

# ETSI TS 132 106-2 V3.1.0 (2000-07)

---

*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);  
Telecommunication Management; Configuration Management;  
Part 2: Notification Integration Reference Point:  
Information Service version 1  
(3G TS 32.106-2 version 3.1.0 Release 1999)**

---



---

**Reference**

RTS/TSGS-0532106UR2

---

**Keywords**

UMTS

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

---

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

---

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF).

In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at <http://www.etsi.org/tb/status/>

If you find errors in the present document, send your comment to:

editor@etsi.fr

---

**Copyright Notification**

---

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2000.

All rights reserved.

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://www.etsi.org/ipr>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

This Technical Specification (TS) has been produced by the ETSI 3<sup>rd</sup> Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under [www.etsi.org/key](http://www.etsi.org/key) .

# Contents

Foreword .....	4
Introduction .....	4
1 Scope .....	6
2 References .....	6
3 Definitions and abbreviations .....	7
3.1 Definitions .....	7
3.2 Abbreviations .....	7
4 System overview .....	8
4.1 System context for Notification .....	8
5 Modelling approach .....	9
6 IRP Information Service .....	9
6.1 Interfaces .....	9
6.1.1 NotificationIRPOperation Interface .....	10
6.1.1.1 Operation subscribe (M) .....	10
6.1.1.2 Operation unsubscribe (M) .....	11
6.1.1.3 Operation getNotificationIRPVersion (M) .....	12
6.1.1.4 Operation getSubscriptionStatus (O) .....	12
6.1.1.5 Operation getSubscriptionIds (O) .....	12
6.1.1.6 Operation changeSubscriptionFilter (O) .....	13
6.1.1.7 Operation suspendSubscription (O) .....	13
6.1.1.8 Operation resumeSubscription (O) .....	14
6.1.1.9 Operation getNotificationCategories (O) .....	14
6.1.2 NotificationIRPNotification Interface .....	15
6.1.2.1 Notification notify .....	15
6.1.2.2 Notification Attributes .....	15
6.1.2.2.1 managedObjectClass (M) .....	15
6.1.2.2.2 managedObjectInstance (M) .....	15
6.1.2.2.3 notificationId (O) .....	15
6.1.2.2.4 eventTime (M) .....	16
6.1.2.2.5 systemDN (C) .....	16
6.1.2.2.6 eventType (M) .....	16
6.1.2.2.7 extendedEventType (M) .....	16
6.1.3 Behaviour .....	17
6.1.3.1 IRPAgent supports multiple subscriptions with one IRPManager .....	17
6.1.3.2 Support of packing multiple notifications .....	17
6.1.3.3 IRPAgent supports emission of multiple Notification categories .....	17
6.1.3.4 Subscription list loss .....	17
<b>Annex A (informative): Change history .....</b>	<b>18</b>

---

## Foreword

This Technical Specification (TS) has been produced by the 3<sup>rd</sup> Generation Partnership Project (3GPP).

The present document is part 2 of a multi-part TS covering the 3<sup>rd</sup> Generation Partnership Project: Technical Specification Group Services and System Aspects; Telecommunication Management; Configuration Management, as identified below:

Part 1: "3G Configuration Management: Concept and Requirements";

**Part 2: "Notification Integration Reference Point: Information Service Version 1";**

Part 3: "Notification Integration Reference Point: CORBA Solution Set Version 1:1";

Part 4: "Notification Integration Reference Point: CMIP Solution Set Version 1:1";

Part 5: "Basic Configuration Management IRP Information Model (including NRM) Version 1";

Part 6: "Basic Configuration Management IRP CORBA Solution Set Version 1:1";

Part 7: "Basic Configuration Management IRP CMIP Solution Set Version 1:1";

Part 8: "Name Convention for Managed Objects".

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

Version x.y.z

where:

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

---

## Introduction

Configuration Management (CM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and monitor the actual configuration on the Network Elements (NEs) and Network Resources (NRs), and they may be initiated by the operator or by functions in the Operations Systems (OSs) or NEs.

CM actions may be requested as part of an implementation programme (e.g. additions and deletions), as part of an optimisation programme (e.g. modifications), and to maintain the overall Quality Of Service (QOS). The CM actions are initiated either as a single action on a NE of the 3G network or as part of a complex procedure involving actions on many NEs.

The Itf-N interface for Configuration Management (CM) is built up by a number of Integration Reference Points (IRPs) and a related Name Convention, which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in 3G TS 32.101 [7] and 3G TS 32.102 [8]. For CM, a number of IRPs (and the Name Convention) are defined herein, used by this as well as other specifications for Telecom Management produced by 3GPP. All these are included in 3G TS 32.106 from Part 2 and onwards.

The present document is Part 2 of 3G TS 32.106 (3G TS 32.106-2) - Notification IRP Information Service.

---

# 1 Scope

Network Elements (NEs) under management generate events to inform event receivers about occurrences within the network that may be of interest to event receivers. There are a number of categories of events. Alarm, as specified in Alarm IRP: Information Service 3G TS 32.111-2 [1], is one member of this category.

The purpose of Notification IRP is to define an interface through which an IRPManager (typically a network management system) can subscribe to IRPAgent (typically an Element Manager (EM) or a NE) for receiving network events. It also specifies attributes carried in the network events. These attributes are common among all event categories. Attributes that are specific to a particular event category are not part of the present document. For example, `perceivedSeverity` is an attribute specific for alarm event category. This attribute is not defined the present document but in Alarm IRP 3G TS 32.111-2 [1].

---

# 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.

- [1] 3G TS 32.111-2: "Alarm IRP: Information Service"
- [2] Void
- [3] ITU-T Recommendation X.734 (09/92): "Information technology - Open Systems Interconnection - Systems management: Event report management function".
- [4] 3G TS 32.106-8: "Name Convention for Managed Objects".
- [5] Void
- [6] OMG: "OMG Notification Service".
- [7] 3G TS 32.101: "3G Telecom Management principles and high level requirements".
- [8] 3G TS 32.102: "3G Telecom Management architecture".
- [9] 3G TS 32.106-1: "3G Configuration Management: Concept and Requirements".
- [10] ITU-T Recommendation X.730: "Object Management Function".
- [11] ITU-T Recommendation X.731: "State Management Function".
- [12] ITU-T Recommendation X.732: "Attributes for representing relationships".
- [13] ITU-T Recommendation X.733: "Alarm Reporting Function".
- [14] ITU-T Recommendation X.736: "Security Alarm Reporting Function".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. For terms and definitions not found here, please refer to 3G TS 32.101 [7], 3G TS 32.102 [8] and 3G TS 32.106-1 [9].

**IRPAgent:** See 3G TS 32.102 [8].

**IRPManager:** See 3G TS 32.102 [8].

**Event:** It is an occurrence that is of significance to network operators, the NEs under surveillance and network management applications. Events can indicate many types of network management information, such as network alarms, network configuration change information and network performance data.

**Extended Event Type:** ITU-T TMN defines event types. They are: Object Creation, Object Deletion, Attribute Value Change, State Change, Relationship Change, Communications Alarm, Processing Error Alarm, Environmental Alarm, Quality of Service Alarm, Equipment Alarm, Integrity Violation, Security Violation, Time Domain Violation, Operational Violation, Physical Violation. Valid values of this set are controlled by ITU-T.

The 3GPP Working Group SA5's (Telecommunication Management) work on IRP requires definitions beyond those ITU-T defined event types. Examples are:

- Indicate alarm acknowledgement state changes;
- Indicate Alarm List (defined in Alarm IRP: IS 3G TS 32.111-2 [1]) has rebuilt successfully.

This set is called `extendedEventType`. Valid values for this set are specified by this IRP.

**Notification:** It refers to the transport of events from event producer to consumer (receiver). In this IRP, notification is used to carry network events from IRPAgent to IRPManager. Producer sends notifications to consumers as soon as there are new events occur. Consumer does not need to check ("pull") for events.

It may be reused if there is no requirement that the previous notification using that Notification identifier be correlated with future notifications. Generally, IRPAgent should choose it to ensure uniqueness over as long a time as is feasible for the IRPAgent.

**Notification Category:** One Notification Category defines the set of all event types and all extended event types specified by one IRP. Neither an event type nor an extended event type may belong to more than one Notification Category.

**Qualifiers:** Qualifiers for operations, notifications and attributes (whether they are Mandatory(M)/ Conditional(C)/ Optional(O)) are defined in the present (Information Service) document, but not for corresponding parameters in the solution set documents (as they are meaningless there). Mandatory and Conditional qualifiers shall always be the same in other IRPs using items from the Notification IRP IS (the present document), but Optional qualifiers may in the other IRPs be set to either Optional or Mandatory.

### 3.2 Abbreviations

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

C	Conditional
CM	Configuration Management
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name
EM	Element Manager
FM	Fault Management
IDL	Interface Definition Language
IRP	Integration Reference Point

IS	Information Service
ITU-T	International Telecommunication Union, Telecommunication Standardisation Sector
M	Mandatory
MIB	Management Information Base
MIM	Management Information Model
MOC	Managed Object Class
MOI	Managed Object Instance
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
O	Optional
OMG	Object Management Group
SS	Solution Set
TMN	Telecommunications Management Network
UML	Unified Modelling Language (OMG)

## 4 System overview

### 4.1 System context for Notification

Figure 1 and Figure 2 identify System contexts of Notification IRP in terms of implementations called IRPAgent and IRPManager.

"IRPManager" depicts a process that interacts with IRPAgent for the purpose of receiving network Notifications via this IRP. IRPAgent detects network events. IRPAgent sends IRPManagers notifications carrying the events. Examples of IRPManagers can be a process running supporting network Notification logging device or supporting network Notification viewing devices (such as a local craft terminal) or a process running within a Network Manager (NM) as shown in Figure 1 and Figure 2. IRPAgent implements and supports this IRP. IRPAgent can run within one Element Manager (EM) with one or more NEs (see Figure 1) or run within one NE (see Figure 2). In the former case, the interfaces (represented by a thick dotted line) between the EM and the NEs are not subject of this IRP. Whether EM and NE share the same hardware system is not relevant to this IRP either. By observing the interaction across the IRP, one cannot deduce if EM and NE are integrated in a single system or if they run in separate systems.

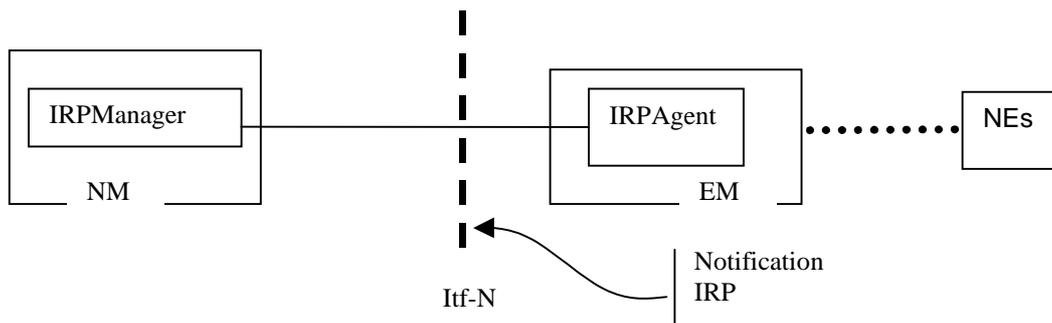
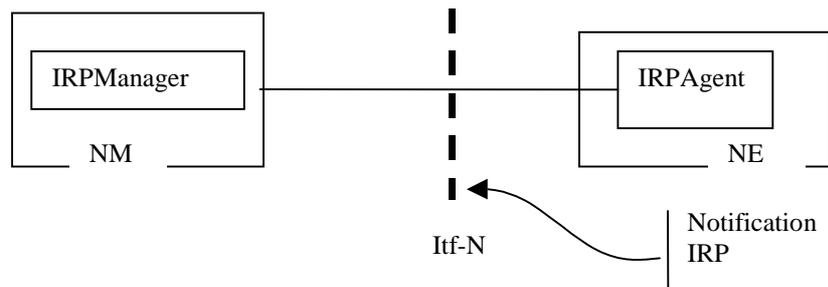


Figure 1: System Context A



**Figure 2: System Context B**

This interface supports the following implementation strategies.

- One IRPAgent supports emission of different categories of Notifications, such as alarms (as specified in 3G TS 32.111-2 [1]) and others.
- One IRPAgent supports emission of one specific category of Notification. For example, one IRPAgent implementation only emits alarms specified in 3G TS 32.111-2 [1]. Another IRPAgent implementation emits configuration status change notifications.
- IRPManager can specify the categories of notifications it wants to receive using `subscribe` operation. In the case IRPManager does not specify the notification category in `subscribe`, IRPAgent will then emit all categories of notifications that IRPAgent handles. This implementation is SS dependent.
- IRPManager can query the categories of notification supported by IRPAgent. This implementation is Solution Set (SS) dependent.

The Notification IRP defines attributes, carried in notifications that are common in all categories of notifications.

Attributes specific to a particular category of notification shall be specified in corresponding IRP (such as Alarm IRP IS – see 3G TS 32.111-2 [1]) using the Notification IRP. Those IRP also define the protocol interaction via which IRPManager receives the notifications.

## 5 Modelling approach

This clause identifies the modelling approach adopted and used in this IRP.

This IRP bases its design on work captured in ITU-T Recommendation X.734 [3], OMG Notification Service [6]. The central design ideas are:

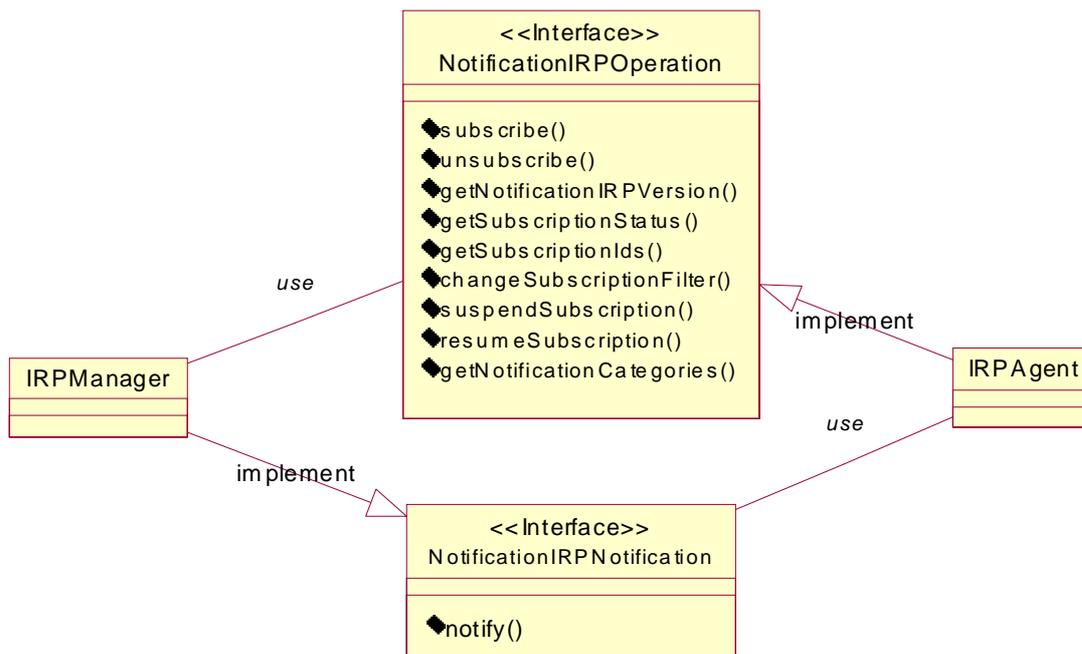
- Separation of notification Consumers (IRPManagers) from Producers (IRPAgents);
- Notifications are sent to IRPManagers without the need for IRPManagers to periodically check for new notifications.
- Common characteristics related to notifications in all other IRPs are gathered in one IRP (the present document).

## 6 IRP Information Service

### 6.1 Interfaces

Figure 3 illustrates the operations and notifications defined as interfaces implemented and used by IRPAgent and IRPManager. Parameters and return status are not indicated. Interface in IRP Information Service is identical to concept conveyed by stereotype `<<interface>>` of UML.

One interface, called `NotificationIRPOperations`, is defined. This interface defines operations implemented by IRPAgent and used (or called by) IRPManager.



**Figure 3: Protocol Independent Interface**

## 6.1.1 NotificationIRPOperation Interface

### 6.1.1.1 Operation subscribe (M)

IRPManager invokes this operation to establish subscription to receive network events via notifications, under the filter constraint specified in this operation. How IRPManager discovers the IRPAgent's address or reference (so that IRPManager can invoke this operation) is outside the scope of the present document.

Table 1: Parameters of subscribe

Name	Qualifier	Purpose
managerReference	Input, M	It specifies the reference of IRPManager to which IRPAgent shall send events.
timeTick	Input, O	It specifies the value of a timer hold by IRPAgent for the subject IRPManager. This value defines a time window within which IRPManager intends to invoke <code>getSubscriptionStatus</code> (or <code>subscribe</code> ) operation. IRPAgent shall reset the timer, with <code>timeTick</code> , when it receives the <code>getSubscriptionStatus</code> (or <code>subscribe</code> ) operation from the subject IRPManager. If the timer expires, IRPAgent may delete its resources allocated to the IRPManager and consider IRPManager as if it has invoked <code>unsubscribe</code> operation. In such case, IRPManager will not receive further notification. IRPManager needs to invoke <code>subscribe</code> operation again. The value is in unit of whole minute. If the value is between 1 and 15, IRPAgent considers it to be 15. If the parameter is absent or if the parameter is present but its value is negative or 0, IRPAgent shall treat <code>timeTick</code> value as infinite, i.e., timer will never expire and IRPAgent needs other means to decide when to delete resources allocated to the IRPManager.
notificationCategories	Input, O	It identifies one or more Notification Categories (see also definition in subclause 3.1). If the parameter is absent, IRPAgent shall consider IRPManager is subscribing to all notification categories supported by IRPAgent.
filter	Input, O	It specifies a filter constraint that IRPAgent shall use to filter notification of the category specified in <code>notificationCategory</code> parameter. IRPAgent shall notify IRPManagers if the event satisfies the filter constraint. If this parameter is absent, then no filter constraint shall be applied. Valid filter constraint grammars are specified by individual notification IRP SS, e.g. Notification IRP: CORBA SS.
subscriptionId	Output, M	It holds an unambiguous identity of this subscription. IRPManager can invoke operations (e.g., <code>suspendSubscription</code> ) using this identity. In normal usage, IRPManager shall not provide this identity to another IRPManager such that the second IRPManager can invoke operations using it.
status	Output, M	(a) Operation succeeded in that the requested subscription has been established successfully AND that IRPAgent is emitting categories of notification specified by IRPManager via the <code>notificationCategory</code> parameter AND that the <code>filter</code> , if present, contains a valid filter constraint. (b) Operation failed because IRPManager is already in subscription, i.e., IRPAgent detects that there is an existing subscription carrying the same <code>managerReference</code> and in subscription for the same <code>notificationCategory</code> . (c) Operation failed because of other specified or unspecified reason.

### 6.1.1.2 Operation unsubscribe (M)

IRPManager invokes this operation to cancel subscription. IRPManager shall supply the `subscriptionId` assigned by IRPAgent in the corresponding operation `subscribe`.

Table 2: Parameters for unsubscribe

Name	Qualifier	Purpose
managerReference	Input, M	It specifies the reference of IRPManager. IRPManager shall supply its valid <code>managerReference</code> . This is the necessary requirement for the operation to be successful.
subscriptionId	Input, O	It carries the <code>subscriptionId</code> carried as the OUT parameter in the <code>subscribe</code> operation. IRPManager shall supply a specific <code>subscriptionId</code> if IRPManager wants to unsubscribe that particular subscription. IRPManager shall not supply <code>subscriptionId</code> (the parameter is absent) if it wants to unsubscribe all subscriptions established between IRPAgents and this <code>managerReference</code> .
status	Output, M	(a) Operation succeeded in that subscription is cancelled successfully.

	(b) Operation failed because of specified or unspecified reason.
--	--

### 6.1.1.3 Operation `getNotificationIRPVersion` (M)

IRPManager wishes to find out the Notification IRP SS versions supported by IRPAgent. IRPAgent shall respond with a list of Notification IRP SS version(s).

**Table 3: Parameters for `getNotificationIRPVersion`**

Name	Qualifier	Purpose
<code>versionNumberList</code>	Output, M	It indicates one or more SS version numbers supported by the IRPAgent. In Release 99, it shall contain only one version number.
<code>status</code>	Output, M	(a) Operation succeeded in that <code>versionNumberList</code> contains valid result. (b) Operation failed. Output parameter <code>versionNumberList</code> may contain invalid result.

### 6.1.1.4 Operation `getSubscriptionStatus` (O)

IRPManager invokes this operation to query the subscription status of a particular subscription.

IRPManager can get similar service by invoking `subscribe` operation. However, the following differences are noted.

- Operation `subscribe` uses `managerReference` and this operation uses `subscriptionId`.
- If IRPAgent has lost IRPManager's reference, IRPManager use of `subscribe` operation may result in establishment of another subscription. Using this operation does not establish another subscription.
- IRPManager can use `getSubscriptionStatus` operation to know about the filter constraint in effect, the state of subscription (i.e., if subscription is suspended/inactive or resumed/active), the `timeTick` value that may be set at `subscribe` invocation time and the `notificationCategory` currently in used in the subscription.

**Table 4: Parameters for `getSubscriptionStatus`**

Name	Qualifier	Purpose
<code>subscriptionId</code>	Input, M	It carries the <code>subscriptionId</code> carried as the output parameter in the <code>subscribe</code> operation.
<code>notificationCategoryList</code>	Output, M	It identifies the <code>notificationCategory</code> or <code>notificationCategories</code> supported in this subscription.
<code>filterInEffect</code>	Output, O	It contains the filter constraint currently active. If it is absent, IRPManager shall not apply any filter constraint to notifications emitted towards the subject IRPManager.
<code>subscriptionState</code>	Output, O	It indicates if the subscription is in "suspended" or "not-suspended".
<code>timeTick</code>	Output, O	It carries the same value as the one in <code>subscribe</code> operation.
<code>status</code>	Output, M	(a) Operation is successful and IRPAgent has valid values for all output parameters. (b) Operation is unsuccessful in that IRPAgent has no knowledge of the subscription.

### 6.1.1.5 Operation `getSubscriptionIds` (O)

IRPManager invokes this operation to get the values of all still valid `subscriptionIds` assigned by IRPAgent as result of previously `subscribe` operations performed by this IRPManager.

**Table 5: Parameters for getSubscriptionIds**

Name	Qualifier	Purpose
managerReference	Input, M	It specifies the reference of IRPManager that requests the list of identifiers of active subscriptions related to this IRPManager.
subscriptionIdList	Output, M	It carries a list of the subscriptionId, each assigned as OUT parameter in previous subscribe operations invoked by the current IRPManager. This value should contain no information if the IRPManager did not yet subscribed to that System or System lost all subscription related information.
status	Output, M	(a) Operation succeeded in that the value contained in OUT parameter is valid. (b) Operation failed because subscription information is lost or IRPAgent cannot complete the operation for other reasons. In this case, the OUT parameter shall contain no information.

### 6.1.1.6 Operation changeSubscriptionFilter (O)

IRPManager invokes this operation to replace the present filter constraint with a new one.

**Table 6: Parameters for changeSubscriptionFilter**

Name	Qualifier	Purpose
subscriptionId	Input, M	It carries the subscriptionId carried as the OUT parameter in the subscribe operation.
filter	Input, M	See description of Table 1: Parameters of subscribe.
status	Output, M	(a) Operation succeeded in that IRPAgent is now producing events based on the new filter constraint. (b) Operation failed in that, for unspecified reason, the new filter constraint cannot be installed. The old filter constraint, if present before this operation, is still in effect.

### 6.1.1.7 Operation suspendSubscription (O)

IRPManager invokes this operation to request IRPAgent to stop emission of notifications. IRPAgent may lose notification(s) if subscription is suspended.

**Table 7: Parameters for suspendSubscription**

Name	Qualifier	Purpose
subscriptionId	Input, M	It carries the subscriptionId carried as the OUT parameter in the subscribe operation.
status	Output, M	(a) Operation succeeded in that IRPAgent has suspended emission of notifications. (b) Operation failed in that, for unspecified reason, IRPAgent has not suspended emission of events.

### 6.1.1.8 Operation `resumeSubscription` (O)

IRPManager invokes this operation to request IRPAgent to resume emission of notifications. If the Subscription State is "not-suspended", IRPAgent shall return status successful and ignore this invocation. If Subscription State is "suspended", IRPAgent shall return status successful, change the Subscription State to "not-suspended" and resume emission of notifications.

**Table 8: Parameters for `resumeSubscription`**

Name	Qualifier	Purpose
<code>subscriptionId</code>	Input, M	It carries the <code>subscriptionId</code> carried as the OUT parameter in the <code>subscribe</code> operation.
<code>status</code>	Output, M	(a) Operation succeeded in that IRPAgent is has resumed emission of events. (b) Operation failed in that, for unspecified reason, IRPAgent cannot resume emission of events.

### 6.1.1.9 Operation `getNotificationCategories` (O)

IRPManager invokes this operation to query the categories of notification supported by IRPAgent. IRPManager does not need to be in subscription to invoke this operation.

**Table 9: Parameters for `getNotificationCategories`**

Name	Qualifier	Purpose
<code>notificationCategoryList</code>	Output, M	It identifies the list of notification categories supported by IRPAgent (see also definition in subclause 3.1). If this parameter value contain no information, then the meaning is that IRPAgent does not support any notification category at the moment.
<code>eventTypeList</code>	Output, O	It contains a list of elements. Each element is a list of <code>eventType</code> . The number of element shall be identical to that of output parameter <code>notificationCategoryList</code> . The n-th element of this list relates to the n-th element of the <code>notificationCategoryList</code> . IRPAgent shall not use arbitrarily any <code>eventType(s)</code> in this n-th element. IRPAgent shall use the same list of <code>eventType(s)</code> specified in the IRP document identified by the n-th element of the <code>notificationCategoryList</code> . If the n-th element contains no information, it implies IRPAgent is not providing explicit identification of <code>eventType(s)</code> of the corresponding <code>notificationCategory</code> . If this parameter is absent or contains no information, it implies that IRPAgent is not providing explicit identification of <code>eventType(s)</code> .
<code>extendedEventTypeList</code>	Output, O	It contains a list of element. Each element is a list of <code>extendedEventType</code> . The number of element shall be identical to that of output parameter <code>notificationCategoryList</code> . The n-th element of this list relates to the n-th element of the <code>notificationCategoryList</code> . IRPAgent shall not use arbitrarily any <code>extendedEventType</code> in this n-th element. IRPAgent shall use the same list of <code>extendedEventType</code> specified in the IRP document identified by the n-th element of the <code>notificationCategoryList</code> . If the n-th element contains no information, it implies IRPAgent is not providing explicit identification of <code>extendedEventType(s)</code> of the corresponding <code>notificationCategory</code> . If this parameter is absent or contains no information, it implies that IRPAgent is not providing explicit identification of <code>extendedEventType(s)</code> .
<code>status</code>	Output, M	(a) Operation succeeded in that the output parameter contains valid information. (b) Operation failed in that the output parameter does not contain valid information.

## 6.1.2 NotificationIRPNotification Interface

### 6.1.2.1 Notification notify

IRPAgent notifies the subscribed IRPManager that an event has occurred and that the event has satisfies the filter constraints used for this subscription. One event example is the notification defined in Alarm IRP: IS (3G TS 32.111-2 [1]).

The present document does not further specify this notify. Other IRPs using the Notification IRP, such as Alarm IRP: IS (3G TS 32.111-2 [1]), shall specify this notify, in particular, the specific parameters carried in notification, for use in their context.

The present document shall specify, in subclause 6.1.2.2, attributes commonly carried in parameters of all notifications.

### 6.1.2.2 Notification Attributes

Information about network events is carried in notification containing parameters of multiple attributes. This IRP specifies attributes that are commonly found in notifications defined by other IRPs. Collectively, they are called Notification Header. Other IRPs using the Notification IRP, such as Alarm IRP: IS (3G TS 32.111-2 [1]), shall specify the attributes used in the notification including:

- Identification and qualification of notification Header attributes for their use;
- Specification and qualification of other attributes relevant for their use.

#### 6.1.2.2.1 managedObjectClass (M)

This parameter specifies the class of the Managed Object (MO) in which the network event occurred. This attribute is filterable.

#### 6.1.2.2.2 managedObjectInstance (M)

This parameter specifies the instance of the MO in which the network event occurred. This attribute is filterable.

#### 6.1.2.2.3 notificationId (O)

This parameter provides an identifier for the notification, which may be carried in the correlatedNotifications parameter (see below) of future notifications. Attribute notificationId shall be chosen to be unique across all notifications of a particular managed object throughout the time that correlation is significant.

It uniquely identifies this notification from other notifications generated by the subject MO.

If IRPManager receives notifications from one IRPAgent, IRPManager shall use notificationId and managedObjectInstance to uniquely identify all received notifications.

If IRPManager receives notifications from multiple IRPAgents and notifications of each MO are reported at most through one IRPAgent, IRPManager shall use notificationId and managedObjectInstance to uniquely identify all received notifications.

If IRPManager receives notifications from multiple IRPAgents and notifications of one or more MOs are reported through two or more IRPAgents, IRPManager shall use notificationId, together with managedObjectInstance and the identity of IRPAgent, to uniquely identify all received notifications. Attribute systemDN, if present, carries IRPAgent's identify. If systemDN is absent, IRPManager needs other means, which are outside the scope of this IRP, to determine the identity of IRPAgent.

If and when the value of this can be re-used is specified in SSs.

This attribute is filterable.

#### 6.1.2.2.4 eventTime (M)

It indicates the event occurrence time. The semantics of Generalised Time specified by ITU-T shall be used here.

This attribute is filterable.

#### 6.1.2.2.5 systemDN (C)

It carries the Distinguished Name (DN) of IRPAgent that detects the network event and generates the notification. See 3G TS 32.106-8 [4] for name convention regarding DN.

This attribute is filterable.

#### 6.1.2.2.6 eventType (M)

It carries identification of ITU-T TMN defined event types. They are:

- Object Creation (ITU-T Recommendation X.730 [10])
- Object Deletion (ITU-T Recommendation X.730 [10])
- Attribute Value Change (ITU-T Recommendation X.731 [11])
- State Change (ITU-T Recommendation X.731 [11])
- Relationship Change (ITU-T Recommendation X.732 [12])
- Communications Alarm (ITU-T Recommendation X.733 [13])
- Processing Error Alarm (ITU-T Recommendation X.733 [13])
- Environmental Alarm (ITU-T Recommendation X.733 [13])
- Quality of Service Alarm (ITU-T Recommendation X.733 [13])
- Equipment Alarm (ITU-T Recommendation X.733 [13])
- Integrity Violation (ITU-T Recommendation X.736 [14])
- Security Violation (ITU-T Recommendation X.736 [14])
- Time Domain Violation (ITU-T Recommendation X.736 [14])
- Operational Violation (ITU-T Recommendation X.736 [14])
- Physical Violation (ITU-T Recommendation X.736 [14])

Each IRP document using the Notification IRP, such as Alarm IRP: IS (3G TS 32.111-2 [1]), identifies which eventType shall be used for that IRP.

This attribute is filterable.

#### 6.1.2.2.7 extendedEventType (M)

IRPAgent, in certain situations, may generate notifications of types whose semantics are extended beyond those defined by ITU-T event types. Examples are:

- Indicate alarm acknowledgement state changes
- Indicate Alarm List of AlarmIRPAgent has rebuilt successfully.

This attribute carries the required extension.

Each IRP document using the Notification IRP, such as Alarm IRP: IS (3G TS 32.111-2 [1]), defines the extended event types required.

This attribute is filterable.

## 6.1.3 Behaviour

### 6.1.3.1 IRPAgent supports multiple subscriptions with one IRPManager

An IRPManager can have multiple `managerReferences`. IRPManager can invoke `subscribe` operations using different `managerReferences` resulting in multiple subscriptions. As far as IRPAgent is concerned, the IRPAgent is sending alarms to multiple "places".

If IRPManager invokes multiple subscriptions with identical `managerReference` and `notificationCategory` combination, all but one subscription shall fail with exception indicating that the IRPManager is already in subscription.

If IRPManager has established subscription by invoking `subscribe` with `notificationCategory` parameter absent, subsequent `subscribe`, either with `notificationCategory` absent or present, using the same `managerReference`, shall fail. IRPAgent shall throw exception indicating that the IRPManager is already in subscription.

IRPManager controls the filter constraint via `subscribe` and `changeSubscriptionFilter` operations.

### 6.1.3.2 Support of packing multiple notifications

It should be possible to pack multiple notifications together for sending to NM. This provides more efficient use of data communication resources. In order to pack multiple notifications, an EM/NE configurable parameter defines the maximum number of notifications to be packed together. Additionally an EM/NE configurable parameter defines the maximum time delay before the notifications have to be sent.

### 6.1.3.3 IRPAgent supports emission of multiple Notification categories

IRPAgent supporting this IRP may emit multiple categories of notifications. For example, it may emit notification defined in Alarm IRP 3G TS 32.111-2 [1]. IRPAgent supports mechanism that IRPManager can use to determine the categories of notifications supported by IRPAgent. IRPAgent also supports mechanism that IRPManager can use to specify the categories of notifications IRPAgent should emit to IRPManager during subscription.

### 6.1.3.4 Subscription list loss

IRPAgent can lose the list of `managerReference` that identifies current IRPManagers under subscription. Under this condition, IRPAgent is incapable of sending events to the affected subscriber(s).

This Notification IRP recommends that IRPManager should invoke the `getSubscriptionStatus` operation periodically to confirm that IRPAgent still has the IRPManager's reference in its list. In case IRPManager does not obtain a positive confirmation, IRPManager should assume that IRPAgent has lost the IRPManager's reference. In this case, IRPManager should invoke `unsubscribe` and then `subscribe` operation again.

This IRP does not recommend the frequency IRPManager should use to invoke `getSubscriptionStatus` operation.

---

## Annex A (informative): Change history

Change history					
TSG SA#	Version	CR	Tdoc SA	New Version	Subject/Comment
S_07	2.0.0	-	SP-000012	3.0.0	Approved at TSG SA #7 and placed under Change Control
Mar 2000	3.0.0			3.0.1	cosmetic
S_08	3.0.1	002	SP-000242	3.1.0	Split of TS - Part 2: Notification Integration Reference Point (IRP): Information Service (IS)

---

# History

<b>Document history</b>		
V3.0.1	March 2000	Publication as TS 132 106
V3.1.0	July 2000	Publication