3GPP TSG CT Meeting #28 **CT-050113**
1st – 3rd June 2005. Quebec, CANADA.

3GPP TSG-CT WG4 Meeting #27 **C4-050869**
Cancun, Mexico. 25th to 29th April 2005.

Title:	**Reservation of a new sub-domain under ".3gppnetwork.org"**
Release:	Rel-6
Work Item:	WLAN Interworking
Source:	3GPP TSG-CT WG4
To:	GSMA IREG PACKET
Cc:	3GPP TSG-CT WG 1, 3GPP TSG-CT

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Attachments: C4-050752

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1. Introduction

3GPP TSG-CT WG4 (CT4) is currently working on Work Items, which make use of an inter-operator IP backbone network. One of these Work Items is "WLAN Interworking" Work Item. It is expected that the GPRS Roaming eXchange network (known as the GRX) will be re-used to support these services between PLMNs. In order to have minimal impact on the GRX, it was identified during CT4 #27 that the ".3gppnetwork.org" domain should be re-used. Therefore, an additional sub-domain of this domain is required.

2. WLAN

CT4 notes that GSMA has previously allocated the "wlan" sub-domain of ".mnc<MNC.mcc<MCC>.3gppnetwork.org" for use in WLAN NAIs (Network Access Identifiers) and WLAN Home Network Realms, and thanks GSMA for allocating those. However, the need for another sub-domain allocation has occurred.

Currently within WLAN 3GPP IP Access, a mechanism has been defined to allow locating the PDG (Packet Data Gateway) using a FQDN derived from the W-APN (Wireless Access Point Name). That is, select which PDG to establish the end to end tunnelling between the WLAN UE and the PDG. For more information, please see the attached change request document C4-050752.

The proposed mechanism requires a known WLAN specific APN Operator Identifier (OID), which shall be reserved on the GRX under the ".3gppnetwork.org" domain. This particular domain allows GRX DNS resolve the W-APN derived FQDN to a specific PDG IP address in Home or Visited PLMN.

During discussions in the CT4, the following domain name was agreed to be proposed to GSMA IREG PACKET for the W-APN OID use:

`w-apn.mnc<MNC>.mcc<MCC>.3gppnetwork.org`

4. Actions:

CN4 kindly asks GSMA IREG PACKET to:

1) Reserve the proposed sub-domain of ".3gppnetwork.org" as defined above;

2) Address their response LS to this LS directly to 3GPP TSG CT plenary (CT) – but copying CT4 and CT1 – because there are no more CT4 meetings (or any other CT WG meetings) before the next CT meeting.

5. Date of Next 3GPP TSG-CT WG4 and 3GPP TSG-CT Meetings:

CT#28	1st – 3rd June 2005	Quebec, CA
CT4#28	29th August – 2nd September 2005	London, UK

3GPP TSG CN WG4 Meeting #27
Cancun, Mexico, 25th – 29th April 2005

C4-050752

CR-Form-v7

CHANGE REQUEST

⌘ **23.003** **CR** **099** ⌘ **rev** **2** ⌘ Current version: **6.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	W-APN Definition
Source:	⌘	TeliaSonera, Nokia
Work item code:	⌘	WLAN-IW
Date:	⌘	07/04/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The format and structure for Wireless Access Point Name (W-APN) is currently undefined.
Summary of change:	⌘	This contribution adds a new sub-clause to I-WLAN clause, which explicitly defines the format and structure for the W-APN to be used with I-WLAN.
Consequences if not approved:	⌘	Undefined W-APN structure, which will lead to incompatible implementations.

Clauses affected:	⌘	9.1.1, 14			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

**** Start of change #1 ****

9.1.1 Format of APN Network Identifier

The APN Network Identifier shall contain at least one label and shall have, after encoding as defined in subclause 9.1 above, a maximum length of 63 octets. An APN Network Identifier shall not start with any of the strings "rac", "lac", "sgsn" or "rnc", and it shall not end in ".gprs". Further, it shall not take the value "*".

In order to guarantee uniqueness of APN Network Identifiers within or between GPRS PLMN, an APN Network Identifier containing more than one label shall correspond to an Internet domain name. This name should only be allocated by the PLMN if that PLMN belongs to an organisation which has officially reserved this name in the Internet domain. Other types of APN Network Identifiers are not guaranteed to be unique within or between GPRS PLMNs.

An APN Network Identifier may be used to access a service associated with a GGSN. This may be achieved by defining:

- an APN which corresponds to a ~~DNS name~~FQDN of a GGSN, and which is locally interpreted by the GGSN as a request for a specific service, or

an APN Network Identifier consisting of 3 or more labels and starting with a Reserved Service Label, or an APN Network Identifier consisting of a Reserved Service Label alone, which indicates a GGSN by the nature of the requested service. Reserved Service Labels and the corresponding services they stand for shall be agreed between operators who have GPRS roaming agreements.

**** End of change #1 ****

**** Start of change #2 ****

14 Numbering, addressing and identification for 3GPP System to WLAN Interworking

14.1 Introduction

This clause describes the format of the parameters needed to access the 3GPP system supporting the WLAN interworking. For further information on the use of the parameters see 3GPP TS 24.234 [48]. For more information on the ".3gppnetwork.org" domain name and its applicability, see Annex D of the present document.

14.2 Home network realm

The home network realm shall be in the form of an Internet domain name, e.g. operator.com, as specified in RFC 1035 [19].

When attempting to authenticate within WLAN access, the WLAN UE shall derive the home network domain name from the IMSI as described in the following steps:

1. take the first 5 or 6 digits, depending on whether a 2 or 3 digit MNC is used (see 3GPP TS 31.102 [27]) and separate them into MCC and MNC; if the MNC is 2 digits then a zero shall be added at the beginning;

2. use the MCC and MNC derived in step 1 to create the "mnc<MNC>.mcc<MCC>. 3gppnetwork.org" domain name;

3. add the label "wlan." to the beginning of the domain name.

An example of a WLAN NAI realm is:

IMSI in use: 234150999999999;

Where:

MCC = 234;

MNC = 15;

MSIN = 0999999999

Which gives the home network domain name: wlan.mnc015.mcc234.3gppnetwork.org.

14.3 Root NAI

The Root NAI shall take the form of a NAI, and shall have the form username@realm as specified in clause 3 of RFC 2486 [25].

The username part format of the Root NAI shall comply with draft-arkko-pppext-eap-aka [50] when EAP AKA authentication is used and with draft-haverinen-pppext-eap-sim [51], when EAP SIM authentication is used.

When the username part includes the IMSI, the Root NAI shall be built according to the following steps:

1. Generate an identity conforming to NAI format from IMSI as defined in EAP SIM [51] and EAP AKA [50] as appropiate;

2. Convert the leading digits of the IMSI, i.e. MNC and MCC, into a domain name, as described in subclause 14.2.

The result will be a root NAI of the form:

"0<IMSI>@wlan.mnc<MNC>.mcc<MCC>.3gppnetwork.org", for EAP AKA authentication and
"1<IMSI>@wlan.mnc<MNC>.mcc<MCC>.3gppnetwork.org", for EAP SIM authentication

For example, for EAP AKA authentication: If the IMSI is 234150999999999 (MCC = 234, MNC = 15), the root NAI then takes the form 0234150999999999@wlan.mnc015.mcc234.3gppnetwork.org.

14.4 Decorated NAI

The Decorated NAI shall take the form of a NAI and shall have the form 'homerealm!username@otherrealm' as specified in clause 3 of the IETF draft 2486-bis [53].

The realm part of Decorated NAI consists of 'otherrealm', see the IETF draft 2486-bis [53]. 'Homerealm' is the realm as specified in clause 14.2, using the HPLMN ID ('homeMCC' + 'homeMNC)'. 'Otherrealm' is the realm built using the PLMN ID (visitedMCC + visited MNC) of the PLMN selected as a result of WLAN PLMN selection (see 3GPP TS 24.234 [48]).

The username part format of the Root NAI shall comply with draft-arkko-pppext-eap-aka [50] when EAP AKA authentication is used and with draft-haverinen-pppext-eap-sim [51], when EAP SIM authentication is used.

When the username part of Decorated NAI includes the IMSI, it shall be built following the same steps specified for Root NAI in clause 14.3.

The result will be a decorated NAI of the form:

"wlan.mnc<homeMNC>.mcc<homeMCC>.3gppnetwork.org !0<IMSI>@wlan.mnc<visitedMNC>.mcc<visitedMCC>.3gppnetwork.org", for EAP AKA authentication and " wlan.mnc<homeMNC>.mcc<homeMCC>.3gppnetwork.org !1<IMSI>@wlan.mnc<visitedMNC>.mcc<visitedMCC>.3gppnetwork.org ", for EAP SIM authentication

For example, for EAP AKA authentication: If the IMSI is 234150999999999 (MCC = 234, MNC = 15) and the PLMN ID of the Selected PLMN is MCC = 610, MNC = 71 then the Decorated NAI takes the form wlan.mnc015.mcc234.3gppnetwork.org!0234150999999999@wlan.mnc071.mcc610.3gppnetwork.org.

NOTE: the 'otherrealm' specified in the present document is resolved by the WLAN AN. If the WLAN AN does not have access to the GRX, then the WLAN AN should resolve the realm by other means e.g. static look-up table, private local DNS server acting as an authoritative name server for that sub-domain.

14.5 Temporary identities

The Temporary identities (Pseudonyms and re-authentication identities) shall take the form of a NAI username as specified in clause 3 of the IETF draft 2486-bis [53].

Temporary identity shall be generated as specified in subclause 6.4.1 of 3GPP TS 33.234 [55]. This part of the temporary identity shall follow the UTF-8 transformation format specified in RFC 2279 [54] except for the following reserved hexadecimal octet value:

FF.

When the temporary identity username is coded with FF, this reserved value is used to indicate the special case when no valid temporary identity exists in the WLAN UE (see 3GPP TS 24.234 [48]). The network shall not allocate a temporary identity with the whole username coded with the reserved hexadecimal value FF.

14.6 Alternative NAI

The Alternative NAI shall take the form of a NAI, i.e. 'any_username@REALM' as specified of draft-ietf-radext-rfc2486bis [53]. The Alternative NAI shall not be routable from any AAA server.

The Alternative NAI shall contain a username part which is not derived from the IMSI. The username part shall not be a null string.

The REALM part of the NAI shall be “unreachable.3gppnetwork.org”.

The result shall be an NAI in the form of:

"<any_non_null_string>@unreachable.3gppnetwork.org"

14.x Structure of W-APN

The W-APN is composed of two parts as follows:

- The W-APN Network Identifier; this defines to which external network the PDG is connected. This part of the W-APN is mandatory.
- The W-APN Operator Identifier; this defines in which PLMN the PDG serving the W-APN is located. This part of the APN is optional.

The W-APN Operator Identifier is placed after the W-APN Network Identifier. The W-APN consisting of both the Network Identifier and Operator Identifier corresponds to a FQDN of a PDG; the W-APN has, after encoding as defined in the paragraph below, a maximum length of 100 octets.

The encoding of the W-APN shall follow the Name Syntax defined in IETF RFC 2181 [18], IETF RFC 1035 [19] and IETF RFC 1123 [20]. The W-APN consists of one or more labels. Each label is coded as a one octet length field followed by that number of octets coded as 8 bit ASCII characters. Following IETF RFC 1035 [19] the labels shall consist only of the alphabetic characters (A-Z and a-z), digits (0-9) and the hyphen (-). Following IETF RFC 1123 [20], the label shall begin and end with either an alphabetic character or a digit. The case of alphabetic characters is not significant. The W-APN is not terminated by a length byte of zero.

For the purpose of presentation, a W-APN is usually displayed as a string in which the labels are separated by dots (e.g. "Label1.Label2.Label3").

14.x.1 Format of W-APN Network Identifier

The W-APN Network Identifier follows the format defined for APNs in subclause 9.1.1. In addition to what has been defined in subclause 9.1.1 the W-APN Network Identifier shall not end in ".3gppnetwork.org".

A W-APN Network Identifier may be used to access a service associated with a PDG. This may be achieved by defining:

- a W-APN which corresponds to a FQDN of a PDG, and which is locally interpreted by the PDG as a request for a specific service, or
- a W-APN Network Identifier consisting of 3 or more labels and starting with a Reserved Service Label, or a W-APN Network Identifier consisting of a Reserved Service Label alone, which indicates a PDG by the nature of the requested service. Reserved Service Labels and the corresponding services they stand for shall be agreed between operators who have WLAN roaming agreements.

14.x.2 Format of W-APN Operator Identifier

The W-APN Operator Identifier is composed of four labels. The last label (or “top level domain”) shall be "3gppnetwork.org". The second and third labels together shall uniquely identify the PLMN. The first label distinguishes the domain name as a W-APN.

For each operator, there is a default W-APN Operator Identifier (i.e. domain name). This default W-APN Operator Identifier is derived from the IMSI as follows:

"w-apn.mnc<MNC>.mcc<MCC>.3gppnetwork.org"

where:

"mnc" and "mcc" serve as invariable identifiers for the following digits.

<MNC> and <MCC> are derived from the components of the IMSI defined in subclause 2.2.

Alternatively, the default W-APN Operator Identifier is derived using the MNC and MCC of the VPLMN. See 3GPP TS 24.234 [48] for more information.

The default W-APN Operator Identifier is used in both non-roaming and roaming situations when attempting to translate a W-APN consisting only of a Network Identifier into the IP address of the PDG in the HPLMN.

In order to guarantee inter-PLMN DNS translation, the <MNC> and <MCC> coding used in the "w-apn.mnc<MNC>.mcc<MCC>.3gppnetwork.org" format of the W-APN OI shall be:

- <MNC> = 3 digits
- <MCC> = 3 digits
- If there are only 2 significant digits in the MNC, one "0" digit shall be inserted at the left side to fill the 3 digits coding of MNC in the W-APN OI.

As an example, the W-APN OI for MCC 345 and MNC 12 is coded in the DNS as:

"w-apn.mnc012.mcc345.3gppnetwork.org".

14.x.3 Alternative Format of W-APN Operator Identifier

For situations when the PDG serving the W-APN is located in such network that is not part of the GRX (i.e. the Interoperator IP backbone), the default Operator Identifier described in sub-clause 14.x.2 is not available for use. This restriction originates from the ".3gppnetwork.org" domain, which is only available in GRX DNS for actual use. Thus an alternative format of W-APN Operator Identifier is required for this case.

The Alternative W-APN Operator Identifiers shall be constructed as follows:

"w-apn.<valid operator's REALM>"

where:

<valid operator's REALM> corresponds to REALM names owned by the operator hosting the PDG serving the desired W-APN.

REALM names are required to be unique, and are piggybacked on the administration of the Public Internet DNS namespace. REALM names may also belong to the operator of the VPLMN.

As an example, the W-APN OI for the Operator REALM ""notareal.com"" is coded in the Public Internet DNS as:

"w-apn.notareal.com".

****** End of change #2 ******