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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;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
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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:

- 32.361: "Entry Point (EP) Integration Reference Point (IRP): Requirements"
- 32.362: "Entry Point (EP) Integration Reference Point (IRP): Information Service (IS)"**
- 32.366: "Entry Point (EP) Integration Reference Point (IRP); Solution Set (SS) definitions"

The present document is part of a TS-family defining the Telecommunication Management (TM) of 3G systems.

The TM principles are described in 3GPP TS 32.101 [1]. The TM architecture is described in 3GPP TS 32.102 [2].

The other specifications define the interface (Itf-N) between the managing system (manager), which is in general the Network Manager (NM) and the managed system (agent), which is either an Element Manager (EM) or the managed NE itself. The Itf-N is composed of a number of Integration Reference Points (IRPs) defining the information in the agent that is visible for the manager, the operations that the manager may perform on this information and the notifications that are sent from the agent to the manager. EP (Entry Point) IRP is one of these IRPs with special function.

It is difficult for an NM to discover all IRPs in the environment that there are several managed systems and/or if there are multiple IRPs related to each managed systems. This Entry Point is proposed to provide a convenient mechanism for NM to discover the managed systems and their related IRPs.

1 Scope

The present document defines the Information Service (IS) part of the Entry Point IRP (EPIRP). It describes the semantics of the information and the interactions visible across Itf-N in a protocol independent way. The information is specified by means of Information Object Classes (IOCs) and SupportIOCs, and the interactions by means of operations and notifications. The present document does not specify the syntax (encoding) of the information.

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 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".
- [4] 3GPP TS 32.111-1: "Telecommunication management; Fault management; Part 1: 3G fault management requirements".
- [5] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".
- [6] 3GPP TS 32.361: "Telecommunication management; Entry Point (EP) Integration Reference Point (IRP): Requirements".
- [7] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".
- [8] 3GPP TS 32.312: "Telecommunication management; Generic Integration Reference Point (IRP) management: Information Service (IS)".
- [9] 3GPP TS 32.311: "Telecommunication management; Generic Integration Reference Point (IRP) management: Requirements".
- [10] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TS 32.101 [1], 32.102 [2], 32.150 [10] 32.361 [6] and the following apply.

IRPVersion: See 3GPP TS 32.311 [9].

SupportIOC: See 3GPP TS 32.150 [10].

3.2 Abbreviations

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

CORBA	Common Object Request Broker Architecture
DN	Distinguished Name
EM	Element Manager
EP	Entry Point
EPIRP	Entry Point IRP
IRP	Integration Reference Point
IOC	Information Object Class
IS	Information Service
NE	Network Element
NM	Network Manager
NRM	Network Resource Model
PM	Performance Management

4 System Overview

4.1 System Context

The general definition of the System Context for the present IRP is found in 3GPP TS 32.150 [10] subclause 4.7.

In addition, the set of related IRP(s) relevant to the present IRP is shown in the two diagrams below.

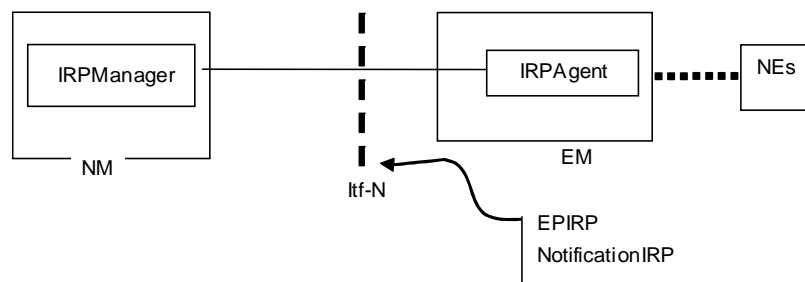


Figure 4.1: System Context A

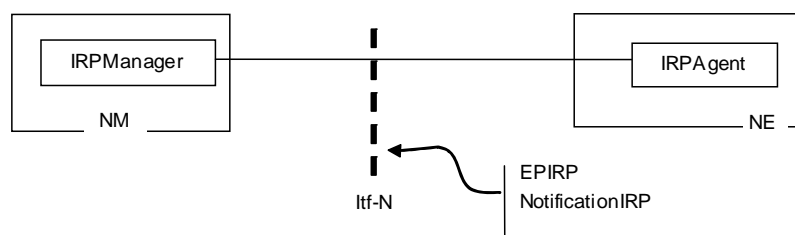


Figure 4.2: System Context B

4.2 Compliance rules

For general definitions of compliance rules related to qualifiers (Mandatory/Optional/Conditional) for *operations*, *notifications* and *parameters* (of operations and notifications) please refer to 3GPP TS 32.150 [10].

5 Information Object Classes

5.1 Imported information entities and local labels

Label reference	Local label
3GPP TS 32.622 [7], information object class, IRPAgent	IRPAgent
3GPP TS 32.622 [7], information attribute, systemDN	systemDN
3GPP TS 32.312 [8], SupportIOC, ManagedGenericIRP	ManagedGenericIRP
3GPP TS 32.312 [8], information attribute, iRPId	iRPId

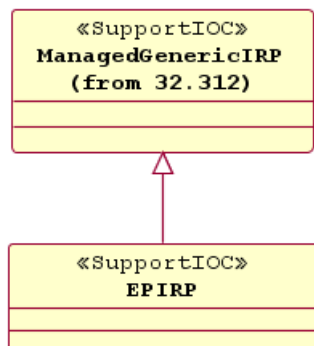
5.2 Class diagram

5.2.1 Attributes and relationships

This clause depicts the set of classes (e.g. IOCs) that encapsulates 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.



5.2.2 Inheritance



5.3 Information Object Class definitions

5.3.1 EPIRP

5.3.1.1 Definition

The EPIRP SupportIOC is used as an initial access point to the managed systems. This interface implements the entry point management capabilities defined by the present document. EPIRP inherits from the ManagedGenericIRP SupportIOC specified in 3GPP TS 32.312 [8]. How the NM gets the IRP Reference of the EPIRP is outside the scope of the present document.

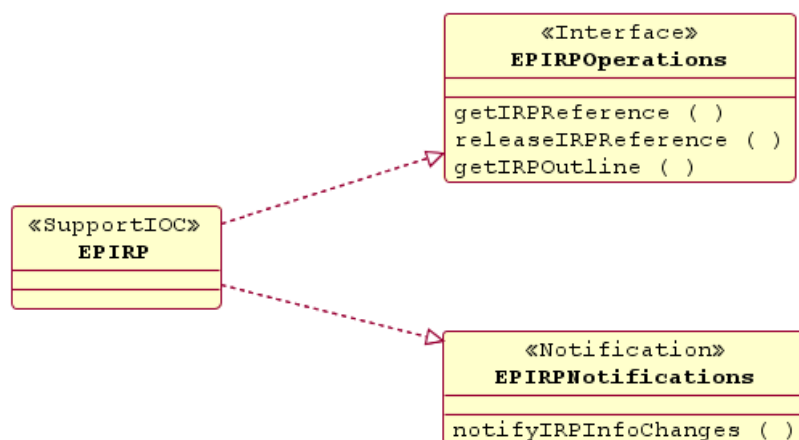
5.3.1.2 Attributes

The EPIRP does not have any own attributes, only those inherited from ManagedGenericIRP.

6 Interface definition

6.1 Class diagram representing interfaces

The following diagram depicts the interfaces of EPIRP with its corresponding operations and notifications.



6.2 Generic rules

- Rule 1:** each operation with at least one input parameter supports a pre-condition `valid_input_parameter` which indicates that all input parameters shall be valid with regards to their information type. Additionally, each such operation supports an exception `operation_failed_invalid_input_parameter` which is raised when pre-condition `valid_input_parameter` is false. The exception has the same entry and exit state.
- Rule 2:** Each operation with at least one optional input parameter supports a set of pre-conditions `supported_optional_input_parameter_xxx` where "xxx" is the name of the optional input parameter and the pre-condition indicates that the operation supports the named optional input parameter. Additionally, each such operation supports an exception `operation_failed_unsupported_optional_input_parameter_xxx` which is raised when (a) the pre-condition `supported_optional_input_parameter_xxx` is false and (b) the named optional input parameter is carrying information. The exception has the same entry and exit state.

- **Rule 3:** each operation shall support a generic exception `operation_failed_internal_problem` that is raised when an internal problem occurs and that the operation cannot be completed. The exception has the same entry and exit state.

6.3 Interface EPIRPOperations (M)

6.3.1 Operation `getIRPOutline` (M)

6.3.1.1 Definition

The `IRPManager` uses this operation to request the `EPIRP` to return the outline information of the supported IRPs. `IRPManager` could set a filter constraint on the returned information according to specific requirements.

The `EPIRP` shall return the outline information of all the IRPs, including itself and other `EPIRP` instances that it knows, supported by the `IRPAgent` that contains the `EPIRP`.

The `EPIRP` may additionally return the outline information of all the IRPs, including `EPIRP` instances, supported by other `IRPAgents`.

6.3.1.2 Input parameters

Parameter Name	Qualifier	Information Type	Comment
<code>iRPVersion</code>	M	--	It specifies an <code>iRPVersion</code> that <code>IRPAgent</code> shall use when constructing its output parameter <code>supportedIRPList</code> . If this parameter is absent, then all the supported <code>iRPVersions</code> shall be used to construct its <code>supportedIRPList</code> .

6.3.1.3 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
supportedIRPList	M	<p>A sequence of elements. Each element contains:</p> <ul style="list-style-type: none"> - systemDN (M) - irPList (M) <p>where irPList is a sequence of IRPAgent elements. Each element is:</p> <ul style="list-style-type: none"> - rDN (M) - irPVersionSet (M) - irPManagementScope (O) 	<p>This parameter will return a sequence of elements.</p> <p>The systemDN (defined in [7]) is the Distinguished Name (DN) of the that contains the IRPAgentRPs identified by the related irPList.</p> <p>Note that this may or may not be the same IRPAgent that contained the (that is responding to this operation).</p> <p>The rDN (relative Distinguished Name) sub-parameter contains the class name and the irPId of the IRP instance. The irPId (defined in [8]) is the identifier of a specific Interface IRP (e.g. AlarmIRP 32.111-1 [4], PMIRP 32.401 [3]) contained by the IRPAgent identified by the systemDN sub-parameter.</p> <p>The irPVersionSet (defined in [8]) is the set of irPVersions supported by the IRP identified by the rDN sub-parameter. irPVersion, defined in [9] (see note), is used to identify a particular IRP Solution Set specification.</p> <p>The irPManagementScope sub-parameter, when present, shall carry a list of the DNs that identify the sub trees under the management of the IRP. This parameter, if present, shall contain no information if the IRP is EPIRP.</p> <p>In case there is no supported IRP, this sequence shall contain no element. The operation is considered successful.</p>
Status	M	ENUM (OperationSucceeded, OperationFailed)	An operation may fail because of a specified or unspecified reason.
<p>NOTE: Each irPVersion number is a version supported by the identified Interface IRP, not a version of an NRM IRP.</p>			

6.3.1.4 Pre-condition

The precondition must hold true before the operation is invoked.

irPVersionIsValid

Assertion Name	Definition
irPVersionIsValid	The irPVersion specified is valid.

6.3.1.5 Post-condition

None.

6.3.1.6 Exceptions

Exception Name	Definition
invalidIRPVersion	<p>Condition: irPVersionIsValid = FALSE</p> <p>Returned information: The response parameter is returned</p> <p>Exit state: Entry state</p>
operationFailed	<p>Condition: Pre-condition is false or post-condition is false</p> <p>Returned Information: The output parameter status</p> <p>Exit state: Entry state</p>

6.3.2 Operation `getIRPReference` (M)

6.3.2.1 Definition

The `IRPManager` uses this operation to request the `EPIRP` to return an IRP Reference for a specific version of a specific IRP, including `EPIRP`.

Whether IRP References are statically or dynamically allocated is outside the scope of the present document.

6.3.2.2 Input parameters

Parameter Name	Qualifier	Information Type	Comment
<code>managerIdentifier</code>	M	--	It carries the identifier of an <code>IRPManager</code> .
<code>systemDN</code>	M	--	It carries the <code>systemDN</code> (defined in [7]) of the <code>IRPAgent</code> containing the specific Interface IRP <code>YyyIRP</code> (e.g. <code>AlarmIRP</code> , <code>PMIRP</code>) needed by the <code>IRPManager</code> .
<code>rDN</code>	M	--	It carries the class name and the <code>irpId</code> of the IRP instance. The <code>systemDN</code> (above) and this <code>rDN</code> form the DN of the IRP instance whose <code>irpReference</code> is requested by the <code>IRPManager</code> .

6.3.2.3 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
<code>irpReference</code>	M	--	This parameter carries an IRP Reference for the specified <code>irpVersion</code> of the specified IRP.
<code>status</code>	M	ENUM (<code>OperationSucceeded</code> , <code>OperationFailed</code>)	An operation may fail because of a specified or unspecified reason.

6.3.2.4 Pre-condition

`requestedParametersAreValid`

Assertion Name	Definition
<code>requestedParametersAreValid</code>	The <code>systemDN</code> and <code>rDN</code> are valid and their combination is valid in a way that the <code>EPIRP</code> is aware of the IRP instance and its associated <code>irpReference</code> .

6.3.2.5 Post-condition

None.

6.3.2.6 Exceptions

Exception Name	Definition
<code>invalidRequestedParameters</code>	Condition: <code>requestParametersAreValid</code> = FALSE Returned information: The response parameter and detailed reason are returned Exit state: Entry state
<code>operationFailed</code>	Condition: Pre-condition is false or post-condition is false Returned Information: The output parameter <code>status</code> . Exit state: Entry state

6.3.3 Operation `releaseIRPReference` (M)

6.3.3.1 Definition

The `IRPManager` uses this operation to request the `IRPAgent` to release a specific `iRPReference`. Whether the `iRPReference` is really released or not in the `IRPAgent` is outside the scope of the present document.

6.3.3.2 Input parameters

Parameter Name	Qualifier	Information Type	Comment
<code>managerIdentifier</code>	M	--	It carries the identifier of an <code>IRPManager</code> .
<code>iRPReference</code>	M	--	It carries the specific <code>iRPReference</code> no longer needed by the <code>IRPManager</code> .

6.3.3.3 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
<code>status</code>	M	ENUM (<code>OperationSucceeded</code> , <code>OperationFailed</code>)	An operation may fail because of a specified or unspecified reason.

6.3.3.4 Pre-condition

The precondition must hold true before the operation is invoked.

`validIRPReference`

Assertion Name	Definition
<code>validIRPReference</code>	The <code>iRPReference</code> is valid.

6.3.3.5 Post-condition

None.

6.3.3.6 Exceptions

Exception Name	Definition
<code>unknownIRPReference</code>	Condition: <code>validIRPReference</code> = FALSE Returned information: The response parameter is returned Exit state: Entry state
<code>operationFailed</code>	Condition: Pre-condition is false or post-condition is false Returned Information: The output parameter <code>status</code> Exit state: Entry state

6.4 Interface EPIRPNotifications (M)

6.4.1 Notification notifyIRPInfoChanges (M)

6.4.1.1 Definition

The subscribed `IRPManager` instances are notified that the information (management scope, IRP Reference, etc.) of one IRP, including itself and other `EPIRP` instances, stored in `EPIRP` has changed. This behaviour of sending `notifyIRPInfoChanges` shall cover the case when the `EPIRP` is installed in the operating environment and the information of IRPs are entered into the `EPIRP` via the `EPIRP` non-standardized local interface.

6.4.1.2 Input Parameters

Parameter Name	Qualifier	Matching Information	Comment
<code>objectClass</code>	M, Y	<code>EPIRP objectClass</code> .	Notification header - see [5]. It shall carry the class name of the <code>EPIRP</code> .
<code>objectInstance</code>	M, Y	<code>EPIRP objectInstance</code> .	Notification header - see [5]. It shall carry the DN of the <code>EPIRP</code> .
<code>notificationId</code>	M, N	--	Notification header - see [5].
<code>eventTime</code>	M, Y	--	Notification header - see [5].
<code>systemDN</code>	C, Y	--	Notification header - see [5].
<code>notificationType</code>	M, Y	" <code>notifyIRPInfoChanges</code> "	Notification header - see [5]
<code>iRPDN</code>	M, N	--	This is the DN of the IRP instance whose information (i.e., outline information and <code>iRPReference</code> information) registered with <code>EPIRP</code> has changed,
<code>changeMode</code>	M, N	ENUM {Register, Deregister, Modify}	Register: <code>EPIRP</code> now holds the outline information and IRP reference information of the IRP whose DN is in <code>iRPDN</code> . Deregister: <code>EPIRP</code> now no longer holds any information of the IRP instance whose DN is in <code>iRPDN</code> . Modify: <code>EPIRP</code> has changed some or all information of the IRP instance whose DN is in <code>iRPDN</code> .
<code>additionalText</code>	O, N	--	It can contain further next information for this notification.

6.4.1.3 Triggering Event

6.4.1.3.1 From-state

`iRPInfoChange`

Assertion Name	Definition
<code>iRPInfoChange</code>	The information of IRP (<code>iRPVersionSet</code> , <code>iRPManagementScope</code> , <code>iRPReference</code>) stored in <code>EPIRP</code> changes.

6.4.1.3.2 To-state

`successEmitNotification`

Assertion Name	Definition
<code>successEmitNotification</code>	<code>EPIRPAgent</code> finished emitting <code>notifyIRPInfoChanges</code> notification.

Annex A (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
Sep 2003	SA_21	SP-030424	--	--	Submitted to TSG SA#21 for Information	--	1.0.0	
Dec 2003	SA_22	SP-030635	--	--	Submitted to TSG SA#22 for Approval	--	2.0.0	6.0.0
Mar 2004	SA_23	SP-040121	0001	--	Clarification on Entry Point (EP IRP) Information Service	F	6.0.0	6.1.0
Jun 2004	SA_24	SP-040247	0002	--	Correct and clarify semantics of notification parameters and notification table	F	6.1.0	6.2.0
Dec 2005	SA_30	SP-050711	0003	--	Apply Generic System Context	F	6.2.0	6.3.0
Mar 2006	SA_31	SP-060089	0004	--	Correct semantics of notification object class and object instance in Comment	F	6.3.0	6.4.0
Jun 2007	SA_36	--	--	--	Automatic upgrade to Rel-7 (no CR) at freeze of Rel-7. Deleted reference to CMIP SS, discontinued from R7 onwards.	--	6.4.0	7.0.0
Sep 2007	SA_37	SP-070614	0005	--	Add IRP class name to operations	C	7.0.0	8.0.0
Mar 2009	SA_43	SP-090207	0006	--	Include reference to SOAP Solution Set specification	D	8.0.0	8.1.0
Dec 2009	-	-	-	-	Update to Rel-9 version (MCC)	--	8.1.0	9.0.0
Mar 2011	-	-	-	-	Update to Rel-10 version (MCC)	--	9.0.0	10.0.0
2012-09	-	-	-	-	Update to Rel-11 version (MCC)		10.0.0	11.0.0
2013-03	SA_59	SP-130049	0009	1	correct wrong ref to iRPIId	A	11.0.0	11.1.0
2014-10	-	-	-	-	Update to Rel-12 version (MCC)		11.1.0	12.0.0
2016-01	-	-	-	-	Update to Rel-13 version (MCC)		12.0.0	13.0.0

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