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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Partial Suspension of Itf-N Integration Reference Point (IRP);

Information Service (IS)

(Release 16)

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# Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

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

z the third digit is incremented when editorial only changes have been incorporated in the document.

# Introduction

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:

32.381: Partial Suspension of Itf-N Integration Reference Point (IRP); Requirements.

**32.382: Partial Suspension of Itf-N Integration Reference Point (IRP); Information Service (IS).**

32.386: Partial Suspension of Itf-NIntegration Reference Point (IRP); Solution Set (SS) definitions.

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

Information of an event is carried in a notification. An IRPAgent (typically an EM or a NE) emits notifications (see 3GPP TS 32.302 [3]. The IRPManager (typically a Network Management System) receives notifications. In certain scenarios floods of unwanted notifications including alarms would be sent to the IRP manager by network object instances. Thereby the interface and the management systems bear unnecessary load. Even worse: the Operator's awareness is drawn away from really urgent events.

# 1 Scope

The purpose of Partial Suspension of Itf-N IRP is to define an interface through which an IRPManager can suspend the forwarding of notifications via Itf-N which were generated in parts of the managed systems.

The present document is the Information Service of Partial Suspension of Itf-N IRP. It defines, for the purpose of suspending generally the forwarding of notifications, the information observable and controlled by management system's client and it also specifies the semantics of the interactions used to carry this information.

# 2 References

The following documents contain provisions that, 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 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".

[4] 3GPP TS 32.381: "Telecommunication management; Partial Suspension of Itf-N Integration Reference Point (IRP); Requirements".

[5] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".

[6] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP); Network Resource Model (NRM)".

[7] 3GPP TS 32.312: "Telecommunication management; Generic Integration Reference Point (IRP) management; Information Service (IS)".

[8] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP); Information Service (SS)".

[9] 3GPP TS 32.662: "Telecommunication management; Configuration Management (CM); Kernel CM; Information Service (IS)".

# 3 Definitions and abbreviations

## 3.1 Definitions

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

**IRP:** See 3GPP TS 32.101 [1].

**IRPAgent:** See 3GPP TS 32.102 [2].

**IRPManager:** See 3GPP TS 32.102 [2].

**Suspended notification:** See 3GPP TS 32.381 [4].

**Itf-N suspended managed instance:** See 3GPP TS 32.381 [4].

**Partial suspension of Itf-N:** See 3GPP TS 32.381 [4].

## 3.2 Abbreviations

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

CM Configuration Management

EM Element Manager

IOC Information Object Class

IRP Integration Reference Point

IS Information Service (see 3GPP TS 32.101 [1])

Itf-N Interface N

MIB Management Information Base

NE Network Element

# 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 [5], clause 4.7.

In addition, the set of related IRP(s) relevant to the present IRP is shown in figures 4.1-1 and 4.1-2.



Partial Suspension of Itf-N IRP

Figure 4.1-1: System Context A



Partial Suspension of Itf-N IRP

Figure 4.1-2: System Context B

# 5 Information Object Classes

## 5.1 Information entities imported and local labels

|  |  |
| --- | --- |
| Label reference | Local label |
| 3GPP TS 32.622 [6], information object class, Top | Top |
| 3GPP TS 32.312 [7], information object class, managedGenericIRP | managedGenericIRP |
| 3GPP TS 32.622 [6], information object class, IRPAgent | IRPAgent |

## 5.2 Class diagram

### 5.2.1 Attributes and relationships

This clause depicts the set of IOCs that encapsulate information within the partial suspension of Itf-N IRP. The intent is to identify the information required for the partial suspension of Itf-N IRP implementation of its operations and notification emission. This clause provides the overview of all Information Object Classes in UML. Subsequent clauses provide more detailed specification of various aspects of these information object classes.



Figure 5.2.1-1: Class Diagram

### 5.2.2 Inheritance

This clause depicts the inheritance relationships that exist between Information Object Classes.



Figure 5.2.2-1: Inheritance Diagram

## 5.3 Information Object Classes definition

### 5.3.1 partialSuspendedOfItfN

#### 5.3.1.1 Definition

This information object represents a partial suspension object instance.

A partialSuspensionOfItfN is fully identified by its distinguished name.

A partialSuspensionOfItfN can represent a group of suspended instances depending on its scope.

It inherits from IOC Top.

#### 5.3.1.2 Attributes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Visibility | Support Qualifier | Read Qualifier | Write Qualifier |
| partialSuspensionId | + | M | M | - |
| baseMOInstance | + | O | M | - |
| scope | + | O | M | - |
| activationTime | + | O | M | - |

### 5.3.2 partialSuspensionOfItfNIRP

#### 5.3.2.1 Definition

This information object represents a partial suspension of Itf-N IRP. It inherits from IOC managedGenericIRP.

## 5.4 Information relationships definition

### 5.4.1 relation-partialSuspensionOfItfNIRP-partialSuspensionOfItfN (M)

#### 5.4.1.1 Definition

This relationship defines the relationship between a partialSuspensionOfItfNIRP and the current partially suspended instances.

#### 5.4.1.2 Roles

|  |  |
| --- | --- |
| Name | Definition |
| thePartiallySuspended | This role represents the one who is partially suspended. It can be played by instances of IOC partialSuspensionOfItfN |
| thePartialSuspensionOfItfNIRP | This role represents the partial suspension of Itf-N IRP which an IRPManager uses. It is played by instances of IOC partialSuspensionOfItfNIRP |

#### 5.4.1.3 Constraints

None

## 5.5 Information attributes definition

This clause defines the semantics of the Attributes used in Information Object Classes.

### 5.5.1 Definitions and legal values

| Attribute Name | Definition | Legal Values |
| --- | --- | --- |
| baseMOInstance | This attribute identifies uniquely a partially suspended base object instance | N/A |
| scope | This attribute indicates the managed object scope of the partial suspension. | N/A |
| partialSuspensionId | This attribute identifies uniquely a partial suspension requested by an IRPManager | N/A |
| activationTime | This attribute identifies the time from which onwards the partial suspension shall be active. | N/A |

# 6 Interface definition

## 6.1 Class diagram representing interfaces



Figure 6.1-1: Class Diagram for AlarmIRPOperation\_6 Interface

## 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 which 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 partialSuspension Interface (M)

This interface defines methods for the IRPManager to request from the IRPAgent to generally suspend the forwarding of notifications via the Itf-N for a scope of managed object instances and all other notifications not related to managed NRM IOC instances. For the definition of partial suspension see the requirements document 3GPP TS 32.381 [4].

### 6.3.1 Operation setPartialSuspensionOfItfN (M)

#### 6.3.1.1 Definition

This operation allows an IRPManager to suspend the forwarding via Itf-N of notifications generated by scoped managed object instancesand all other notifications not related to managed NRM IOC instances.

It is the IRPAgent's decision whether or not the suspended notifications are logged, whether or not they go into the AlarmList.

The IRPAgent may apply a time delay before activation of the partial suspension and inform about it in the optional output parameter activationTime of this operation and notification notifyChangeOfPartialSuspensionOfItfN (this allows intervention of other IRPManagers in multi-manager scenarios).

#### 6.3.1.2 Input parameters

| Parameter Name | Qualifier | Information type | Comment |
| --- | --- | --- | --- |
| managerReference | M | See 3GPP TS 32.302 [3] |  |
| baseMOInstance | O | See 3GPP TS 32.602 [8] | If this parameter is not present, then all instances under the control of the IRPAgent are suspended. |
| scope | CM | See 3GPP TS 32.662 [9] | Condition: baseMOInstance is present |

#### 6.3.1.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| partialSuspensionId | CM | INTEGER | Condition:  status==Success.  It uniquely identifies the new suspension in the IRPAgent. |
| conflictingPartialSuspension­List | CM | LIST OF PartialSuspension  STRUCT (  partialSuspensionId,  [partialSuspensionParameterList]  LIST OF partialSuspensionParameter  STRUCT  ([baseObjectInstance,  scope,]  [activationTime]  )  ) | Condition:  failure reason is AtLeastOneInstanceAlready­Suspended.  It contains the corresponding partialSuspensionId of instances which are already suspended.  [ ] signifies optional parts of the output parameter.  activationTime can be omitted if it is has already expired or if it was not used.  partialSuspensionParameterList is absent if no scoping was applied at activation of the partialSuspension and activationTime is not present, i.e. the list would be empty. |
| activationTime | O | GeneralizedTime | This is the IRPAgent's time, when this partial suspension will become active. |
| status | M | ENUM (  Success,  Failure  ) | Failure reasons are:  AtLeastOneInstanceAlreadySuspended,  TooBusy and other unspecified reasons. |

#### 6.3.1.4 Pre-condition

baseMOInstanceExists AND instancesNotYetSuspended

|  |  |
| --- | --- |
| Assertion Name | Definition |
| baseMOInstanceExists | The specified baseMOInstance does exist. |
| instancesNotYet­Suspended | None of the scoped instances is already suspended. |

#### 6.3.1.5 Post-condition

partialSuspensionIsApplied

|  |  |
| --- | --- |
| Assertion Name | Definition |
| partialSuspensionIsApplied | The requested partial suspension of Itf-N is applied by the IRPAgent. |

#### 6.3.1.6 Exceptions

|  |  |
| --- | --- |
| Name | Properties |
| operation\_failed | **Condition:** the pre-condition is false or the post-condition is false.  **Returned Information:** The output parameter status.  **Exit state:** Entry state. |

### 6.3.2 Operation removePartialSuspensionOfItfN (M)

#### 6.3.2.1 Definition

This operation allows any IRPManager to remove a previously defined partial suspension of Itf-N.

#### 6.3.2.2 Input parameters

| Parameter Name | Qualifier | Information type | Comment |
| --- | --- | --- | --- |
| managerReference | M | See 3GPP TS 32.302 [3] | See 3GPP TS 32.302 [3] |
| partialSuspensionId | M | See clause 6.3.1.3 | = output of an earlier setPartialSuspensionOfItfN operation |

#### 6.3.2.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| status | M | ENUM (Success, Failure) |  |

#### 6.3.2.4 Pre-condition

partialSuspensionIdExists

|  |  |
| --- | --- |
| Assertion Name | Definition |
| partialSuspensionIdExists | The specified suspension does exist in the IRPAgent. |

#### 6.3.2.5 Post-condition

partialSuspensionIsRemoved

|  |  |
| --- | --- |
| Assertion Name | Definition |
| partialSuspensionIsRemoved | The specified partial suspension is not applied anymore. |

#### 6.3.2.6 Exceptions

|  |  |
| --- | --- |
| Name | Properties |
| operation\_failed | **Condition:** the pre-condition is false or the post-condition is false.  **Returned Information:** The output parameter status.  **Exit state:** Entry state. |

### 6.3.3 Operation readActivePartialSuspensionsOfItfN (O)

#### 6.3.3.1 Definition

This operation allows an IRPManager to determine which partial suspensions are active in the IRPAgent, independently of the IRPManagers which requested the suspensions.

#### 6.3.3.2 Input parameters

None.

#### 6.3.3.3 Output parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| activePartialSuspension­List | CM | LIST OF PartialSuspension  STRUCT (  partialSuspensionId,  [partialSuspensionParameterList]  LIST OF partialSuspensionParameter  STRUCT  (baseObjectInstance,  scope,  [activationTime]  )  ) | If the IRPAgent does not detect an active suspension, then status==Success and activePartialSuspensionList is empty.  A partial suspension whose activationTime is not yet reached shall also be in this activePartialSuspensionList.  Condition:  Present if and only if status==Success  activationTime can be omitted if it is has already expired or if it was not used.  partialSuspensionParameterList is absent if no scoping was applied at activation of the partialSuspension and activationTime is not present, i.e. the list would be empty. |
| status | M | ENUM (Success, Failure) |  |

#### 6.3.3.4 Pre-condition

atLeastOnePartialSuspensionIsActive

|  |  |
| --- | --- |
| Assertion Name | Definition |
| atLeastOnePartialSuspensionIsActive | There is at least one suspension in the IRPAgent. |

#### 6.3.3.5 Post-condition

allActivePartialSuspensionsAreDelivered

|  |  |
| --- | --- |
| Assertion Name | Definition |
| allActivePartialSuspensionsAreDelivered | All partial suspensions which are active are listed in the output. |

#### 6.3.3.6 Exceptions

|  |  |
| --- | --- |
| Name | Properties |
| operation\_failed | **Condition:** the pre-condition is false or the post-condition is false.  **Returned Information:** The output parameter status.  **Exit state:** Entry state. |

### 6.3.4 Notification notifyChangeOfPartialSuspensionOfItfN (M)

#### 6.3.4.1 Definition

This notification is sent:

- after the IRPAgent has successfully performed a setPartialSuspensionOfItfN request and possibly (if this is supported) before the activationTime of this partial suspension;

- after the IRPAgent has successfully performed a removePartialSuspensionOfItfN request.

IRPManagers should be aware that the IRPAgent can not deliver reliable results for some operations while partial suspension is active. Therefore the IRPManager should not use such operations, e.g. CM and FM or TM etc. operations in the scoped branch of the MIB, which is suspended.

This notification can also be sent to an IRPManager who nevertheless requested an operation for an instance whose notification forwarding is suspended.

#### 6.3.4.2 Input Parameters

| Parameter Name | Qualifier | Matching Information | Comment |
| --- | --- | --- | --- |
| objectClass | M, Y | -- | Notification header - see 3GPP TS 32.302 [3]: it shall carry the PartialSuspensionOfItfNIRP class name |
| objectInstance | M, Y | -- | Notification header - see 3GPP TS 32.302 [3]: it shall carry the DN of the PartialSuspensionOfItfNIRP instance. |
| notificationId | M, N | -- | Notification header - see 3GPP TS 32.302 [3] |
| eventTime | M, Y | -- | Notification header - see 3GPP TS 32.302 [3] |
| notificationType | M, Y | "notifyPartialSuspensionOfItfN" | Notification header - see 3GPP TS 32.302 [3] |
| systemDN | C, Y | IRPAgent.systemDN. | Notification header - see 3GPP TS 32.302 [3] |
| typeOfChange | M, Y | ENUM(  SetPartialSuspension,  RemovePartialSuspension  ) |  |
| partialSuspensionId | M, Y | partialSuspensionIRP.partialSuspensionId | See clause 6.3.1.3 |
| managerReference | M, Y | partialSuspensionIRP.managerReference | See clause 6.3.1.2 |
| baseMOInstance | CO, Y | partialSuspensionIRP.baseMOInstance, see clause 6.3.1.2 | Condition:  scoping was used at activation of this partial suspension |
| scope | CM, Y | partialSuspensionIRP.scope, see clause 6.3.1.2 | Condition:  scoping was used at activation of this partial suspension |
| activationTime | CO, N | Same type as eventTime | Condition:  typeOfChange== SetPartialSuspension |

#### 6.3.4.3 Triggering Event

##### 6.3.4.3.1 From-state

aPartialSuspensionWasSetOrRemoved

|  |  |
| --- | --- |
| Assertion Name | Definition |
| aPartialSuspensionWasSetOrRemoved | The IRPAgent has successfully set or removed a partial suspension. |

##### 6.3.4.3.2 To-state

subcribedManagersInformedAboutChangeInSuspension

|  |  |
| --- | --- |
| Assertion Name | Definition |
| subcribedManagersInformedAboutSuspension | All subscribed IRPManagers are informed about the change in the suspension. |

Annex A (informative):  
Change history

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | | |
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Cat | Old | New |
| Jun 2006 | SA\_32 | SP-060255 | -- | -- | Submitted to SA#32 for Information | -- | 1.0.0 |  |
| Jun 2006 | -- | -- | -- | -- | History box clean-up | -- | 1.0.0 | 1.0.1 |
| Mar 2007 | SA\_35 | SP-070059 | -- | -- | Submitted to SA#35 for Approval | -- | 2.0.0 | 7.0.0 |
| Jun 2008 | SA\_40 | SP-080328 | 0001 | -- | Correct operation name | F | 7.0.0 | 7.1.0 |
| Dec 2008 | SA\_42 | -- | -- | -- | Upgrade to Release 8 | -- | 7.1.0 | 8.0.0 |
| Dec 2009 | - | - | - | - | Update to Rel-9 version (MCC) | -- | 8.0.0 | 9.0.0 |
| 2011-03 | - | - | - | - | 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** |
| 2014-10 | - | - | - | - | Update to Rel-12 version (MCC) |  | 11.0.0 | **12.0.0** |
| 2016-01 | - | - | - | - | Update to Rel-13 version (MCC) |  | 12.0.0 | **13.0.0** |
| 2017-03 | SA#75 | - | - | - | Promotion to Release 14 without technical change |  | 13.0.0 | **14.0.0** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2018-06 |  |  |  |  |  | Update to Rel-15 version (MCC) | 15.0.0 |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | **16.0.0** |