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Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Telecommunication management;
IP Multimedia Subsystem (IMS)
Network Resource Model (NRM)
Integration Reference Point (IRP);
Solution Set (SS) definitions
(Release 11)**



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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:

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Introduction

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:

32.731:	IP Multimedia Subsystem (IMS) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements
32.732:	IP Multimedia Subsystem (IMS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)
32.736	IP Multimedia Subsystem (IMS) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions

1 Scope

The present document specifies the Solution Set definitions for the IRP whose semantics is specified in IMS (IP Multimedia Subsystem) NRM (Network Resource Model) IRP: Information Service 3GPP TS 32.732 [3].

This Solution Set definitions specification is related to 3GPP TS 32.732 V10.1.X.

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 32.101: "Telecommunication management; Principles and high level requirements".
- [2] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [3] 3GPP TS 32.732: "Telecommunication management; IP Multimedia Subsystem (IMS) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".
- [4] 3GPP TS 32.306: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Solution Set (SS) definitions".
- [5] 3GPP TS 32.626: "Telecommunication management; Configuration Management (CM); Generic Network Resources Integration Reference Point (IRP): Solution Set (SS) definitions".
- [6] 3GPP TS 32.300 "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [7] W3C REC-xml-names-19990114: "Namespaces in XML".
- [8] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Information Service (IS)".
- [9] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".
- [10] W3C REC-xml-20001006: "Extensible Markup Language (XML) 1.0 (Second Edition)".
- [11] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".
- [12] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".
- [13] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

3 Definitions and abbreviations

3.1 Definitions

For terms and definitions please refer to TS 32.101 [1], TS 32.102 [2] and TS 32.732 [3].

For the purposes of the present document, the following XML terms and definitions apply:

XML file: file containing an XML document

XML document: composed of the succession of an optional XML declaration followed by a root XML element

NOTE: See [10]; in the scope of the present document.

XML declaration: it specifies the version of XML being used

NOTE: See [10].

XML element: has a type, is identified by a name, may have a set of XML attribute specifications and is either composed of the succession of an XML start-tag followed by the XML content of the XML element followed by an XML end-tag, or composed simply of an XML empty-element tag; each XML element may contain other XML elements

NOTE: See [10].

empty XML element: having an empty XML content; an empty XML element still possibly has a set of XML attribute specifications; an empty XML element is either composed of the succession of an XML start-tag directly followed by an XML end-tag, or composed simply of an XML empty-element tag

NOTE: See [10].

XML content (of an XML element): empty if the XML element is simply composed of an XML empty-element tag; otherwise the part, possibly empty, of the XML element between its XML start-tag and its XML end-tag

XML start-tag: the beginning of a non-empty XML element is marked by an XML start-tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [10].

XML end-tag: the end of a non-empty XML element is marked by an XML end-tag containing the name of the XML element

NOTE: See [10].

XML empty-element tag: an empty XML element is composed simply of an empty-element tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [10].

XML attribute specification: has a name and a value

DTD: defines structure and content constraints to be respected by an XML document to be valid with regard to this DTD

NOTE: See [10].

XML schema: more powerful than a DTD, an XML schema defines structure and content constraints to be respected by an XML document to conform with this XML schema; through the use of XML namespaces several XML schemas can be used together by a single XML document; an XML schema is itself also an XML document that shall conform with the XML schema for XML schemas

NOTE: See [11], [12] and [13].

XML namespace: enables qualifying element and attribute names used in XML documents by associating them with namespaces identified by different XML schemas

NOTE: See [7], in the scope of the present document.

XML complex type: defined in an XML schema; cannot be directly used in an XML document; can be the concrete type or the derivation base type for an XML element type or for another XML complex type; ultimately defines constraints for an XML element on its XML attribute specifications and/or its XML content

NOTE: See [11], [12] and [13].

XML element type: declared by an XML schema; can be directly used in an XML document; as the concrete type of an XML element, directly or indirectly defines constraints on its XML attribute specifications and/or its XML content; can also be the concrete type or the derivation base type for another XML element type

NOTE: See [11], [12] and [13].

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CM	Configuration Management
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name
DTD	Document Type Definition
EDGE	Enhanced Data for GSM Evolution
GERAN	GSM/EDGE Radio Access Network

GSM	Global System for Mobile communication
IDL	Interface Definition Language (OMG)
IMS	IP Multimedia Subsystem
IOC	Information Object Class
IRP	Integration Reference Point
IS	Information Service
MGW	Media GateWay
MO	Managed Object
MOC	Managed Object Class
NRM	Network Resource Model
OMG	Object Management Group
SS	Solution Set
UMTS	Universal Mobile Telecommunications System
UTRAN	Universal Terrestrial Radio Access Network
XML	eXtensible Markup Language

4 Solution Set definitions

This specification defines the following 3GPP IMS NRM IRP Solution Set definitions:

- 3GPP IMS NRM IRP CORBA SS (Annex A)
- 3GPP IMS NRM IRP XML definitions (Annex B)

Annex A (normative): CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in IMS NRM IRP: Information Service (TS 32.732 [3]).

A.1 Architectural Features

The overall architectural feature of IMS NRM IRP is specified in 3GPP TS 32.732[3].

This clause specifies features that are specific to the CORBA SS.

A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [6].

A.1.2 Notifications

Notifications are sent according to the Notification IRP: CORBA SS (see 3GPP TS 32.306 [4]).

A.2 Mapping

A.2.1 General mappings

Attributes modelling associations as defined in the NRM (here also called "reference attributes") are in this SS mapped to attributes. The names of the reference attributes in the NRM are mapped to the corresponding attribute names in the MOC. When the cardinality for an association is 0..1 or 1..1 the datatype for the reference attribute is defined as an MOReference. The value of an MO reference contains the distinguished name of the associated MO. When the cardinality for an association allows more than one referred MO, the reference attribute will be of type MOReferenceSet, which contains a sequence of MO references.

A.2.2 Information Object Class (IOC) mapping

A.2.2.1 IOC ASFunction

Mapping from NRM IOC ASFunction attributes to SS equivalent MOC ASFunction

Attributes of IOC ASFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
asFunctionId	asFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSsystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.2 IOC BGCFFunction

Mapping from NRM IOC BGCFFunction attributes to SS equivalent MOC BGCFFunction

Attributes of IOC BGCFFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
bgcfFunctionId	bgcfFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.3 IOC CSCFFunction

Mapping from NRM IOC CSCFFunction attributes to SS equivalent MOC CSCFFunction

Attributes of IOC CSCFFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
cscfFunctionId	cscfFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.4 IOC HSSFunction

Mapping from NRM IOC HSSFunction attributes to SS equivalent MOC HSSFunction

Attributes of IOC HSSFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
hssFunctionId	hssFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.5 Void

A.2.2.6 IOC IMSMGWFunction

Mapping from NRM IOC IMSMGWFunction attributes to SS equivalent MOC IMSMGWFunction attributes

Attributes of IOC IMSMGWFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
imsMgwFunctionId	imsMgwFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.7 IOC MGCFFunction

Mapping from NRM IOC MGCFFunction attributes to SS equivalent MOC MGCFFunction

Attributes of IOC MGCFFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
mgcfFunctionId	mgcfFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.8 IOC MRFCFunction

Mapping from NRM IOC MRFCFunction attributes to SS equivalent MOC MRFCFunction

Attributes of IOC MRFCFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
mrfcFunctionId	mrfcFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.9 IOC MRFPFunction

Mapping from NRM IOC MRFPFunction attributes to SS equivalent MOC MRFPFunction

Attributes of IOC MRFPFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
mrfpFunctionId	mrfpFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.10 Void

A.2.2.11 Void

A.2.2.12 IOC SLFFunction

Mapping from NRM IOC SLFFunction attributes to SS equivalent MOC SLFFunction

Attributes of IOC SLFFunction in TS 32.732 [3]	SS Attributes	SS Type	Qualifier
slfFunctionId	slfFunctionId	string	Read-Only, M
linkList	linkList	GenericNetworkResourcesIRPSystem::AttributeTypes::LinkListSet	Read-Only, O

A.2.2.13 Void

A.2.2.14 IOC Link_CAMELIMSSFAS_HSS

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.15 IOC Link_AS_ICSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.16 IOC Link_AS_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.17 IOC Link_AS_SLF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.18 IOC Link_BGCF_BGCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.19 Void

A.2.2.20 IOC Link_BGCF_MGCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.21 IOC Link_BGCF_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.22 Void

A.2.2.23 IOC Link_HSS_ICSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.24 IOC Link_ICSCF_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.25 IOC Link_ICSCF_MGCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.26 Void

A.2.2.27 IOC Link_ICSCF_PCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.28 IOC Link_PCSCF_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.29 Void

A.2.2.30 IOC Link_HSS_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.31 IOC Link_ICSCF_SLF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.32 IOC Link_IMSMGW_MGCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.33 IOC Link_MGCF_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.34 IOC Link_MRFC_MRFP

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.35 IOC Link_MRFC_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.36 IOC Link_SCSCF_SCSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.37 IOC Link_SCSCF_SLF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.626 [5].

A.2.2.38 IOC Link_HSS_SIPAS

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.623 [5].

A.2.2.39 IOC Link_HSS_OSASCSAS

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.623 [5].

A.2.2.40 IOC Link_PCSCF_ECSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.623 [5].

A.2.2.41 IOC Link_BGCF_ECSCF

All attributes are inherited from Link. See mapping of attributes for Link IOC in 3GPP TS 32.623 [5].

A.2.2.42 IOC Link_MGCF_ECSCF

All attributes are inherited from `Link`. See mapping of attributes for `Link` IOC in 3GPP TS 32.623 [5].

A.3 Rules for NRM extensions

This clause discusses how the models and IDL definitions provided in the present document can be extended for a particular implementation and still remain compliant with 3GPP SA 5's specifications.

A.3.1 Allowed extensions

Vendor-specific MOCs may be supported. The vendor-specific MOCs may support new types of attributes. The 3GPP SA5-specified notifications may be issued referring to the vendor-specific MOCs and vendor-specific attributes. New MOCs shall be distinguishable from 3GPP SA5 MOCs by name. 3GPP SA5-specified and vendor-specific attributes may be used in vendor-specific MOCs. Vendor-specific attribute names shall be distinguishable from existing attribute names.

NRM MOCs may be subclassed. Subclassed MOCs shall maintain the specified behaviour of the 3GPP SA 5's superior classes. They may add vendor-specific behaviour with vendor-specific attributes. When subclassing, naming attributes cannot be changed. The subclassed MOC shall support all attributes of its superior class. Vendor-specific attributes cannot be added to 3GPP SA5 NRM MOCs without subclassing.

When subclassing, the 3GPP SA5-specified containment rules and their specified cardinality shall still be followed. As an example, `ManagementNode` (or its subclasses) shall be contained under `SubNetwork` (or its subclasses).

Managed Object Instances may be instantiated as CORBA objects. This requires that the MOCs be represented in IDL. 3GPP SA5's NRM MOCs are not currently specified in IDL, but may be specified in IDL for instantiation or subclassing purposes. However, management information models should not require that IRPManagers access the instantiated managed objects other than through supported methods in the present document.

Extension rules related to notifications (Notification categories, Event Types, Extended Event Types etc.) are for further study.

A.3.2 Extensions not allowed

The IDL specifications in the present document cannot be edited or altered. Any additional IDL specifications shall be specified in separate IDL files.

IDL interfaces (note: not MOCs) specified in the present document may not be subclassed or extended. New interfaces may be defined with vendor-specific methods.

A.4 Solution Set definitions

A.4.1 IDL definition structure

Clause A.4.2 defines the MO classes for the IMS NRM IRP.

A.4.2 IDL specification “IMSNRMDefs.idl”

```

// File: IMSNRMDefs.idl
#ifndef _IMSNRMDEFS_IDL_
#define _IMSNRMDEFS_IDL_
#include "GenericNetworkResourcesNRMDefs.idl"

#pragma prefix "3gppsa5.org"

/**
 * This module defines constants for each MO class name and
 * the attribute names for each defined MO class.
 */
module IMSNRMDefs
{
    /**
     * Definitions for MO class ASFunction
     */
    interface ASFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "ASFunction";

        // Attribute Names
        //
        const string asFunctionId = "asFunctionId";
        const string linkList = "linkList";
    };
    /**
     * Definitions for MO class SIPASFunction
     */
    interface SIPASFunction : ASFunction
    {
        const string CLASS = "SIPASFunction";

        // All Attributes inherited from ASFunction
    };
    /**
     * Definitions for MO class OSASCSASFunction
     */
    interface OSASCSASFunction : ASFunction
    {
        const string CLASS = "OSASCSASFunction";

        // All Attributes inherited from ASFunction
    };
    /**
     * Definitions for MO class CAMELIMSSFASFunction
     */
    interface CAMELIMSSFASFunction : ASFunction
    {
        const string CLASS = "CAMELIMSSFASFunction";

        // All Attributes inherited from ASFunction
    };
    /**
     * Definitions for MO class BGCFFunction
     */
    interface BGCFFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "BGCFFunction";

        // Attribute Names
        //
        const string bgcfFunctionId = "bgcfFunctionId";
        const string linkList = "linkList";
    };
    /**
     * Definitions for MO class CSCFFunction
     */
    interface CSCFFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "CSCFFunction";
        // Attribute Names
        //
        const string cscfFunctionId = "cscfFunctionId";
        const string linkList = "linkList";
    };
};

```

```

/**
 * Definitions for MO class ICSCFFunction
 */
interface ICSCFFunction : CSCFFunction
{
    const string CLASS = "ICSCFFunction";

    // All Attributes inherited from CSCFFunction
    //
};
/**
 * Definitions for MO class IMSMGWFunction
 */
interface IMSMGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "IMSMGWFunction";

    // Attribute Names
    //
    const string imsMgwFunctionId = "imsMgwFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class MGCFFunction
 */
interface MGCFFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "MGCFFunction";

    // Attribute Names
    //
    const string mgcfFunctionId = "mgcfFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class MRFCFunction
 */
interface MRFCFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "MRFCFunction";

    // Attribute Names
    //
    const string mrfcFunctionId = "mrfcFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class MRFPFunction
 */
interface MRFPFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "MRFPFunction";

    // Attribute Names
    //
    const string mrfpFunctionId = "mrfpFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class PCSCFFunction
 */
interface PCSCFFunction : CSCFFunction
{
    const string CLASS = "PCSCFFunction";
    // All Attributes inherited from CSCFFunction
    //
};
/**
 * Definitions for MO class SCSCFFunction
 */
interface SCSCFFunction : CSCFFunction
{
    const string CLASS = "SCSCFFunction";

    // All Attributes inherited from CSCFFunction
    //
};
/**
 * Definitions for MO class SLFFunction

```



```

*/
interface SLFFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "SLFFunction";

    // Attribute Names
    //
    const string slfFunctionId = "slfFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class ECSCFFunction
 */
interface ECSCFFunction : CSCFFunction
{
    const string CLASS = "ECSCFFunction";
    // All Attributes inherited from CSCFFunction
    //
};
/**
 * Definitions for MO class Link_AS_SCSCF
 */
interface Link_AS_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_AS_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_AS_SLF
 */
interface Link_AS_SLF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_AS_SLF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_BGCF_BGCF
 */
interface Link_BGCF_BGCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_BGCF_BGCF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_BGCF_MGCF
 */
interface Link_BGCF_MGCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_BGCF_MGCF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_BGCF_SCSCF
 */
interface Link_BGCF_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_BGCF_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_SCSCF_ICSCF
 */
interface Link_SCSCF_ICSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_SCSCF_ICSCF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_ICSCF_Mgcf
 */
interface Link_ICSCF_Mgcf : GenericNetworkResourcesNRMDefs::Link

```

```

    {
        const string CLASS = "Link_ICSCF_Mgcf";
        // All Attributes inherited from Link
    };
/**
 * Definitions for MO class Link_ICSCF_PCSCF
 */
interface Link_ICSCF_PCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_ICSCF_PCSCF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_PCSCF_SCSCF
 */
interface Link_PCSCF_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_PCSCF_SCSCF";
    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_ICSCF_SLF
 */
interface Link_ICSCF_SLF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_ICSCF_SLF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_IMSMGW_MGCF
 */
interface Link_IMSMGW_MGCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_IMSMGW_MGCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_MGCF_SCSCF
 */
interface Link_MGCF_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_MGCF_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_MRFC_MRFP
 */
interface Link_MRFC_MRFP : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_MRFC_MRFP";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_MRFC_SCSCF
 */
interface Link_MRFC_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_MRFC_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_SCSCF_SCSCF
 */
interface Link_SCSCF_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_SCSCF_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_SCSCF_SLF
 */

```

```

interface Link_SCSCF_SLF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_SCSCF_SLF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class HSSFunction
 */
interface HSSFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "HSSFunction";

    // Attribute Names
    //
    const string hssFunctionId = "hssFunctionId";
    const string linkList = "linkList";
};
/**
 * Definitions for MO class Link_HSS_SCSCF
 */
interface Link_HSS_SCSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_HSS_SCSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_HSS_ICSCF
 */
interface Link_HSS_ICSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_HSS_ICSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_HSS_SIPAS
 */
interface Link_HSS_SIPAS : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_HSS_SIPAS";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_HSS_OSASCSAS
 */
interface Link_HSS_OSASCSAS : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_HSS_OSASCSAS";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_CAMELIMSSFAS_HSS
 */
interface Link_CAMELIMSSFAS_HSS : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_CAMELIMSSFAS_HSS";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_AS_ICSCF
 */
interface Link_AS_ICSCF : GenericNetworkResourcesNRMDefs::Link
{
    const string CLASS = "Link_AS_ICSCF";

    // All Attributes inherited from Link
};
/**
 * Definitions for MO class Link_PCSCF_ECSCF
 */
interface Link_PCSCF_ECSCF : GenericNetworkResourcesNRMDefs::Link

```

```
{
  const string CLASS = "Link_PCSCF_ECSCF";

  // All Attributes inherited from Link

};
/**
 * Definitions for MO class Link_BGCF_ECSCF
 */
interface Link_BGCF_ECSCF : GenericNetworkResourcesNRMDefs::Link
{
  const string CLASS = "Link_BGCF_ECSCF";

  // All Attributes inherited from Link

};
/**
 * Definitions for MO class Link_MGCF_ECSCF
 */
interface Link_MGCF_ECSCF : GenericNetworkResourcesNRMDefs::Link
{
  const string CLASS = "Link_MGCF_ECSCF";

  // All Attributes inherited from Link

};
};

#endif // _IMSNRMDEFS_IDL_
```

Annex B (normative): XML definitions

This annex provides the NRM-specific part related to the IMS NRM IRP [3] of the XML file format definition for the Bulk Configuration Management IRP IS [8].

The main part of this XML file format definition is provided by 3GPP TS 32.616 [9].

Bulk CM XML file formats are based on XML [10], XML Schema [11] [12] [13] and XML Namespace [7] standards.

B.1 Architectural features

The overall architectural feature of IMS NRM IRP is specified in 3GPP TS 32.732 [3].

This clause specifies features that are specific to the XML Schema definitions.

B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [6].

B.2 Mapping

Not present in the current version of this specification.

B.3 Solution Set definitions

B.3.1 XML definition structure

The overall description of the file format of configuration data XML files is provided by 3GPP TS 32.616 [9].

B.3.2 of the present document defines the NRM-specific XML schema `imsNrm.xsd` for the IMS NRM IRP IS defined in 3GPP TS 32.732 [3].

XML schema `imsNrm.xsd` explicitly declares NRM-specific XML element types for the related NRM.

The definition of those NRM-specific XML element types complies with the generic mapping rules defined in 3GPP TS 32.616 [9].

B.3.2 XML Schema "imsNrm.xsd"

```

<?xml version="1.0" encoding="UTF-8"?>

<!--
 3GPP TS 32.736 IMS NRM IRP
 Bulk CM Configuration data file NRM-specific XML schema
 imsNrm.xsd
-->

<schema
 targetNamespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.736#imsNrm"
 elementFormDefault="qualified"
 attributeFormDefault="unqualified"
 xmlns="http://www.w3.org/2001/XMLSchema"
 xmlns:xn="http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"
 xmlns:im="http://www.3gpp.org/ftp/specs/archive/32_series/32.736#imsNrm"
>

  <import namespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"/>

  <!--IMS NRM IRP IS class associated XML elements -->

  <element
    name="ASFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:ASFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element
    name="CAMELIMSSFASFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:ASFunctionOptionallyContainedNrmClass"/>
              <element ref="im:CAMELIMSSFASFunctionFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

```

```

<element
  name="OSASCSASFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:ASFunctionOptionallyContainedNrmClass"/>
            <element ref="im:OSASCSASFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element
  name="SIPASFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:ASFunctionOptionallyContainedNrmClass"/>
            <element ref="im:SIPASFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element
  name="BGCFFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:BGCFFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```

```

</complexType>
</element>

<element
  name="ICSCFFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:ICSCFFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element
  name="IMSMGWFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:IMSMGWFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element
  name="MGCFFunction"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="linkList" type="xn:linkListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:MGCFFunctionOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```



```

    </complexType>
  </element>

  <element
    name="MRFCFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:MRFCFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element
    name="MRFPFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:MRFPFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element
    name="PCSCFFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:PCSCFFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

```

```

    </complexType>
  </element>

  <element
    name="SCSCFFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:SCSCFFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element
    name="ECSCFFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:ECSCFFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element
    name="SLFFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="linkList" type="xn:linkListType" minOccurs="0"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:SLFFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

```

```

</complexType>
</element>

<element name="Link_AS_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_AS_SCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_AS_SLF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_AS_SLFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_BGCF_BGCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_BGCF_BGCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```

```

        </choice>
      </sequence>
    </extension>
  </complexContent>
</complexType>
</element>

<element name="Link_BGCF_MGCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_BGCF_MGCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_BGCF_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_BGCF_SCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_ICSCF_SCSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```

```

        </complexType>
      </element>
      <choice minOccurs="0" maxOccurs="unbounded">
        <element ref="im:Link_ICSCF_SCSCFOptionallyContainedNrmClass"/>
        <element ref="xn:VsDataContainer"/>
      </choice>
    </sequence>
  </extension>
</complexContent>
</complexType>
</element>
<element name="Link_ICSCF_MGCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
  >
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_ICSCF_MGCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_ICSCF_PCSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
  >
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_ICSCF_PCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_PCSCF_SCSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
  >
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>

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    <all>
      <element name="aEnd" type="xn:dn"/>
      <element name="linkType" type="xn:linkType" minOccurs="0"/>
      <element name="protocolName" type="string" minOccurs="0"/>
      <element name="protocolVersion" type="string" minOccurs="0"/>
      <element name="userLabel" type="string"/>
      <element name="zEnd" type="xn:dn"/>
    </all>
  </complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
  <element ref="im:Link_PCSCF_SCSCFOptionallyContainedNrmClass"/>
  <element ref="xn:VsDataContainer"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>
<element name="Link_ICSCF_SLF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_ICSCF_SLFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>
<element name="Link_IMSMGW_MGCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_IMSMGW_MGCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>
<element name="Link_MGCF_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>

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    <element name="attributes" minOccurs="0">
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        <all>
          <element name="aEnd" type="xn:dn"/>
          <element name="linkType" type="xn:linkType" minOccurs="0"/>
          <element name="protocolName" type="string" minOccurs="0"/>
          <element name="protocolVersion" type="string" minOccurs="0"/>
          <element name="userLabel" type="string"/>
          <element name="zEnd" type="xn:dn"/>
        </all>
      </complexType>
    </element>
    <choice minOccurs="0" maxOccurs="unbounded">
      <element ref="im:Link_MGCF_SCSCFOptionallyContainedNrmClass"/>
      <element ref="xn:VsDataContainer"/>
    </choice>
  </sequence>
</extension>
</complexContent>
</complexType>
</element>

<element name="Link_MRFC_MRFP" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_MRFC_MRFPOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_MRFC_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_MRFC_SCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_SCSCF_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>

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    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_SCSCF_SCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_SCSCF_SLF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_SCSCF_SLFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

  <element
name="HSSFfunction"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
<complexType>
  <complexContent>
    <extension base="xn:NrmClass">
      <sequence>
        <element name="attributes" minOccurs="0">
          <complexType>
            <all>
              <element name="userLabel" type="string"/>
              <element name="linkList" type="xn:linkListType" minOccurs="0"/>
            </all>
          </complexType>
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          <element ref="xn:VsDataContainer"/>
        </choice>
      </sequence>
    </extension>
  </complexContent>
</complexType>
</element>

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<element name="Link_HSS_SCSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_HSS_SCSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_HSS_ICSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_HSS_ICSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_HSS_SIPAS" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_HSS_SIPASOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

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    </complexType>
  </element>

  <element name="Link_HSS_OSASCSAS" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="aEnd" type="xn:dn"/>
                  <element name="linkType" type="xn:linkType" minOccurs="0"/>
                  <element name="protocolName" type="string" minOccurs="0"/>
                  <element name="protocolVersion" type="string" minOccurs="0"/>
                  <element name="userLabel" type="string"/>
                  <element name="zEnd" type="xn:dn"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:Link_HSS_OSASCSASOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element name="Link_CAMELIMSSFAS_HSS"
substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="aEnd" type="xn:dn"/>
                  <element name="linkType" type="xn:linkType" minOccurs="0"/>
                  <element name="protocolName" type="string" minOccurs="0"/>
                  <element name="protocolVersion" type="string" minOccurs="0"/>
                  <element name="userLabel" type="string"/>
                  <element name="zEnd" type="xn:dn"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:Link_CAMELIMSSFAS_HSSOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element name="Link_AS_ICSCF" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="aEnd" type="xn:dn"/>
                  <element name="linkType" type="xn:linkType" minOccurs="0"/>
                  <element name="protocolName" type="string" minOccurs="0"/>
                  <element name="protocolVersion" type="string" minOccurs="0"/>
                  <element name="userLabel" type="string"/>
                  <element name="zEnd" type="xn:dn"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="im:Link_AS_ICSCFOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

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        </choice>
      </sequence>
    </extension>
  </complexContent>
</complexType>
</element>

<element name="Link_PCSCF_ECSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_PCSCF_ECSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_BGCF_ECSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="aEnd" type="xn:dn"/>
                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>
                <element name="protocolVersion" type="string" minOccurs="0"/>
                <element name="userLabel" type="string"/>
                <element name="zEnd" type="xn:dn"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="im:Link_BGCF_ECSCFOptionallyContainedNrmClass"/>
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Link_MGCF_ECSCF"
  substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"
>
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
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                <element name="linkType" type="xn:linkType" minOccurs="0"/>
                <element name="protocolName" type="string" minOccurs="0"/>

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        <element name="protocolVersion" type="string" minOccurs="0"/>
        <element name="userLabel" type="string"/>
        <element name="zEnd" type="xn:dn"/>
    </all>
</complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
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    <element ref="xn:VsDataContainer"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>

<element name="ASFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="SIPASFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="OSASCASASFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="CAMELIMSSFASFunctionOptionallyContainedNrmClass" type="xn:NrmClass"
abstract="true"/>
<element name="BGCFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
    <element name="ICSCFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="IMSMGWFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="MGCFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="MRFCFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="MRFPFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
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<element name="SLFFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="ECSCFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_AS_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_AS_SLFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_BGCF_BGCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_BGCF_MGCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_BGCF_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_ICSCF_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_ICSCF_MGCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_ICSCF_PCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_PCSCF_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_ICSCF_SLFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
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<element name="Link_MGCF_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_MRFC_MRFPOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_MRFC_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_SCSCF_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_SCSCF_SLFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="HSSFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_HSS_SCSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_HSS_ICSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_HSS_SIPASOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_HSS_OSASCASASOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_CAMELIMSSFAS_HSSOptionallyContainedNrmClass" type="xn:NrmClass"
abstract="true"/>
<element name="Link_AS_ICSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_PCSCF_ECSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_BGCF_ECSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
<element name="Link_MGCF_ECSCFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
</schema>

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Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2010-09	SA#49	SP-100521	--	--	Presentation to SA for Information and Approval	---	1.0.0
2010-10	--	--	--	--	Publication	1.0.0	10.0.0
2010-12	SA#50	SP-100833	001	1	Correcting XML schema of IMS Network Resource Model - Align with 32.622	10.0.0	10.1.0
2010-12	SA#50	SP-100859	002	5	Correcting CscfFunction definition of IMS NRM - Align with TS 32.732 IS	10.0.0	10.1.0
2011-09	SA#53	SP-110536	003	1	Add ECSCFunction to IMS NRM	10.1.0	11.0.0