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Technical Specification

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Telecommunication management;
Core Network (CN) and non-3GPP access
interworking system Network Resource Model (NRM)
Integration Reference Point (IRP);
Information Service (IS)
(Release 12)**



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Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

Ready for Converged Management

NOTE: This specification is part of a set that has been developed for converged management solutions.

The present document is part of a TS-family covering the 3rd Generation Partnership Project Technical Specification Group Services and System Aspects, Telecommunication management; as identified below:

- 28.601: "Telecommunication management; Core Network (CN) and non-3GPP access interworking system Network Resource Model (NRM) Integration Reference Point (IRP); Requirements"
- 28.602: "Telecommunication management; Core Network (CN) and non-3GPP access interworking system Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)"**
- 28.606: "Telecommunication management; Core Network (CN) and non-3GPP access Interworking system Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions"

The interface Itf-N, defined in 3GPP TS 32.102 [2], is built up by a number of Integration Reference Points (IRPs) and a related Name Convention, which realize the functional capabilities over this interface. The basic structure of the IRPs is defined in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.103 [14].

1 Scope

The present document is an Integration Reference Point (IRP) named "Core Network (CN) and non-3GPP access interworking system Network Resource Model IRP", through which an 'IRP Agent' (typically an Element Manager or Network Element) can communicate Configuration Management (CM) information to one or several 'IRP Managers' (typically Network Managers) concerning interworking network resources.

According to the structure of IWLAN defined in 3GPP TS 23.23 [5], several nodes are defined in 3GPP (e.g. WAG, PDG, 3GPP AAA, etc). The present document is focusing on the definition of NRM IRP IOCs for management support.

It reuses relevant parts of the generic NRM in 3GPP TS 28.622 [6], either by direct reuse or sub-classing, and in addition to that defines I-WLAN specific Information Object Classes.

In order to access the information defined by this NRM, an Interface IRP is needed, such as the Basic CM IRP IS (3GPP TS 32.602 [7]) or the Bulk CM IRP IS (3GPP TS 32.612 [8]). However, which Interface IRP that is applicable is outside the scope of the present document.

The present document supports the Federated Network Information Model (FNIM) concept described in 3GPP TS 32.107 [16] in that the relevant Information Object Classes (IOCs) defined in the present document are directly or indirectly inherited from those specified in the Umbrella Information Model (UIM) of 3GPP TS 28.620 [17].

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 TS 25.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".
- [3] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [4] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".
- [5] 3GPP TS 23.234: "3GPP system to Wireless Local Area Network (WLAN) interworking; System Description".
- [6] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".
- [7] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic Configuration Management Integration Reference Point (IRP): Information Service (IS)".
- [8] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Information Service (IS)".
- [9] 3GPP TS 28.625: "Telecommunication management; State Management Data Definition Integration Reference Point (IRP); Information Service (IS)".

- [10] 3GPP TS 28.705: "Telecommunication management; IP Multimedia Subsystem (IMS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)"
- [11] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP); Information Service (IS)".
- [12] 3GPP TS 32.662: "Telecommunication management; Configuration Management (CM); Kernel CM; Information service (IS)".
- [13] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".
- [14] 3GPP TS 32.103: "Telecommunication management; Integration Reference Point (IRP) overview and usage guide".
- [15] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".
- [16] 3GPP TS 32.107: "Telecommunication management; Fixed Mobile Convergence (FMC) Federated Network Information Model (FNIM)"
- [17] 3GPP TS 28.620: "Telecommunication management; Fixed Mobile Convergence (FMC) Federated Network Information Model (FNIM) Umbrella Information Model (UIM)"
- [18] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".
- [19] IETF RFC4949: "Internet Security Glossary, Version 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], GPP TS 32.101 [2], 3GPP TS 32.102 [3], 3GPP TS 32.150 [15], 3GPP TS 28.622 [6] and 3GPP TS 32.600 [4] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

IOC	Information Object Class
WAG	WLAN Access Gateway
PDG	Packet Data Gateway
AAA	Access, Authentication and Authorisation
ACL	Access Control List

4 Model

4.1 Imported information entities and local labels

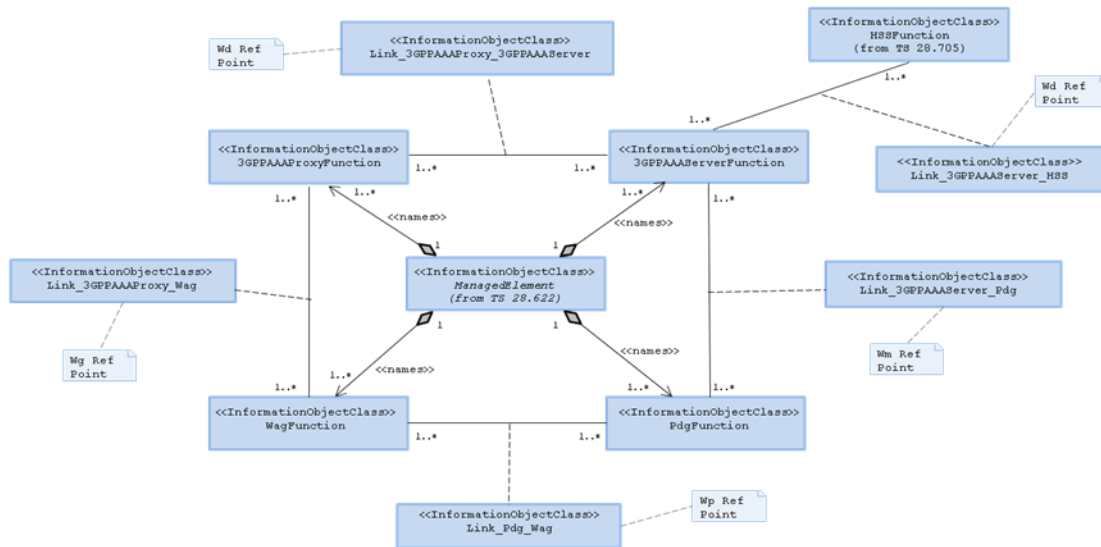
Table 4.1: Imported information entities and local labels

Label reference	Local label
3GPP TS 28.622 [6], IOC, ManagedElement	ManagedElement
3GPP TS 28.622 [6], IOC, ManagedFunction	ManagedFunction
3GPP TS 28.622 [6], IOC, Top	Top
3GPP TS 28.622 [6], IOC, VsDataContainer	VsDataContainer
3GPP TS 28.705 [10], IOC, HSSFunction	HSSFunction
3GPP TS 28.625 [9], attribute, proceduralStatus	proceduralStatus

4.2 Class diagram

4.2.1 Relationships

This clause depicts the set of classes (e.g. IOCs) encapsulating the information relevant for this IRP. This clause provides an overview of the relationships between relevant classes in UML. Subsequent clauses provide more detailed specification of various aspects of these classes.



NOTE: The listed cardinality numbers, in particular the use of cardinality number zero, do not represent transient states. The transient state is considered an inherent property of all IOC instances and therefore there is no need to represent them by individual IOC cardinality numbers.

Figure 4.2.1.1: IWLAN NRM Containment/Naming and Association diagram

4.2.2 Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

Figure 6.2.2.1 shows the inheritance hierarchy for the IWLAN NRM.

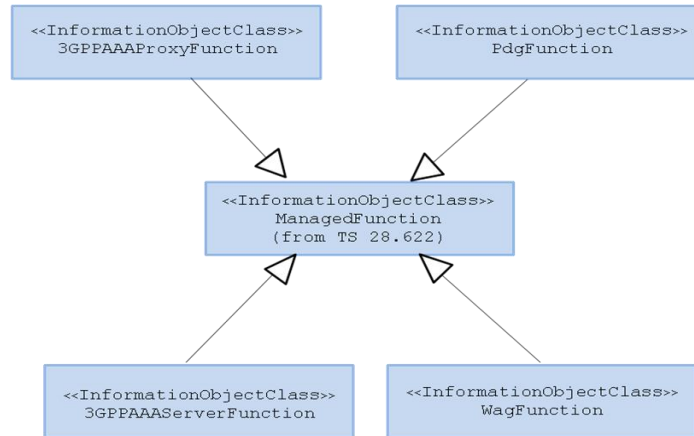


Figure 4.2.2.1: IWLAN NRM inheritance hierarchy for ManagedFunction

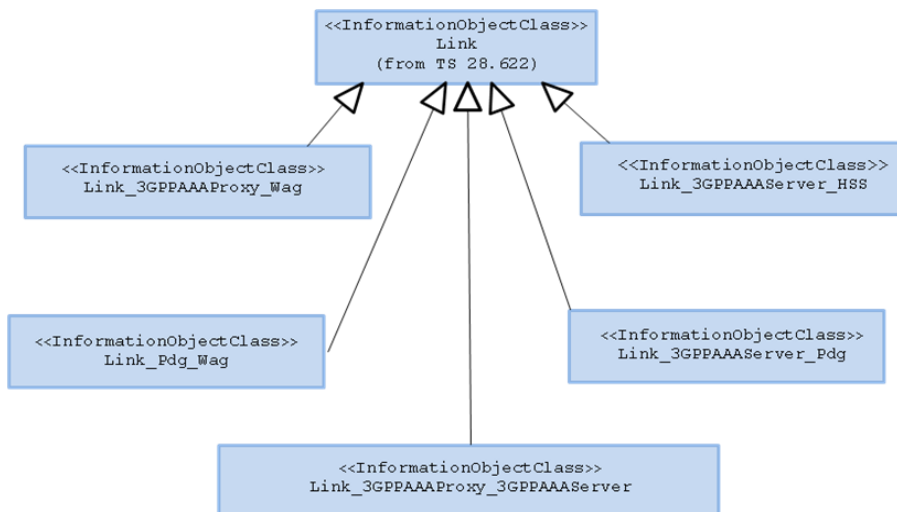


Figure 4.2.2.2: IWLAN NRM inheritance hierarchy for Link

4.3 Class definitions

4.3.1 WagFunction

4.3.1.1 Definition

This IOC represents WLAN Access Gateway (WAG) functionality.
For more information about the WAG, see 3GPP TS 23.234 [5].

4.3.1.2 Attributes

Table 4.3.1.2-1:

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifiable
aCList	M	M	M	-	M

Table 4.3.1.2-2:

Attribute Name	Support Qualifier	READ	WRITE
proceduralStatus	O	M	-
NOTE: No state propagation shall be implied.			

4.3.1.3 Attribute constraints

None.

4.3.1.4 Notifications

The common notifications defined in clause 4.5 are valid without exceptions or additions for this IOC.

4.3.2 PdgFunction

4.3.2.1 Definition

This IOC represents Packet Data Gateway (PDG) functionality.
For more information about the PDG, see 3GPP TS 23.234 [5].

4.3.2.2 Attributes

Table 4.3.2.2-1:

Attribute Name	Support Qualifier	READ	WRITE
proceduralStatus	O	M	-
NOTE: No state propagation shall be implied.			

4.3.2.3 Attribute constraints

None.

4.3.2.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.3 3GPPAAAServerFunction

4.3.3.1 Definition

This IOC represents the 3GPP Access, Authentication and Authorisation (AAA) Server functionality. For more information about the 3GPP AAA server, see 3GPP TS 23.402 [13].

4.3.3.2 Attributes

None.

4.3.3.3 Attribute constraints

None.

4.3.3.4 Notifications

The common notifications defined in subclause 4.5 are valid without exceptions or additions for this IOC.

4.3.4 3GPPAAAProxyFunction

4.3.4.1 Definition

This IOC represents the 3GPP Access, Authentication and Authorisation (AAA) Proxy functionality. For more information about the 3GPP AAA Proxy, see 3GPP TS 23.402 [13].

4.3.4.2 Attributes

None.

4.3.4.3 Attribute constraints

None.

4.3.4.4 Notifications

The common notifications defined in clause 4.5 are valid without exceptions or additions for this IOC.

4.3.5 Link_Pdg_Wag

4.3.5.1 Definition

This IOC represents the Wp reference point as defined in 3GPP 23.402 [13]

4.3.5.2 Attributes

None.

4.3.5.3 Attribute constraints

None.

4.3.5.4 Notifications

The common notifications defined in clause 4.5 are valid without exceptions or additions for this IOC.

4.3.6 Link_3GPPAAAServer_Pdg

4.3.6.1 Definition

This IOC represents the Wm reference point as defined in 3GPP 23.402 [13].

4.3.6.2 Attributes

None.

4.3.6.3 Attribute constraints

None.

4.3.6.4 Notifications

The common notifications defined in clause 4.5 are valid without exceptions or additions for this IOC.

4.3.7 Link_3GPPAAAProxy_3GPPAAAServer

4.3.7.1 Definition

This IOC represents the Wd reference point as defined in 3GPP 23.402 [13].

4.3.7.2 Attributes

None.

4.3.7.3 Attribute constraints

None.

4.3.7.4 Notifications

The common notifications defined in subclause 4.5 are valid without exceptions or additions for this IOC.

4.3.8 Link_3GPPAAAProxy_Wag

4.3.8.1 Definition

This IOC represents the Wg reference point as defined in 3GPP 23.402 [13].

4.3.8.2 Attributes

None.

4.3.8.3 Attribute constraints

None.

4.3.8.4 Notifications

The common notifications defined in subclause 4.5 are valid without exceptions or additions for this IOC.

4.3.9 Link_3GPPAAAServer_HSS

4.3.9.1 Definition

This IOC represents the Wx reference point as defined in 3GPP 23.402 [13].

4.3.9.2 Attributes

None.

4.3.9.3 Attribute constraints

None.

4.3.9.4 Notifications

The common notifications defined in clause 4.5 are valid without exceptions or additions for this IOC.

4.4 Attribute definitions

4.4.1 Attribute properties

Table 4.4.1 defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

Table 4.4.1:

Attribute Name	Documentation and Allowed Values	Properties
aCList	<p>It is an Access Control List (ACL). As stated in TS 23.234 [5], the WAG does not have a full trust relationship with the WLAN UE. The WAG may implement policy enforcement before tunnel establishment to enhance the firewall against unwanted packets go through the PLMN, for example, to forbid the roaming WLAN UE from sending tunnel establishment to PLMN other than its HPLMN; to forbid packets from unauthorized WLAN UE. The ACL configuration normally uses IP-based control, e.g. filtering IP/ICMP/UDP/TCP packets. There is also Media Access Control (MAC) based ACL configuration. However, it is hardly applied to filtering on WAG. The filtering parameter(s) applying to those configurations can be one or more of the following:</p> <ul style="list-style-type: none"> - source IPv4/IPv6 address, - destination IPv4/IPv6 address, - protocol number, - source port number, - destination port number <p>allowed Values: See RFC4949 [19] for the definition of ACL. The allowed values could take the format as "access-list access-list-name [deny permit] protocol source source-netmask destination destination-netmask"</p>	<p>type: TBD multiplicity: TBD isOrdered: N/A isUnique: N/A default Value: No default value isNullable: True</p>

4.4.2 Constraints

None.

4.5 Common notifications

4.5.1 Alarm notifications

This clause presents a list of notifications, defined in 3GPP TS 32.111-2 [11], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in 3GPP TS 32.302 [18], would capture the DN of an instance of an IOC defined in this IRP specification.

Table 4.5.1:

Name	Qualifier	Notes
<code>notifyAckStateChanged</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyChangedAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyClearedAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyNewAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyComments</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyAlarmListRebuilt</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyPotentialFaultyAlarmList</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	

4.5.2 Configuration notifications

This clause presents a list of notifications, defined in 3GPP TS 32.662 [12], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in 3GPP TS 32.302 [18], would capture the DN of an instance of an IOC defined in this IRP specification.

Table 4.5.2:

Name	Qualifier	Notes
<code>notifyAttributeValueChange</code>	O	
<code>notifyObjectCreation</code>	O	
<code>notifyObjectDeletion</code>	O	

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Feb 2012			--	--		--	0.0.1
Nov 2012					NRM is added. The version have been updated to Rel-12	0.0.1	0.1.1
May 2013					Revise the skeleton align w ith TS 28.622 according to agreed pCR S5-131061	0.1.1	0.1.2
Jun 2013					Add the attributes to WagFunction and PdgFunction according to agreed pCR S5-131085, S5-131063 and S5-131064	0.1.2	0.2.0
Aug 2013					Revise the NRM diagram to align w ith 28-series and update several link IOC names; Add allowedValues description for aCList attribute	0.2.0	0.3.0
Sep 2013	SA#61	SP-130446			Presented for information	0.3.0	1.0.0
Sep 2013	-	-			MCC clean-up	1.0.0	1.0.1