2 and then perform the H1 PDN attach procedure with the HA. If the UE already knows the HA address but does not have a valid binding at the HA, the UE shall perform the H1 PDN attach procedure with the HA after the attachment to the GPRS system. If the UE has already a valid binding at the HA, the UE shall send a Binding Update message as specified in 3GPP TS 24.303 [3].

- If the UE is on the home link, the UE shall send a Binding Update with lifetime set to 0 to remove the binding at the HA as specified in 3GPP TS 24.303 [3].

Once the handover is completed, the UE should initiate tunnel disconnection from the 3GPP I-WLAN.

5.2.3.2 Network procedures

5.2.3.2.1 GPRS systems aspects

Once the UE is connected to the GPRS system and if it is on the home link for a PDN connection, the GPRS system shall ensure that the UE keeps the same Home Address during the PDP context activation procedure.

5.2.3.2.2 HA aspects

Upon receiving of the Binding Update message from the UE, the HA shall behave as described in 3GPP TS 24.303 [3].

5.3 Detach

5.3.1 General

The DSMIPv6 detach is performed by the UE to tear down the IP tunnel between the UE and the HA and the respective IKEv2 session or by the network to inform the UE that it does not have access to a specific PDN through DSMIPv6 any longer. After the detach procedure, the UE still has IP connectivity provided by the access network.

5.3.2 UE procedures

5.3.2.1 Network-initiated detach

The network-initiated detach is based on the usage of the Binding Revocation Indication (BRI) message. When the UE receives a BRI, it shall proceed as described in 3GPP TS 24.303 [3].

5.3.2.2 UE-initiated detach

To detach from a specific PDN to which it is connected through a DSMIPv6 session, the UE shall de-register the DSMIPv6 binding and tear down the IPsec security association as specified in 3GPP TS 24.303 [3].

5.3.3 Network procedures

5.3.3.1 GPRS systems aspects

Network detachment of the UE connected to GPRS systems is performed as described in 3GPP TS 24.008 [4]. This procedure is independent from H1 reference point procedures.

5.3.3.2 3GPP I-WLAN aspects

Network detachment of the UE connected to a 3GPP I-WLAN is performed as described in 3GPP TS 24.324 [5]. This procedure is independent from H1 reference point procedures.

5.3.3.3 HA aspects

Once the HA receives a trigger for network-initiated detach procedure or a Binding Update with lifetime field set to 0, the HA shall proceed as described in the Dual-Stack Mobile IPv6 detach procedure in 3GPP TS 24.303 [3].

5.4 Protection of DSMIPv6 tunnel traffic

5.4.1 General

UE and HA may create a child security association using the IKEv2 session established as described in subclause 5.1.2.3. This child security association is used to cipher or integrity protect, or both, all data traffic exchanged

within the DSMIPv6 tunnel. The procedure is initiated by the HA and may be initiated at any time after the security association between UE and HA has been set up. The support of this procedure is optional for both the HA and the UE.

5.4.2 UE procedures

When the UE receives a CREATE_CHILD_SA request from the HA with selectors indicating the DSMIPv6 tunnel traffic, the UE should reply with a CREATE_CHILD_SA response selecting the preferred transform proposed by the HA as specified in IETF RFC 4306 [9].

If the child SA is created successfully, the UE shall start ciphering or integrity protecting, or both, all the uplink packets in the DSMIPv6 tunnel as negotiated with the HA during the CREATE_CHILD_SA procedure.

The UE may stop ciphering or integrity protecting, or both, the DSMIPv6 tunnel traffic. In order to do that, the UE shall delete the respective child security association by sending an INFORMATIONAL request message including the DELETE payload as specified in IETF RFC 4306 [9]. The protocol ID shall be set to 3 in order to indicate that only the ESP SA shall be removed.

5.4.3 HA procedures

After establishing the IPsec security association with the UE as described in subclause 5.1.3.3, the HA may optionally trigger the creation of a child security association to protect the traffic send via the DSMIPv6 tunnel.

In order to activate the protection of DSMIPv6 tunnel traffic, the HA shall initiate the creation of a child security association sending a CREATE_CHILD_SA request message to the UE. In the CREATE_CHILD_SA message the HA shall request for an ESP security association; the HA shall also set the SA payload depending if integrity protection or ciphering, or both, are needed as described in IETF RFC 4306 [9]. The traffic selectors shall be set as described in subclause 5.2.4 of IETF RFC 3776 [11].

If the child security association is created successfully, the HA shall start ciphering or integrity protecting, or both, all the downlink packets in the DSMIPv6 tunnel as negotiated with the UE during the CREATE_CHILD_SA procedure.

At any time the HA may stop ciphering or integrity protecting, or both, the DSMIPv6 tunnel traffic. In order to do that, the HA shall delete the respective child security association by sending an INFORMATIONAL request message including the DELETE payload as specified in IETF RFC 4306 [9]. The protocol ID shall be set to 3 in order to indicate that only the ESP SA shall be removed.

Annex A (normative): Message details

A.1 General

The DSMIPv6 messages described in annex A of 3GPP TS 24.303 [3] are applicable to this specification. Additional mobility option(s) and message(s) are described in this section which is also applicable for the mobility between 3GPP I-WLAN and GPRS systems.

A.2 I-WLAN Mobility Specific DSMIPv6 Information Elements

A.2.1 General

This specification requires the encoding of additional I-WLAN Mobility Specific Information Elements for DSMIPv6 with the 3GPP Mobile IPv6 Option, as defined by 3GPP TS 29.282 [16]. The I-WLAN Mobility Specific Information Elements defined by this specification are listed in the table A.2.1-1.

Table A.2.1-1: I-WLAN Mobility Specific DSMIPv6 Information Elements

I-WLAN Mobility Specific DSMIPv6 Information Elements	I-WLAN Mobility Specific DSMIPv6 Information Elements description
I-WLAN Mobility Access Point Name (APN)	Subclause A.2.2

The subtype for an I-WLAN Mobility Specific DSMIPv6 Information Element shall be reserved in 3GPP TS 29.282 [16]. The data format of the I-WLAN Mobility Specific DSMIPv6 Information Element shall be defined in this specification. If the data format is defined by another specification, that specification shall be referenced in the table above.

A.2.2 I-WLAN Mobility Access Point Name (APN)

The purpose of the I-WLAN Mobility APN Information Element is to carry an APN if the HA is collocated with the GGSN. The APN is used by the UE when handover is performed from 3GPP I-WLAN to GPRS.

The 3GPP Vendor-Specific Vendor Specific Access Point Name IE is described in figure A.2.1-1 below:

	Bits							
Octets	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
1~n	Access Point Name (APN)							

Figure A.2.1-1: 3GPP Vendor-Specific Access Point Name (APN)

Annex B (normative): IKEv2 Configuration Payload attributes

B.1 General

When connecting to 3GPP I-WLAN, the UE may request the Home Agent IP address(es) or the Home Network Prefix, or both, by including the corresponding attributes in an IKE_AUTH request message Configuration Payload of type CFG_REQUEST as described below.

Upon receipt of an IKE_AUTH request message containing a request for HA IP address(es) or HNP, or both, and after authorization and authentication with the 3GPP AAA server as described in 3GPP TS 24.234 [5], and if available in the PDG, the PDG shall provide to the UE at least one of:

- the HA IPv6 address and optionally the HA IPv4 address in the IKE_AUTH response CFG_REPLY Configuration Payload as specified in 3GPP TS 24.302 [17]; or

- the IPv6 HNP as described in the HNP attribute is defined as MIP6_HOME_PREFIX attribute as described in IETF RFC 5026 [18].

When the UE wants to have other PDN connections through the same PDG, the UE may discover the HA IP address(es) using DNS as defined in 3GPP TS 24.303 [3].

Annex C (informative): Deployment cases for access system as home link

C.1 General

3GPP TS 23.327 [2] describes how to handle the mobility between 3GPP I-WLAN and GPRS systems based on DSMIPv6 protocol. Each system, GPRS or I-WLAN, can be the UE's home link or foreign link depending on the IP prefix associated to the access systems.

The GPRS can be the UE's home link if the HNP is assigned in the router advertisement to the UE after PDP context establishment. Otherwise, the GPRS access will be considered as a foreign link.

The I-WLAN can be the UE's home link if the HNP is assigned to the UE by PDG with an INTERNAL_IP6_SUBNET attribute. Otherwise, the I-WLAN will be considered as a foreign link.

In both cases, the HA function is the anchor point of the UE mobility between 3GPP I-WLAN and GPRS systems.

This annex describes possible deployment cases where one of the access systems acts as the home link.

C.2 Access system as Home link in collocated case

In order to act as home link, the access system can have the HA function collocated.

For instance, the GPRS access can be the UE home link if the GGSN function and the HA function are logically collocated. The UE receives HNP when attaching to GPRS access. In this case, the interface between GGSN and HA function becomes an internal interface.

When the GGSN (or PDG) and the HA function are collocated, it is assumed that some information (e.g. UE binding information) and the network resource (e.g. IP address pool) are shared. Some kind of signalling between the two functions is necessary. How the information and resource are shared between the two functions is an implementation issue, which is out of the scope of this TS.

C.3 Access system as Home link in non-collocated case

When the GGSN (or PDG) and the HA function are not collocated, it is possible to make the access system act as home link. This is possible only if the HA and the access are sharing the UE binding information and the UE IP address pool.The interactions for the HNP allocation is an implementation issue, which is out of the scope of this TS. For example, this can be achieved by using static HNP assignment, or dynmamic HNP assignment using RADIUS or DHCP procedures.

If static IP address assignment is used, the UE's HNP is statically configured in the HSS. The GGSN or PDG receives the static HNP from HSS or 3GPP AAA server during the authentication procedure, and assigns it to the UE.

If DHCP is used for dynamic HNP address assignment, the support of DHCPv6 prefix delegation option by the HA and the access system acting as home link is required.

As an example for dynamic HNP allocation procedure at GGSN using RADIUS, the RADIUS procedure can be triggered by a pre-configured APN at GPRS attachment procedure. The GGSN can be configured to request and release a HNP for the given UE and given APN from an external server by using the Radius interface. The GGSN can receive the UE's HNP from the RADIUS server during authentication of the UE. There are at least two deployment options for how to coordinate the UE's HNP assignment between GGSN and the RADIUS server:

- One alternative is that the HA acts as a RADIUS proxy or server. In this case, based on the received IMSI and APN, the HA will retrieve the assigned HNP and return it back to the GGSN as part of the access accept message.

- Another alternative is that there is an external RADIUS server to which the GGSN communicates with directly. The HA requests HNP of the UE from the same RADIUS external server at DSMIP bootstrapping procedures. The RADIUS external server needs to allocate the same HNP to the UE based on the IMSI and APN when the request is received from different network nodes.

Annex D (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2008-05					Draft skeleton provided by Rapporteur		0.0.0
2008-05	CT1#53				Includes the following documents: C1-081970, C1-082002	0.0.0	0.1.0
2008-06	CT#40				Inclusion of the TS number (24.327) after CT approval of the WID	0.1.0	0.1.1
2008-07	CT1#54				Includes the following documents: C1-082647, C1-082648, C1-082649, C1-082650, C1-082651, C1-082652, C1-082653	0.1.1	0.2.0
2008-08	CT1#55				Includes the following documents: C1-083012, C1-083077, C1-083078, C1-083493, C1-083494, C1-083495, C1-083496	0.2.0	0.3.0
2008-09					Version 1.0.0 created for presentation to TSG CT#41 for information	0.3.0	1.0.0
2008-10	CT1#55bis				Includes the following documents: C1-084374, C1-084375, C1-084376, C1-084377, C1-084378, C1-084379	1.0.0	1.1.0
2008-11	CT1#56				Includes the following documents: C1-084696, C1-085073, C1-085323, C1-085325, C1-085361, C1-085362	1.1.0	1.2.0
2008-11	E-mail review				Editorial clean-up	1.2.0	1.2.1
2008-11	E-mail review				Editorial clean-up: change Annex A and B to Heading 8, and Annex A.x to Heading 1, and Annex A.x.y to Heading 2	1.2.1	1.2.2
2008-11					Version 2.0.0 created for presentation to TSG CT#42 for approval	1.2.2	2.0.0
2008-12	CT#42				Version 8.0.0 created after approval in CT#42	2.0.0	8.0.0
2009-01					LTE logo and keyword removed, GSM logo and keyword added	8.0.0	8.0.1
2009-03	CT#43				Typo in the title fixed and editorial cleanup	8.0.1	8.1.0
2009-03	CT#43	CP-090248	0001	4	Removing 3GPP Vendor Specific Mobility Option format	8.0.1	8.1.0
2009-03	CT#43	CP-090151	0002		Clarification on IPv4 Home Address assignment	8.0.1	8.1.0
2009-03	CT#43	CP-090151	0003	2	HA IP address(es) and HNP assignment through IKEv2 with PDG	8.0.1	8.1.0
2009-03	CT#43	CP-090151	0004	1	UE sends its Home Address, if available	8.0.1	8.1.0
2009-03	CT#43	CP-090151	0005	1	Editorial's corrections	8.0.1	8.1.0
2009-03	CT#43	CP-090151	0008	1	Clarification on using Protocol Configuration Options	8.0.1	8.1.0
2009-06	CT#44	CP-090420	0010	1	Internet draft reference update	8.1.0	8.2.0
2009-09	CT#45	CP-090673	0012	1	I-WLAN Mobility	8.2.0	8.3.0
2009-09	CT#45	CP-090673	0014		DSMIPv6 reference update	8.2.0	8.3.0

History

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V8.1.0	March 2009	Publication
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V8.3.0	September 2009	Publication