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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Performance Management (PM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

(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:

32.411: Performance Management (PM) Integration Reference Point (IRP): Requirements

32.412: Performance Management (PM) Integration Reference Point (IRP): Information Service (IS)

**32.416: Performance Management (PM) Integration Reference Point (IRP): Solution Set (SS) definitions**

The present document is part of a set of TSs which describe the requirements and information model necessary for the Telecommunication Management (TM) of 3G systems. The TM principles and TM architecture are specified in 3GPP TS 32.101 [1] and 3GPP TS 32.102 [2].

A 3G system is composed of a multitude of Network Elements (NE) of various types and, typically, different vendors, which inter-operate in a co-ordinated manner in order to satisfy the network users' communication requirements. Any evaluation of PLMN-system behaviour will require performance data collected and recorded by its NEs according to a schedule established by the EM.

This aspect of the management environment is termed Performance Management. The purpose of any Performance Management activity is to collect performance related data, which can be used to locate potential problems in the network.

# 1 Scope

The present document specifies the Solution Set definitions for the IRP whose semantics is specified in PM (Performance Management) IRP: Information Service 3GPP TS 32.412 [7].

This Solution Set definitions specification is related to 3GPP TS 32.412 V14.0.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 32.411: "Telecommunication management; Performance Management (PM) Integration Reference Point (IRP): Requirements".

[4] 3GPP TS 32.311: "Telecommunication management; Generic Integration Reference Point (IRP): Requirements".

[5] 3GPP TS 32.306: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Solution Set (SS) definitions".

[6] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[7] 3GPP TS 32.412: "Telecommunication management; Performance Management (PM) Integration Reference Point (IRP): Information Service (IS)".

[8] 3GPP TS 32.312: "Telecommunication management; Generic Integration Reference Point (IRP) management: Information Service (IS)".

[9] OMG TC Document telecom/98-11-01: "OMG Notification Service". <http://www.omg.org/technology/documents/>

[10] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[11] 3GPP TS 32.336: "Telecommunication management; Notification Log (NL) Integration Reference Point (IRP): Solution Set (SS) definitions ".

[12] 3GPP TS 32.331: "Telecommunication management; Notification Log (NL) Integration Reference Point (IRP): Requirements".

[13] 3GPP TS 32.316: "Telecommunication management; Generic Integration Reference Point (IRP) management; Solution Set (SS) definitions".

[14] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".

[15] W3C SOAP 1.1 specification (<http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>)

[16] W3C XPath 1.0 specification (<http://www.w3.org/TR/1999/REC-xpath-19991116>)

[17] W3C WSDL 1.1 specification (<http://www.w3.org/TR/2001/NOTE-wsdl-20010315>)

[18] W3C SOAP 1.2 specification (<http://www.w3.org/TR/soap12-part1/>)

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.401 [10], 3GPP TS 32.411 [3], 3GPP TS 32.331 [12], 3GPP TS 32.150 [14] and the following apply:

**IRP document version number string (or "IRPVersion"):** See 3GPP TS 32.311 [4]..

## 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

EM Element Manager

IDL Interface Definition Language

IRP Integration Reference Point

IS Information Service

MOC Managed Object Class

NE Network Element

NL Notification Log

OMG Object Management Group

PM Performance Management

PMIRP Performance Management Integration Reference Point

SS Solution Set

WSDL Web Service Description Language

XML eXtensible Markup Language

# 4 Solution Set definitions

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

- 3GPP PM IRP CORBA SS (Annex A).

- 3GPP PM IRP XML definitions (Annex B).

- 3GPP PM IRP SOAP Solution Set (Annex C).

Annex A (normative):   
CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in PM IRP: Information Service (TS 32.412 [7]).

# A.1 Architectural Features

The overall architectural feature of PM IRP is specified in 3GPP TS 32.411 [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 [5]).

The contents of the PM IRP notifications are defined in the present document.

# A.2 Mapping

## A.2.1 Operation and Notification mapping

PM IRP: IS 3GPP TS 32.412 [7] defines semantics of operation and notification visible across the PMIRP. Table A.2.1.1 indicates mapping of these operations and notifications to their equivalents defined in this SS.

Table A.2.1.1: Mapping from IS Operations and Notification to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operations/ notification 3GPP TS 32.412 [7] | SS Method | Qualifier |
| createMeasurementJob | create\_measurement\_job | M |
| stopMeasurementJob | stop\_measurement\_job | M |
| suspendMeasurementJob | suspend\_measurement\_job | O |
| resumeMeasurementJob | resume\_measurement\_job | O |
| listMeasurementJobs | list\_measurement\_jobs | M |
| createThresholdMonitor | create\_threshold\_monitor | O |
| deleteThresholdMonitor | delete\_threshold\_monitor | O |
| listThresholdMonitors | list\_threshold\_monitors | O |
| suspendThresholdMonitor | suspend\_threshold\_monitor | O |
| resumeThresholdMonitor | resume\_threshold\_monitor | O |
| getIRPVersion | get\_pm\_irp\_versions | M |
| getOperationProfile (see note) | get\_pm\_irp\_operations\_profile | O |
| getNotificationProfile (see note) | get\_pm\_irp\_notification\_profile | O |
| notifyMeasurementJobStatusChanged | push\_structured\_events(See subclause 6.1) | M |
| notifyThresholdMonitorObjectCreation | push\_structured\_events (See subclause 6.1) | O |
| notifyThresholdMonitorObjectDeletion | push\_structured\_events (See subclause 6.1) | O |
| notifyThresholdMonitorStatusChanged | push\_structured\_events(See subclause 6.1) | O |
| NOTE: This operation is of ManagedGenericIRP IOC specified in 3GPP TS 32.312 [8]. The PM IRP IOC of [7] inherits from it. | | |

### A.2.2 Operation parameter mapping

The PM IRP: IS 3GPP TS 32.412 [7] defines semantics of parameters carried in operations across the PM IRP. The following tables indicate the mapping of these parameters, as per operation, to their equivalents defined in this SS.

Table A.2.2.1: Mapping from IS createMeasurementJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| iocName | PMIRPConstDefs::MOClassName mo\_class | M |
| iocInstanceList | PMIRPConstDefs::MOInstanceList mo\_instance\_list | M |
| measurementCategoryList | PMIRPConstDefs::MeasurementCategoryList measurement\_category\_list | M |
| granularityPeriod | PMIRPConstDefs::GranularityPeriod granularity\_period | M |
| reportingPeriod | PMIRPConstDefs::ReportingPeriod reporting\_period | M |
| startTime | PMIRPConstDefs::IRPTimeOpt start\_time | O |
| stopTime | PMIRPConstDefs::IRPTimeOpt stop\_time | O |
| schedule | PMIRPConstDefs::ScheduleOpt schedule | O |
| jobId | PMIRPConstDefs::JobId job\_id | M |
| unsupportedList | PMIRPConstDefs::JUnsupportedList unsupported\_list | M |
| priority | PMIRPConstDefs::JobPriorityOpt priority | O |
| reliability | PMIRPConstDefs::JobReliabilityOpt reliability | O |
| status | Return value of type ManagedGenericIRPConstDefs::Signal  Exception:  CreateMeasurementJob, ManagedGenericIRPSystem::InvalidParameter, ManagedGenericIRPSystem::ParameterNotSupported, HighWorkLoad | M |

Table A.2.2.2: Mapping from IS stopMeasurementJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| jobId | PMIRPConstDefs::JobId job\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  StopMeasurementJob, UnknownJob, JobCannotBeStopped | M |

Table A.2.2.3: Mapping from IS suspendMeasurementJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| jobId | PMIRPConstDefs::JobId job\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  SuspendMeasurementJob, UnknownJob, JobAlreadySuspended, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.4: Mapping from IS resumeMeasurementJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| jobId | PMIRPConstDefs::JobId job\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  ResumeMeasurementJob, UnknownJob, JobIsNotSuspended, HighWorkLoad, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.5: Mapping from IS listMeasurementJobs parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| jobIdList | PMIRPConstDefs::JobIdList job\_list\_id | M |
| jobInfoList | PMIRPConstDefs::JobInfoList job\_info\_list | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  ListMeasurementJobs, ManagedGenericIRPSystem::InvalidParameter | M |

Table A.2.2.6: Mapping from IS createThresholdMonitor parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| iocName | PMIRPConstDefs::MOClassName mo\_class | M |
| iocInstanceList | PMIRPConstDefs::MOInstanceList mo\_instance\_list | M |
| thresholdInfoList | PMIRPConstDefs::ThresholdInfoList threshold\_info\_list | M |
| monitorGranularityPeriod | PMIRPConstDefs::MonitorGranularityPeriod monitor\_granularity\_period | M |
| monitorId | PMIRPConstDefs::MonitorId monitor\_id | M |
| unsupportedList | PMIRPConstDefs::MUnsupportedList unsupported\_list | M |
| status | Return value of type ManagedGenericIRPConstDefs::Signal  Exception:  CreateThresholdMonitor, ManagedGenericIRPSystem::InvalidParameter, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.7: Mapping from IS deleteThresholdMonitor parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| monitorId | PMIRPConstDefs::MonitorId monitor\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  DeleteThresholdMonitor, UnknownThresholdMonitor, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.8: Mapping from IS listThresholdMonitors parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| monitorIdList | PMIRPConstDefs::MonitorIdList monitor\_id\_list | M |
| monitorInfoList | PMIRPConstDefs::MonitorInfoList monitor\_info\_list | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  ListThresholdMonitors, ManagedGenericIRPSystem::InvalidParameter, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.9: Mapping from IS suspendThresholdMonitor parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| monitorId | PMIRPConstDefs::MonitorId monitor\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  SuspendThresholdMonitor, UnknownThresholdMonitor, ThresholdMonitorAlreadySuspended, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.10: Mapping from IS resumeThresholdMonitor parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| monitorId | PMIRPConstDefs::MonitorId monitor\_id | M |
| status | Return value of type PMIRPConstDefs::Result  Exception:  ResumeThresholdMonitor, UnknownThresholdMonitor, ThresholdMonitorIsNotSuspended, ManagedGenericIRPSystem::OperationNotSupported | M |

Table A.2.2.11: Mapping from IS getIRPVersion parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| versionNumberSet | Return value of type ManagedGenericIRPConstDefs::VersionNumberSet | M |
| status | Exception:  GetPMIRPVersions | M |

Table A.2.2.12: Mapping from IS getOperationProfile parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| iRPVersion | ManagedGenericIRPConstDefs::VersionNumber pm\_irp\_version | M |
| operationNameProfile, operationParameterProfile | Return value of type ManagedGenericIRPConstDefs::MethodList | M |
| status | Exception:  GetPMIRPOperationsProfile, ManagedGenericIRPSystem::OperationNotSupported, ManagedGenericIRPSystem::InvalidParameter | M |

Table A.2.2.13: Mapping from IS getNotificationProfile parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| iRPVersion | ManagedGenericIRPConstDefs::VersionNumber pm\_irp\_version | M |
| notificationNameProfile, notificationParameterProfile | Return value of type ManagedGenericIRPConstDefs::MethodList | M |
| status | Exception:  GetPMIRPNotificationProfile, ManagedGenericIRPSystem::OperationNotSupported, ManagedGenericIRPSystem::InvalidParameter | M |

## A.2.3 Notification parameter mapping

The PM IRP: IS 3GPP TS 32.412 [7] defines semantics of parameters carried in notifications. The following table indicates the mapping of these parameters to their OMG CORBA Structured Event (defined in OMG Notification Service [9]) equivalents. The composition of OMG Structured Event, as defined in the OMG Notification Service [9], is:

Header

Fixed Header

domain\_name

type\_name

event\_name

Variable Header

Body

filterable\_body\_fields

remaining\_body

The following tables list all OMG Structured Event attributes in the second column. The first column identifies the PM IRP: IS 3GPP TS 32.412 [7] defined notification parameters.

Table A.2.3.1: Mapping for notifyMeasurementJobStatusChanged

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyMeasurementJobStatusChanged". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| notificationId | One NV pair of remaining\_body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| jobId | One NV pair of filterable\_body\_fields | M | Name of NV pair is the JOB\_ID of PMIRPNotifications::notifyMeasurementJobStatusChanged.  Value of NV pair is JobId of module PMIRPConstDefs. |
| jobStatus | One NV pair of remaining\_body | M | Name of NV pair is the JOB\_STATUS of PMIRPNotifications::notifyMeasurementJobStatusChanged.  Value of NV pair is JobStatus of module PMIRPConstDefs. |
| reason | One NV pair of remaining\_body | O | Name of NV pair is the REASON of PMIRPNotifications::notifyMeasurementJobStatusChanged.  Value of NV pair is a string. |

Table A.2.3.2: Mapping for notifyThresholdMonitorObjectCreation

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyThresholdMonitorObjectCreation". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| notificationId | One NV pair of remaining body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| monitorId | One NV pair of remaining body | M | Name of NV pair is the MONITOR\_ID of module PMIRPNotifications::notifyThresholdMonitorObjectCreation.  Value of NV pair is MonitorId of module PMIRPConstDefs. |
| monitorGranularityPeriod | One NV pair of remaining body | M | Name of NV pair is the MONITOR\_GRANULARITY\_PERIOD of module PMIRPNotifications::notifyThresholdMonitorObjectCreation.  Value of NV pair is MonitorGranularityPeriod of module PMIRPConstDefs. |
| thresholdMonitorStatus | One NV pair of remaining body | M | Name of NV pair is the MONITOR\_STATUS of module PMIRPNotifications::notifyThresholdMonitorObjectCreation.  Value of NV pair is MonitorStatus of module PMIRPConstDefs. |

Table A.2.3.3: Mapping for notifyThresholdMonitorObjectDeletion

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyThresholdMonitorObjectDeletion". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| notificationId | One NV pair of remaining body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| monitorId | One NV pair of filterable\_body\_fields | M | Name of NV pair is the MONITOR\_ID of PMIRPNotifications::notifyThresholdMonitorObjectDeletion.  Value of NV pair is MonitorId of module PMIRPConstDefs. |

Table A.2.3.4: Mapping for notifyThresholdMonitorStatusChanged

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyThresholdMonitorStatusChanged". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| notificationId | One NV pair of remaining\_body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [5]). |
| monitorId | One NV pair of filterable\_body\_fields | M | Name of NV pair is the MONITOR\_ID of PMIRPNotifications::notifyThresholdMonitorStatusChanged  Value of NV pair is MonitorId of module PMIRPConstDefs. |
| monitorStatus | One NV pair of remaining\_body | M | Name of NV pair is the MONITOR \_STATUS of PMIRPNotifications::notifyThresholdMonitorStatusChanged  Value of NV pair is MonitorStatus of module PMIRPConstDefs. |
| reason | One NV pair of remaining\_body | O | Name of NV pair is the REASON of PMIRPNotifications::notifyThresholdMonitorStatusChanged  Value of NV pair is a string. |

# A.3 PMIRPNotification Interface

OMG CORBA Notification push operation is used to realise the notification of PMIRP Notifications. All the notifications in this interface are implemented using this push\_structured\_event method.

## A.3.1 Method push (M)

module CosNotifyComm {

…

Interface SequencePushConsumer : NotifyPublish {

void push\_structured\_events(

in CosNotification::EventBatch notifications)

raises( CosEventComm::Disconnected);

…

}; // SequencePushConsumer

…

}; // CosNotifyComm

NOTE 1: The push\_structured\_events method takes an input parameter of type EventBatch as defined in the OMG CosNotification module (OMG Notification Service [9]). This data type is the same as a sequence of Structured Events. Upon invocation, this parameter will contain a sequence of Structured Events being delivered to IRPManager by IRPAgent to which it is connected.

NOTE 2: The maximum number of events that will be transmitted within a single invocation of this operation is controlled by IRPAgent wide configuration parameter.

NOTE 3: The amount of time the supplier (IRPAgent) of a sequence of Structured Events will accumulate individual events into the sequence before invoking this operation is controlled by IRPAgent wide configuration parameter as well.

NOTE 4: IRPAgent may push EventBatch with only one Structured Event.

# A.4 Solution Set definitions

## A.4.1 IDL definition structure

Clause A.4.2 defines the constants and types used by the PM IRP.

Clause A.4.3 defines the operations which are performed by the PM IRP agent.

Clause A.4.4 defines the notifications which are performed by the PM IRP agent.

## A.4.2 IDL specification “PMIRPConstDefs.idl”

//File: PMIRPConstDefs.idl

#ifndef \_PM\_IRP\_CONST\_DEFS\_IDL\_

#define \_PM\_IRP\_CONST\_DEFS\_IDL\_

#include <TimeBase.idl>

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* ## Module: PMIRPConstDefs

This module contains commonly used definitions for PM IRP

===============================================================

\*/

module PMIRPConstDefs

{

enum Result {OK, FAILURE};

typedef string MOClassName;

typedef string MOInstance;

typedef sequence<MOInstance> MOInstanceList;

typedef string MeasurementCategory;

typedef sequence<MeasurementCategory> MeasurementCategoryList;

typedef unsigned long GranularityPeriod; //The unit is minute.

typedef unsigned long ReportingPeriod; //The unit is minute.

typedef TimeBase::UtcT UTCTime;

union IRPTimeOpt switch(boolean)

{

case TRUE: UTCTime value;

};

struct Time24

{

unsigned short hour; // 0-23

unsigned short minute; // 0-59

};

struct IntervalOfDay

{

Time24 interval\_start\_time;

Time24 interval\_stop\_time;

};

typedef sequence<IntervalOfDay> DailyScheduling;

const short SUNDAY = 1;

const short MONDAY = 2;

const short TUESDAY = 4;

const short WEDNESDAY = 8;

const short THURSDAY = 16;

const short FRIDAY = 32;

const short SATURDAY = 64;

typedef short DaysOfWeek;

// Bit mask of week days,

// e.g. "SUNDAY(1) and WEDNESDAY(8)" is encoded as 9.

struct WeeklySchedulingElement

{

DaysOfWeek days;

DailyScheduling intervals\_of\_day;

};

typedef sequence<WeeklySchedulingElement> WeeklyScheduling;

enum ScheduleType { DAILY, WEEKLY };

union Schedule switch (ScheduleType)

{

case DAILY: DailyScheduling daily\_scheduling;

case WEEKLY: WeeklyScheduling weekly\_scheduling;

};

union ScheduleOpt switch(boolean)

{

case TRUE: Schedule value;

};

typedef unsigned long JobId;

typedef sequence<JobId> JobIdList;

struct JUnsupported

{

MOInstance mo\_instance;

MeasurementCategory measurement\_category;

string reason;

};

typedef sequence<JUnsupported> JUnsupportedList;

/\*\*

\* Defines the name of an attribute of a Managed Object

\*/

typedef string MOAttributeName;

enum JobStatus {SCHEDULED, ACTIVE, SUSPENDED, STOPPED};

enum JobPriority {LOW, MEDIUM, HIGH};

union JobPriorityOpt switch (boolean)

{

case TRUE: JobPriority value;

};  
 union JobReliabilityOpt switch (boolean)

{

case TRUE: JobReliability value;

};

typedef string JobReliability;

struct JobInfo

{

JobId job\_id;

MOClassName mo\_class;

MOInstanceList mo\_instance\_list;

MeasurementCategoryList measurement\_category\_list;

GranularityPeriod granularity\_period;

ReportingPeriod reporting\_period;

IRPTimeOpt start\_time;

IRPTimeOpt stop\_time;

ScheduleOpt schedule;

JobStatus job\_status;

JobPriorityOpt job\_priority;   
 JobReliabilityOpt job\_reliability;

};

typedef sequence<JobInfo> JobInfoList;

typedef string MeasurementTypeName;

typedef string SubCounterName;

typedef short ProbableCause; //THRESHOLD\_CROSSED = 351;

typedef string SpecificProblem;

typedef any ThresholdValue;

enum Severity {WARNING, MINOR, MAJOR, CRITICAL};

union Hysteresis switch(boolean)

{

case TRUE: long long\_value;

case FALSE: float float\_value;

};

enum Direction {INCREASING, DECREASING};

struct ThresholdPackElement

{

ThresholdValue threshold\_value;

Severity severity\_;

Hysteresis hysteresis\_;

};

typedef sequence<ThresholdPackElement> ThresholdPack;

struct ThresholdInfo

{

MeasurementTypeName measurement\_type\_name;

SubCounterName sub\_counter\_name;

ProbableCause probable\_cause;

SpecificProblem specific\_problem;

Direction direction\_;

ThresholdPack threshold\_pack;

};

typedef sequence<ThresholdInfo> ThresholdInfoList;

typedef GranularityPeriod MonitorGranularityPeriod;// time period is based on 5 minutes.

typedef unsigned long MonitorId;

struct MUnsupported

{

MOInstance mo\_instance;

MeasurementTypeName measurement\_type\_name;

SubCounterName sub\_counter\_name;

string reason;

};

typedef sequence<MUnsupported> MUnsupportedList;

enum MonitorStatus {M\_SUSPENDED, M\_ACTIVE};

typedef sequence<MonitorId> MonitorIdList;

typedef string \_EventType; // The value is "Quality of Service Alarm"

struct MonitorInfo

{

MonitorId monitor\_id;

MOClassName mo\_class;

MOInstanceList mo\_instance\_list;

MonitorGranularityPeriod monitor\_granularity\_period;

ThresholdInfoList threshold\_info\_list;

MonitorStatus threshold\_monitor\_status;

\_EventType event\_type;

};

typedef sequence<MonitorInfo> MonitorInfoList;

/\*\*

\* This block identifies attributes which are included as part of the

\* PMIRP. These attribute values should not

\* clash with those defined for the attributes of notification

\* header (see IDL of Notification IRP).

\*/

interface AttributeNameValue

{

const string JOB\_ID = "JOB\_ID";

const string JOB\_STATUS = "JOB\_STATUS";

const string REASON = "REASON";

const string MONITOR\_ID = "MONITOR\_ID";

const string MONITOR\_STATUS = "MONITOR\_STATUS";

const string MONITOR\_GRANULARITY\_PERIOD = "MONITOR\_GRANULARITY\_PERIOD";

const string MONITOR\_EVENT\_TYPE = "MONITOR\_EVENT\_TYPE";

const string PROBABLE\_CAUSE = "PROBABLE\_CAUSE";

const string SPECIFIC\_PROBLEM = "SPECIFIC\_PROBLEM";

const string DIRECTION = "DIRECTION";

};

};

#endif // \_PM\_IRP\_CONST\_DEFS\_IDL\_

## A.4.3 IDL specification “PMIRPSystem.idl”

//File: PMIRPSystem.idl

#ifndef \_PM\_IRP\_SYSTEM\_IDL\_

#define \_PM\_IRP\_SYSTEM\_IDL\_

#include <ManagedGenericIRPSystem.idl>

#include <ManagedGenericIRPConstDefs.idl>

#include <PMIRPConstDefs.idl>

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* ## Module: PMIRPSystem

This module contains the specification of all operations of PM IRP Agent.

================================================================

\*/

module PMIRPSystem

{

/\*\*

\* The reason specifies whether EM or NE has high workload. The value shall be one

\* of following: emCpuBusy; emHDShortage, emLowMemory, {neCpuBusy, neObjectInstList},

\* {neHDShortage neObjectInstList}, {neLowMemory, neObjectInstList}, maxJobReached,

\* otherReason.

\* In the case the reason is a tuple, the first element is the string such as

\* "NE\_CPU\_BUSY" followed by a comma, then followed by a sequence of DN where

\* each DN is separated by its adjacent DN, if any, by a colon. The DN is formatted

\* as described in 32.300.

\*/

exception HighWorkLoad { string reason; };

interface HighWorkLoadExceptionReason

{

const string EM\_CPU\_BUSY = "EM\_CPU\_BUSY";

const string EM\_HD\_SHORTAGE = "EM\_HD\_SHORTAGE";

const string EM\_LOW\_MEMORY = "EM\_LOW\_MEMORY";

const string NE\_CPU\_BUSY = "NE\_CPU\_BUSY";

const string NE\_HD\_SHORTAGE = "NE\_HD\_SHORTAGE";

const string NE\_LOW\_MEMORY = "NE\_LOW\_MEMORY";

const string MAX\_JOB\_REACHED = "MAX\_JOB\_REACHED";

const string OTHER\_REASON = "OTHER\_REASON";

};

exception UnknownJob { string reason; };

exception JobCannotBeStopped { string reason; };

exception JobAlreadySuspended { string reason; };

exception JobIsNotSuspended { string reason; };

exception UnknownThresholdMonitor { string reason; };

exception ThresholdMonitorAlreadySuspended { string reason; };

exception ThresholdMonitorIsNotSuspended { string reason; };

/\*\*

\* System fails to complete the operation. System can provide reason

\* to qualify the exception. The semantics carried in reason

\* is outside the scope of this IRP.

\*/

exception GetPMIRPVersions { string reason; };

exception GetPMIRPOperationsProfile { string reason; };

exception GetPMIRPNotificationProfile { string reason; };

exception CreateMeasurementJob { string reason; };

exception StopMeasurementJob { string reason; };

exception SuspendMeasurementJob { string reason; };

exception ResumeMeasurementJob { string reason; };

exception ListMeasurementJobs { string reason; };

exception CreateThresholdMonitor { string reason; };

exception DeleteThresholdMonitor { string reason; };

exception ListThresholdMonitors { string reason; };

exception SuspendThresholdMonitor { string reason; };

exception ResumeThresholdMonitor { string reason; };

interface PMIRP

{

/\*\*

\* Return the list of all supported PM IRP versions.

\*/

ManagedGenericIRPConstDefs::VersionNumberSet get\_pm\_irp\_versions (

)

raises (GetPMIRPVersions);

/\*\*

\* Return the list of all supported operations and their supported

\* parameters for a specific PM IRP version.

\*/

ManagedGenericIRPConstDefs::MethodList get\_pm\_irp\_operations\_profile (

in ManagedGenericIRPConstDefs::VersionNumber pm\_irp\_version

)

raises (GetPMIRPOperationsProfile,

ManagedGenericIRPSystem::OperationNotSupported,

ManagedGenericIRPSystem::InvalidParameter);

/\*\*

\* Return the list of all supported notifications and their supported

\* parameters for a specific PM IRP version.

\*/

ManagedGenericIRPConstDefs::MethodList get\_pm\_irp\_notification\_profile

(

in ManagedGenericIRPConstDefs::VersionNumber pm\_irp\_version

)

raises (GetPMIRPNotificationProfile,

ManagedGenericIRPSystem::OperationNotSupported,

ManagedGenericIRPSystem::InvalidParameter);

/\*\*

\* Request to create a MeasurementJob through Itf-N.

\*/

ManagedGenericIRPConstDefs::Signal create\_measurement\_job (

in PMIRPConstDefs::MOClassName mo\_class,

in PMIRPConstDefs::MOInstanceList mo\_instance\_list,

in PMIRPConstDefs::MeasurementCategoryList measurement\_category\_list,

in PMIRPConstDefs::GranularityPeriod granularity\_period,

in PMIRPConstDefs::ReportingPeriod reporting\_period,

in PMIRPConstDefs::IRPTimeOpt start\_time,

in PMIRPConstDefs::IRPTimeOpt stop\_time,

in PMIRPConstDefs::ScheduleOpt schedule,

in PMIRPConstDefs::JobPriorityOpt priority,   
 in PMIRPConstDefs::JobReliabilityOpt reliability,

out PMIRPConstDefs::JobId job\_id,

out PMIRPConstDefs::JUnsupportedList unsupported\_list

)

raises (CreateMeasurementJob,

ManagedGenericIRPSystem::InvalidParameter,

ManagedGenericIRPSystem::ParameterNotSupported,

HighWorkLoad);

/\*\*

\* Request to stop a MeasurementJob through Itf-N, after which,

\* the MeasurementJob will still be visible via Itf-N. Whether

\* the MeasurementJob is thoroughly removed immediately from

\* the managed system is vendor specific.

\*/

PMIRPConstDefs::Result stop\_measurement\_job (

in PMIRPConstDefs::JobId job\_id)

raises (StopMeasurementJob,

UnknownJob,

JobCannotBeStopped);

/\*\*

\* Request to suspend a MeasurementJob

\*/

PMIRPConstDefs::Result suspend\_measurement\_job (

in PMIRPConstDefs::JobId job\_id)

raises (SuspendMeasurementJob,

UnknownJob,

JobAlreadySuspended,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to resume a MeasurementJob

\*/

PMIRPConstDefs::Result resume\_measurement\_job (

in PMIRPConstDefs::JobId job\_id)

raises (ResumeMeasurementJob,

UnknownJob,

JobIsNotSuspended,

HighWorkLoad,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to list the information of all or of specified

\* MeasurementJobs

\*/

PMIRPConstDefs::Result list\_measurement\_jobs (

in PMIRPConstDefs::JobIdList job\_list\_id,

out PMIRPConstDefs::JobInfoList job\_info\_list)

raises (ListMeasurementJobs,

ManagedGenericIRPSystem::InvalidParameter);

/\*\*

\* Request to create a ThresholdMonitor to define the threshold

\* for some specific measurementTypes or subCounters

\*/

ManagedGenericIRPConstDefs::Signal create\_threshold\_monitor (

in PMIRPConstDefs::MOClassName mo\_class,

in PMIRPConstDefs::MOInstanceList mo\_instance\_list,

in PMIRPConstDefs::ThresholdInfoList threshold\_info\_list,

in PMIRPConstDefs::MonitorGranularityPeriod monitor\_granularity\_period,

out PMIRPConstDefs::MonitorId monitor\_id,

out PMIRPConstDefs::MUnsupportedList unsupported\_list)

raises (CreateThresholdMonitor,

ManagedGenericIRPSystem::InvalidParameter,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to delete a specified ThresholdMonitor

\*/

PMIRPConstDefs::Result delete\_threshold\_monitor (

in PMIRPConstDefs::MonitorId monitor\_id)

raises (DeleteThresholdMonitor,

UnknownThresholdMonitor,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to list detailed information about all or

\* specified ThresholdMonitors

\*/

PMIRPConstDefs::Result list\_threshold\_monitors (

in PMIRPConstDefs::MonitorIdList monitor\_id\_list,

out PMIRPConstDefs::MonitorInfoList monitor\_info\_list)

raises (ListThresholdMonitors,

ManagedGenericIRPSystem::InvalidParameter,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to suspend a ThresholdMonitor

\*/

PMIRPConstDefs::Result suspend\_threshold\_monitor (

in PMIRPConstDefs::MonitorId monitor\_id)

raises (SuspendThresholdMonitor,

UnknownThresholdMonitor,

ThresholdMonitorAlreadySuspended,

ManagedGenericIRPSystem::OperationNotSupported);

/\*\*

\* Request to resume a ThresholdMonitor

\*/

PMIRPConstDefs::Result resume\_threshold\_monitor (

in PMIRPConstDefs::MonitorId monitor\_id)

raises (ResumeThresholdMonitor,

UnknownThresholdMonitor,

ThresholdMonitorIsNotSuspended,

ManagedGenericIRPSystem::OperationNotSupported);

};

};

#endif // \_PM\_IRP\_SYSTEM\_IDL\_

## A.4.4 IDL specification “PMIRPNotifications.idl”

// File: PMIRPNotifications.idl

#ifndef \_PM\_IRP\_NOTIFICATIONS\_IDL\_

#define \_PM\_IRP\_NOTIFICATIONS\_IDL\_

#include <PMIRPConstDefs.idl>

#include <NotificationIRPNotifications.idl>

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* ## Module: PMIRPNotifications

This module contains the specification of all notifications of PM IRP Agent.

================================================================

\*/

module PMIRPNotifications

{

/\*\*

\* Constant definitions for the notifyMeasurementJobStatusChanged notification

\*/

interface NotifyMeasurementJobStatusChanged: NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyMeasurementJobStatusChanged";

/\*\*

\* This constant defines the name of the jobId property.

\* The data type for the value of this property

\* is PMIRPConstDefs::JobId.

\*/

const string JOB\_ID = PMIRPConstDefs::AttributeNameValue::JOB\_ID;

/\*\*

\* This constant defines the name of the jobStatus property.

\* The data type for the value of this property

\* is PMIRPConstDefs::JobStatus.

\*/

const string JOB\_STATUS = PMIRPConstDefs::AttributeNameValue::JOB\_STATUS;

/\*\*

\* This constant defines the name of the reason property.

\* The data type for the value of this property is string.

\*/

const string REASON = PMIRPConstDefs::AttributeNameValue::REASON;

};

/\*\*

\* Constant definitions for the notifyThresholdMonitorObjectCreation notification

\*/

interface NotifyThresholdMonitorObjectCreation:

NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyThresholdMonitorObjectCreation";

/\*\*

\* This constant defines the name of the monitorId property,

\* which is transported in the filterable\_body fields.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorId.

\*/

const string MONITOR\_ID = PMIRPConstDefs::AttributeNameValue::MONITOR\_ID;

/\*\*

\* This constant defines the name of the monitorGranularityPeriod property,

\* which is transported in the filterable\_body fields.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorGranularityPeriod.

\*/

const string MONITOR\_GRANULARITY\_PERIOD =

PMIRPConstDefs::AttributeNameValue::MONITOR\_GRANULARITY\_PERIOD;

/\*\*

\* This constant defines the name of the thresholdMonitorStatus property,

\* which is transported in the filterable\_body fields.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorStatus.

\*/

const string MONITOR\_STATUS =

PMIRPConstDefs::AttributeNameValue::MONITOR\_STATUS;

};

/\*\*

\* Constant definitions for the notifyThresholdMonitorObjectDeletion notification

\*/

interface NotifyThresholdMonitorObjectDeletion:

NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyThresholdMonitorObjectDeletion";

/\*\*

\* This constant defines the name of the monitorId property,

\* which is transported in the filterable\_body fields.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorId.

\*/

const string MONITOR\_ID = PMIRPConstDefs::AttributeNameValue::MONITOR\_ID;

};

/\*\*

\* Constant definitions for the notifyThresholdMonitorStatusChanged notification

\*/

interface NotifyThresholdMonitorStatusChanged: NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyThresholdMonitorStatusChanged";

/\*\*

\* This constant defines the name of the monitorId property.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorId.

\*/

const string MONITOR\_ID = PMIRPConstDefs::AttributeNameValue::MONITOR\_ID;

/\*\*

\* This constant defines the name of the monitorStatus property.

\* The data type for the value of this property

\* is PMIRPConstDefs::MonitorStatus.

\*/

const string MONITOR\_STATUS = PMIRPConstDefs::AttributeNameValue::MONITOR\_STATUS;

/\*\*

\* This constant defines the name of the reason property.

\* The data type for the value of this property is string.

\*/

const string REASON = PMIRPConstDefs::AttributeNameValue::REASON;

};

};

#endif // \_PM\_IRP\_NOTIFICATIONS\_IDL\_

Annex B (normative):   
XML definitions

This annex specifies the XML definitions for the Performance Management (PM) Integration Reference Point (IRP) as it applies to Itf-N, in accordance with PM IRP IS definitions in 3GPP TS 32.412 [7], for usage with the SOAP Solution Set in Annex C as well as Notification Log IRP XML definitions in 3GPP TS 32.336 [11].

# B.1 Architectural features

The overall architectural feature of PM IRP is specified in 3GPP TS 32.412 [7].

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

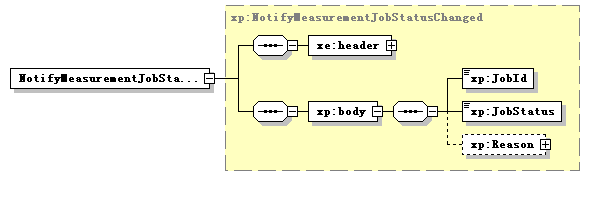
## B.3.1 XML definition structure

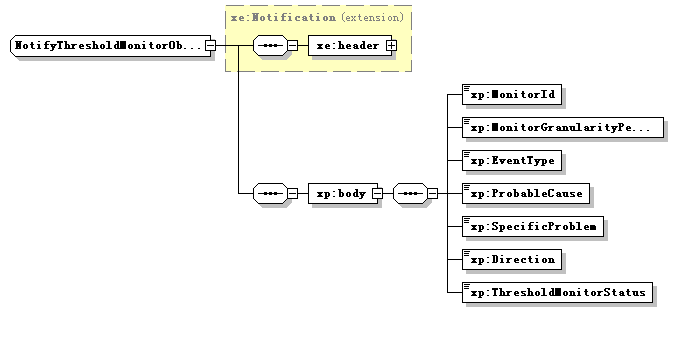
Clause B.3.2 provides a graphical representation of the XML elements.

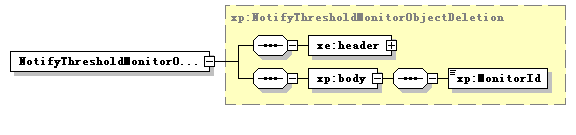
Clause B.3.3 provides XML definitions of PM IRP notifications as defined in 3GPP TS 32.412 [7].

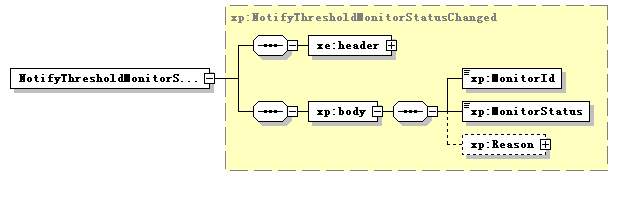
Clause B.3.4 provides XML definitions of PM IOC as defined in 3GPP TS 32.412 [7].

## B.3.2 Graphical Representation









## B.3.3 XML Schema “pMIRPNotif.xsd”

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

<!--

3GPP TS 32.416 PMIRP Notification XML Schema

pMIRPNotif.xsd

-->

<schema xmlns:xp="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPNotif" xmlns:xe="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification" xmlns:xai="http://www.3gpp.org/ftp/specs/archive/32\_series/32.111-6#alarmIRPIOCs" xmlns:xpi="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs" xmlns="http://www.w3.org/2001/XMLSchema" targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPNotif" elementFormDefault="qualified" attributeFormDefault="unqualified">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification"/>

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs"/>

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.111-6#alarmIRPIOCs"/> <simpleType name="QoSEventType">

<restriction base="xai:EventType">

<enumeration value="Quality Of Service Alarm"/>

</restriction>

</simpleType>

<complexType name="NotifyMeasurementJobStatusChanged">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="JobId" type="xpi:JobId"/>

<element name="JobStatus" type="xpi:JobStatus"/>

<element name="Reason" type="xpi:JobStatusChangedReasons" minOccurs="0"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<complexType name="NotifyThresholdMonitorObjectCreation">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="MonitorId" type="xpi:MonitorId"/>

<element name="MonitorGranularityPeriod" type="xpi:MonitorGranularityPeriod"/>

<element name="EventType" type="xp:QoSEventType"/>

<element name="ProbableCause" type="xpi:TcProbableCause"/>

<element name="SpecificProblem" type="xpi:SpecificProblem"/>

<element name="Direction" type="xpi:Direction"/>

<element name="ThresholdMonitorStatus" type="xpi:ThresholdMonitorStatus"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<complexType name="NotifyThresholdMonitorObjectDeletion">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="MonitorId" type="xpi:MonitorId"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<complexType name="NotifyThresholdMonitorStatusChanged">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="MonitorId" type="xpi:MonitorId"/>

<element name="MonitorStatus" type="xpi:ThresholdMonitorStatus"/>

<element name="Reason" type="xpi:MonitorStatusChangedReasons" minOccurs="0"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<element name="NotifyMeasurementJobStatusChanged" type="xp:NotifyMeasurementJobStatusChanged"/>

<element name="NotifyThresholdMonitorObjectCreation" type="xp:NotifyThresholdMonitorObjectCreation"/>

<element name="NotifyThresholdMonitorObjectDeletion" type="xp:NotifyThresholdMonitorObjectDeletion"/>

<element name="NotifyThresholdMonitorStatusChanged" type="xp:NotifyThresholdMonitorStatusChanged"/>

</schema>

## B.3.4 XML Schema “pMIRPIOCs.xsd”

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

<!--

3GPP TS 32.416 Performance Management IRP IOC XML Schema

pMIRPIOCs.xsd

-->

<schema xmlns:xpi="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs" xmlns:xe="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification" xmlns:xai="http://www.3gpp.org/ftp/specs/archive/32\_series/32.111-6#alarmIRPIOCs" xmlns="http://www.w3.org/2001/XMLSchema" targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs" elementFormDefault="qualified" attributeFormDefault="unqualified">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification"/>

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.111-6#alarmIRPIOCs"/>

<!-- Type definitions -->

<simpleType name="JobId">

<restriction base="string">

<minLength value="1"/>

</restriction>

</simpleType>

<simpleType name="JobStatus">

<restriction base="string">

<enumeration value="Scheduled"/>

<enumeration value="Active"/>

<enumeration value="Suspended"/>

<enumeration value="Stopped"/>

</restriction>

</simpleType>

<simpleType name="JobStatusChangedReason">

<restriction base="string">

<enumeration value="failToReadMeasurementTypesForExtendedProlongPeriod"/>

<enumeration value="internalProblem"/>

<enumeration value="stopMeasurementJob"/>

<enumeration value="stopTimeReached"/>

<enumeration value="resumeMeasurementJob"/>

<enumeration value="suspendMeasurementJob"/>

<enumeration value="startTimeReached"/>

<enumeration value="suspendMeasurementJobBySystem"/>

</restriction>

</simpleType>

<complexType name="JobStatusChangedReasons">

<sequence>

<element name="Reason" type="xpi:JobStatusChangedReason" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="MonitorStatusChangedReason">

<restriction base="string">

<enumeration value="ResumeThresholdMonitor"/>

<enumeration value="SuspendThresholdMonitor"/>

</restriction>

</simpleType>

<complexType name="MonitorStatusChangedReasons">

<sequence>

<element name="Reason" type="xpi:MonitorStatusChangedReason" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="MonitorId">

<restriction base="string">

<minLength value="1"/>

</restriction>

</simpleType>

<complexType name="DailyScheduling">

<sequence minOccurs="0">

<element name="intervalStart" type="time"/>

<element name="intervalEnd" type="time"/>

</sequence>

<!-- This element type is allowed to be empty -->

</complexType>

<simpleType name="WeekDay">

<restriction base="string">

<enumeration value="Monday"/>

<enumeration value="Tuesday"/>

<enumeration value="Wednesday"/>

<enumeration value="Thursday"/>

<enumeration value="Friday"/>

<enumeration value="Saturday"/>

<enumeration value="Sunday"/>

</restriction>

</simpleType>

<complexType name="WeekDays">

<sequence>

<element name="day" type="xpi:WeekDay" maxOccurs="7"/>

</sequence>

</complexType>

<complexType name="WeeklyScheduling">

<sequence>

<element name="days" type="xpi:WeekDays" minOccurs="0"/>

<element name="dailyScheduling" type="xpi:DailyScheduling" minOccurs="0"/>

</sequence>

</complexType>

<simpleType name="GranularityPeriod">

<restriction base="string">

<enumeration value="5 Minutes"/>

<enumeration value="15 Minutes"/>

<enumeration value="30 Minutes"/>

<enumeration value="1 Hour"/>

<enumeration value="12 Hours"/>

<enumeration value="24 Hours"/>

</restriction>

</simpleType>

<simpleType name="MonitorGranularityPeriod">

<restriction base="xpi:GranularityPeriod"/>

</simpleType>

<simpleType name="JobGranularityPeriod">

<restriction base="xpi:GranularityPeriod"/>

</simpleType>

<simpleType name="JobReportingPeriod">

<restriction base="positiveInteger"/>

<!-- The legal value is in number of minutes and otherwise according to jobReportingPeriod of 3GPP TS 32.412 -->

</simpleType>

<simpleType name="JobStartTime">

<restriction base="dateTime"/>

</simpleType>

<simpleType name="JobStopTime">

<restriction base="dateTime"/>

</simpleType>

<complexType name="JobSchedule">

<choice>

<element name="dailyScheduling" type="xpi:DailyScheduling"/>

<element name="weeklyScheduling" type="xpi:WeeklyScheduling"/>

</choice>

</complexType>

<simpleType name="JobPriority">

<restriction base="string">

<enumeration value="Low"/>

<enumeration value="Medium"/>

<enumeration value="High"/>

</restriction>

</simpleType>

<simpleType name="PrabableCausePM">

<restriction base="string">

<enumeration value="Threshold Crossed"/>

</restriction>

</simpleType>

<simpleType name="Direction">

<restriction base="string">

<enumeration value="Increasing"/>

<enumeration value="Decreasing"/>

</restriction>

</simpleType>

<simpleType name="QoSEventType">

<restriction base="xai:EventType">

<enumeration value="Quality Of Service Alarm"/>

</restriction>

</simpleType>

<simpleType name="TcProbableCause">

<restriction base="xai:ProbableCause">

<enumeration value="Threshold Crossed"/>

</restriction>

</simpleType>

<simpleType name="SpecificProblem">

<restriction base="string"/>

</simpleType>

<simpleType name="ThresholdMonitorStatus">

<restriction base="string">

<enumeration value="Active"/>

<enumeration value="Suspended"/>

</restriction>

</simpleType>

<simpleType name="ThresholdSeverity">

<restriction base="string">

<enumeration value="Warning"/>

<enumeration value="Minor"/>

<enumeration value="Major"/>

<enumeration value="Critical"/>

</restriction>

</simpleType>  
 <simpleType name="JobReliability">

<restriction base="string"/>  
 <enumeration value="True"/>  
 <enumeration value="False"/>  
 </restriction>

</simpleType>

<!-- Attributes of the MeasurementJob IOC -->

<element name="jobId" type="xpi:JobId"/>

<element name="jobGranularityPeriod" type="xpi:JobGranularityPeriod"/>

<element name="jobReportingPeriod" type="xpi:JobReportingPeriod"/>

<element name="jobStatus" type="xpi:JobStatus"/>

<element name="jobPriority" type="xpi:JobPriority"/>  
 <element name="jobReliability" type="xpi:JobReliability"/>

<!-- Attributes of the JobMeasurementSchedule IOC -->

<element name="jobStartTime" type="xpi:JobStartTime"/>

<element name="jobStopTime" type="xpi:JobStopTime"/>

<element name="jobSchedule" type="xpi:JobSchedule"/>

<!-- Attributes of the MeasuredAttribute IOC -->

<element name="measurementTypeName" type="string"/>

<!-- Attributes of the MeasurementReader IOC -->

<element name="measurementResultValue" type="anyType"/>

<element name="probableCause" type="xpi:TcProbableCause"/>

<element name="specificProblem" type="xpi:SpecificProblem"/>

<element name="direction" type="xpi:Direction"/>

<!-- Attributes of the Monitor IOC -->

<element name="monitorId" type="string"/>

<element name="monitorGranularityPeriod" type="xpi:GranularityPeriod"/>

<!-- Attributes of the ThresholdMonitor IOC -->

<element name="thresholdMonitorStatus" type="xpi:ThresholdMonitorStatus"/>

<!-- Attributes of the ThresholdLevel IOC -->

<element name="thresholdValue" type="string"/>

<element name="thresholdSeverity" type="xpi:ThresholdSeverity"/>

<element name="hysteresis" type="string"/>

</schema>

Annex C (normative):  
SOAP Solution Set

This annex specifies the SOAP Solution Set for the IRP whose semantics are specified in PM IRP: Information Service (3GPP TS 32.412[7]).

# C.1 Architectural Features

The overall architectural feature of the Performance Management (PM) IRP is specified in 3GPP TS 32.412 [7]. This clause specifies features that are specific to the SOAP Solution Set.

The SOAP 1.1 specification [15] and WSDL 1.1 specification [17] are supported.

The SOAP 1.2 specification [18] is supported optionally.

This specification uses "document" style in WSDL file.

This specification uses "literal" encoding style in WSDL file.

The filter language used in the SS is the XPath Language (see W3C XPath 1.0 specification [16]). IRPAgents may throw a FilterComplexityLimit fault when a given filter is too complex.

The PM IRP SOAP SS uses the Notification IRP SOAP SS of 3GPP TS 32.306 [5]. The IRPAgent shall support the push interface model, which means that the IRPAgent sends PM notifications to the IRPManager as soon as new events occur. The IRPManager does not need to check ("pull") for events.

Relevant definitions are imported from the PM IRP XML definitions of Annex B.

This specification uses a number of namespace prefixes throughout that are listed in Table C.1.1.

Table C.1.1: Prefixes and Namespaces used in this specification

|  |  |
| --- | --- |
| **PREFIX** | **NAMESPACE** |
| (no prefix) | http://schemas.xmlsoap.org/wsdl/ |
| soap | http://schemas.xmlsoap.org/wsdl/soap/ |
| pMIRPSystem | http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPSystem |
| pMIRPData | http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPData |
| xpi | http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs |
| xn | http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm |
| genericIRPSystem | http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem |

## C.1.1 Syntax for Distinguished Names

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

# C.2 Mapping

## C.2.1 Operation and notification mapping

The PM IRP IS (3GPP TS 32.412 [7]) defines the operations and their semantics.

Table C.2.1 maps the operations defined in the PM IRP IS to their equivalent port type and binding operations in this Solution Set (SS).

Table C.2.1 also maps the notifications of the PM IRP IS, as well as inherited operations.

Table C.2.1 also qualifies if an operation is Mandatory (M) or Optional (O).

Table C.2.1: Mapping from IS Operation to SS Equivalents

|  |  |  |  |
| --- | --- | --- | --- |
| IS Operation in 3GPP TS 32.412 [7] | SS: Operation for WSDL port type and WSDL binding | SS: Port of PMIRPService | Qualifier |
| createMeasurementJob | createMeasurementJob (note 1) | PMIRPPort | M |
| stopMeasurementJob | stopMeasurementJob (note 1) | PMIRPPort | M |
| suspendMeasurementJob | suspendMeasurementJob (note 1) | PMIRPPort | O |
| resumeMeasurementJob | resumeMeasurementJob (note 1) | PMIRPPort | O |
| listMeasurementJobs | listMeasurementJobs (note 1) | PMIRPPort | M |
| createThresholdMonitor | createThresholdMonitor (note 1) | PMIRPPort | M (note 4 a) |
| deleteThresholdMonitor | deleteThresholdMonitor (note 1) | PMIRPPort | M (note 4 a) |
| listThresholdMonitors | listThresholdMonitors (note 1) | PMIRPPort | M (note 4 a) |
| suspendThresholdMonitor | suspendThresholdMonitor (note 1) | PMIRPPort | M (note 4 b) |
| resumeThresholdMonitor | resumeThresholdMonitor (note 1) | PMIRPPort | M (note 4 b) |
| notifyMeasurementJobStatusChanged | notify (note 2) | NotificationIRPNtfPort | M |
| notifyThresholdMonitorObjectCreation | notify (note 2) | NotificationIRPNtfPort | M (note 4 c) |
| notifyThresholdMonitorObjectDeletion | notify (note 2) | NotificationIRPNtfPort | M (note 4 c) |
| notifyThresholdMonitorStatusChanged | notify (note 2) | NotificationIRPNtfPort | O |
| getIRPVersion (note 3) | See TS 32.316 [13] | GenericIRPPort | M |
| getOperationProfile (note 3) | See TS 32.316 [13] | GenericIRPPort | O |
| getNotificationProfile (note 3) | See TS 32.316 [13] | GenericIRPPort | O |
| NOTE 1: The operation is under the port type pMIRPSystem:PMIRPPortType and under the binding pMIRPSystem:PMIRPBinding. | | | |
| NOTE 2: The IS equivalent maps to an XML definition specified in Annex B, and this being an input parameter to the operation notify under the port type ntfIRPNtfSystem:NotificationIRPNtf and under the binding ntfIRPNtfSystem:NotificationIRPNtf of 3GPP TS 32.306 [5]. This binding is linked to a port of the PMIRPService as indicated in the table above. | | | |
| NOTE 3: The IS operation is inherited from the ManagedGenericIRP IOC specified in 3GPP TS 32.312 [8].  This inheritance is by the PMIRP IOC of 3GPP TS 32.412 [7] inheriting from the ManagedGenericIRP IOC. The corresponding binding is linked to a port of the PMIRPService as indicated in the table above. | | | |
| NOTE 4: a) Mandatory if the optional PMIRPOperations\_2 interface (see the PM IRP IS clause 7.4) is supported. b) Mandatory if the optional PMIRPOperations\_3 interface (see the PM IRP IS clause 7.5) is supported. c) Mandatory if the optional PMIRPNotification\_2 interface (see the PM IRP IS clause 7.7) is supported. | | | |

## C.2.2 Operation parameter mapping

The PM IRP IS (3GPP TS 32.412 [7]) defines semantics of parameters carried in the operations. The tables below show the mapping of these parameters, as per operation, to their equivalents defined in this SS.

### C.2.2.1 Operation createMeasurementJob

#### C.2.2.1.1 Input parameters

Table C.2.2.1.1: Mapping from IS createMeasurementJob input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| iOCName | iOCName | M |
| iOCInstanceList | iOCInstanceList | M |
| measurementCategoryList | measurementCategoryList | M |
| granularityPeriod | granularityPeriod | M |
| reportingPeriod | reportingPeriod | M |
| startTime | startTime | O |
| stopTime | stopTime | O |
| schedule | schedule | O |
| priority | priority | O |
| reliability | reliability | O |

#### C.2.2.1.2 Output parameters

Table C.2.2.1.2: Mapping from IS createMeasurementJob output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| jobId | jobId | M |
| unsupportedList | unsupportedList | M |
| status | status | M |

#### C.2.2.1.3 Fault definition

Table C.2.2.1.3: Mapping from IS createMeasurementJob exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| invalidStartTime | InvalidStartTime | M |
| invalidStopTime | InvalidStopTime | M |
| invalidSchedule | InvalidSchedule | M |
| invalidGranularityPeriod | InvalidGranularityPeriod | M |
| invalidReportingPeriod | InvalidReportingPeriod | M |
| highWorkLoad | HighWorkLoad | M |
| invalidPriority | InvalidPriority | M |
| noValidMeasurementType | NoValidMeasurementType | M |
| invalidReliability | InvalidReliability | M |

### C.2.2.2 Operation stopMeasurementJob

#### C.2.2.2.1 Input parameters

Table C.2.2.2.1: Mapping from IS stopMeasurementJob input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| JobId | jobId | M |

#### C.2.2.2.2 Output parameters

Table C.2.2.2.2: Mapping from IS stopMeasurementJob output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| Status | status | M |

#### C.2.2.2.3 Fault definition

Table C.2.2.2.3: Mapping from IS stopMeasurementJob exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownJob | UnknownJob | M |
| jobCannotBeStopped | JobCannotBeStopped | M |

### C.2.2.3 Operation suspendMeasurementJob

#### C.2.2.3.1 Input parameters

Table C.2.2.3.1: Mapping from IS suspendMeasurementJob input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| jobId | jobId | M |

#### C.2.2.3.2 Output parameters

Table C.2.2.3.2: Mapping from IS suspendMeasurementJob output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.3.3 Fault definition

Table C.2.2.3.3: Mapping from IS suspendMeasurementJob exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownJob | UnknownJob | M |
| jobAlreadySuspended | JobAlreadySuspended | M |

### C.2.2.4 Operation resumeMeasurementJob

#### C.2.2.4.1 Input parameters

Table C.2.2.4.1: Mapping from IS resumeMeasurementJob input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| jobId | jobId | M |

#### C.2.2.4.2 Output parameters

Table C.2.2.4.2: Mapping from IS resumeMeasurementJob output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.4.3 Fault definition

Table C.2.2.4.3: Mapping from IS resumeMeasurementJob exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownJob | UnknownJob | M |
| jobIsNotSuspended | JobIsNotSuspended | M |
| highWorkLoad | HighWorkLoad | M |

### C.2.2.5 Operation listMeasurementJobs

#### C.2.2.5.1 Input parameters

Table C.2.2.5.1: Mapping from IS listMeasurementJobs input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| jobIdList | jobIdList | M |

#### C.2.2.5.2 Output parameters

Table C.2.2.5.2: Mapping from IS listMeasurementJobs output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| jobInfoList | jobInfoList | M |
| status | status | M |

#### C.2.2.5.3 Fault definition

Table C.2.2.5.3: Mapping from IS listMeasurementJobs exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| invalidJobIdList | InvalidJobIdList | M |

### C.2.2.6 Operation createThresholdMonitor

#### C.2.2.6.1 Input parameters

Table C.2.2.6.1: Mapping from IS createThresholdMonitor input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| iOCName | iOCName | M |
| iOCInstanceList | iOCInstanceList | M |
| thresholdInfoList | thresholdInfoList | M |
| monitorGranularityPeriod | monitorGranularityPeriod | M |

#### C.2.2.6.2 Output parameters

Table C.2.2.6.2: Mapping from IS createThresholdMonitor output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| monitorId | monitorId | M |
| unsupportedList | unsupportedList | M |
| status | status | M |

#### C.2.2.6.3 Fault definition

Table C.2.2.6.3: Mapping from IS createThresholdMonitor exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| invalidClassOrInstances | InvalidClassOrInstances | M |
| invalidGranularityPeriod | InvalidGranularityPeriod | M |
| noValidMeasurementType | NoValidMeasurementType | M |
| invalidNumberOfThresholdPackElements | InvalidNumberOfThresholdPackElements | M |
| invalidOrderOfThresholdPackElements | InvalidOrderOfThresholdPackElements | M |
| invalidDirection | InvalidDirection | M |

### C.2.2.7 Operation deleteThresholdMonitor

#### C.2.2.7.1 Input parameters

Table C.2.2.7.1: Mapping from IS deleteThresholdMonitor input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| monitorId | monitorId | M |

#### C.2.2.7.2 Output parameters

Table C.2.2.7.2: Mapping from IS deleteThresholdMonitor output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.7.3 Fault definition

Table C.2.2.7.3: Mapping from IS deleteThresholdMonitor exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownThresholdMonitor | UnknownThresholdMonitor | M |

### C.2.2.8 Operation listThresholdMonitors

#### C.2.2.8.1 Input parameters

Table C.2.2.8.1: Mapping from IS listThresholdMonitors input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| monitorIdList | monitorIdList | M |

#### C.2.2.8.2 Output parameters

Table C.2.2.8.2: Mapping from IS listThresholdMonitors output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.8.3 Fault definition

Table C.2.2.8.3: Mapping from IS listThresholdMonitors exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| invalidMonitorIdList | InvalidMonitorIdList | M |

### C.2.2.9 Operation suspendThresholdMonitor

#### C.2.2.9.1 Input parameters

Table C.2.2.9.1: Mapping from IS suspendThresholdMonitor input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| monitorIdList | monitorIdList | M |

#### C.2.2.9.2 Output parameters

Table C.2.2.9.2: Mapping from IS suspendThresholdMonitor output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.9.3 Fault definition

Table C.2.2.9.3: Mapping from IS suspendThresholdMonitor exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownThresholdMonitor | UnknownThresholdMonitor | M |
| thresholdMonitorAlreadySuspended | ThresholdMonitorAlreadySuspended | M |

### C.2.2.10 Operation resumeThresholdMonitor

#### C.2.2.10.1 Input parameters

Table C.2.2.10.1: Mapping from IS resumeThresholdMonitor input parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding input message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| monitorId | monitorId | M |

#### C.2.2.10.2 Output parameters

Table C.2.2.10.2: Mapping from IS resumeThresholdMonitor output parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS WSDL type sub-element  used in corresponding output message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| status | status | M |

#### C.2.2.10.3 Fault definition

Table C.2.2.10.3: Mapping from IS resumeThresholdMonitor exceptions to SS equivalents

|  |  |  |
| --- | --- | --- |
| Assertion name | SS WSDL type enumeration value  used in corresponding fault message  under corresponding port type operation  as indicated in Table C.2.1 | Qualifier |
| unknownThresholdMonitor | UnknownThresholdMonitor | M |
| thresholdMonitorIsNotSuspended | ThresholdMonitorIsNotSuspended | M |

# C.3 Solution Set definitions

## C.3.1 WSDL definition structure

Clause C.3.2 provides a graphical representation of the PM IRP service.

Clause C.3.3 defines the services which are supported the PM IRP agent.

## C.3.2 Graphical Representation

The WSDL structure is depicted in Figure C.3.2 below depicting port type, binding and service. The port type contains port type operations, which again contains input, output and fault messages. The binding contains binding operations, which have the same name as the port type operations. The binding connects to a port inside the service.

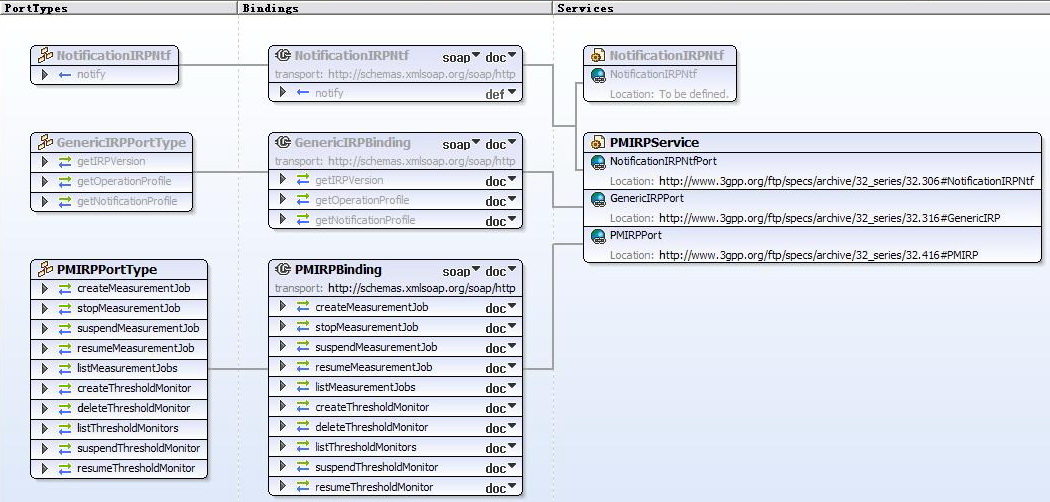


Figure C.3.2: Performance Management IRP SOAP Solution Set WSDL structure

## C.3.3 WSDL specification “PMIRPSystem.wsdl”

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

<!--

3GPP TS 32.416 Performance Management (PM) IRP SOAP Solution Set

-->

<definitions xmlns="http://schemas.xmlsoap.org/wsdl/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:pMIRPSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPSystem" xmlns:pMIRPData="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPData" xmlns:xpi="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs" xmlns:xn="http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm" xmlns:genericIRPSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem" xmlns:ntfIRPNtfSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtfSystem"

targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPSystem">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtfSystem"/>

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem"/> <types>

<schema targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRPData" xmlns="http://www.w3.org/2001/XMLSchema">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#pMIRPIOCs"/>

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

<!-- The following types are defined for the PM IRP operations -->

<simpleType name="OperationStatusTwo">

<restriction base="string">

<enumeration value="Success"/>

<enumeration value="Failure"/>

</restriction>

</simpleType>

<simpleType name="OperationStatusThree">

<restriction base="string">

<enumeration value="Success"/>

<enumeration value="Failure"/>

<enumeration value="PartialSuccess"/>

</restriction>

</simpleType>

<complexType name="JobIdList">

<sequence>

<element ref="xpi:jobId" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="JobInfoElement">

<sequence>

<element ref="xpi:jobId"/>

<element ref="xpi:jobGranularityPeriod"/>

<element ref="xpi:jobReportingPeriod"/>

<element ref="xpi:jobStatus"/>

<element ref="xpi:jobPriority"/>  
 <element ref="xpi:jobReliability"/>

<element ref="xpi:jobStartTime"/>

<element ref="xpi:jobStopTime"/>

<element ref="xpi:jobSchedule"/>

<element name="iOCName" type="string"/>

<element name="iOCInstanceList" type="xn:dnList"/>

<element name="measurementCategoryList" type="pMIRPData:MeasurementCategoryList"/>

</sequence>

</complexType>

<complexType name="JobInfoList">

<sequence>

<element name="jobInfoElement" type="pMIRPData:JobInfoElement" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="MeasurementCategoryList">

<sequence>

<element ref="xpi:measurementTypeName" minOccurs="1" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="MonitorIdList">

<sequence>

<element ref="xpi:monitorId" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="MonitorInfoElement">

<sequence>

<element ref="xpi:monitorId"/>

<element ref="xpi:monitorGranularityPeriod"/>

<element ref="xpi:thresholdMonitorStatus"/>

<element name="iOCName" type="string"/>

<element name="iOCInstanceList" type="xn:dnList"/>

<element name="thresholdInfoList" type="pMIRPData:ThresholdInfoList"/>

</sequence>

</complexType>

<complexType name="MonitorInfoList">

<sequence>

<element name="monitorInfoElement" type="pMIRPData:MonitorInfoElement" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="ThresholdLevel">

<sequence>

<element ref="xpi:thresholdValue"/>

<element ref="xpi:thresholdSeverity"/>

<element ref="xpi:hysteresis"/>

</sequence>

</complexType>

<complexType name="ThresholdLevelList">

<sequence>

<element name="thresholdPackElement" type="pMIRPData:ThresholdLevel" minOccurs="1" maxOccurs="4"/>

</sequence>

</complexType>

<complexType name="ThresholdInfoElement">

<sequence>

<element ref="xpi:measurementTypeName"/>

<element ref="xpi:probableCause"/>

<element ref="xpi:specificProblem"/>

<element ref="xpi:direction"/>

<element name="thresholdPack" type="pMIRPData:ThresholdLevelList"/>

</sequence>

</complexType>

<complexType name="ThresholdInfoList">

<sequence>

<element name="ThresholdInfoElement" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="UnsupportedMeasurement1">

<sequence>

<element name="objectInstance" type="xn:dn"/>

<element ref="xpi:measurementTypeName"/>

<element name="reason" type="string"/>

</sequence>

</complexType>

<complexType name="UnsupportedList1">

<sequence>

<element name="unsupportedMeasurement" type="pMIRPData:UnsupportedMeasurement1" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="UnsupportedMeasurement2">

<sequence>

<element name="objectClass" type="string"/>

<element name="objectInstance" type="xn:dn"/>

<element ref="xpi:measurementTypeName"/>

<element name="reason" type="string"/>

</sequence>

</complexType>

<complexType name="UnsupportedList2">

<sequence>

<element name="unsupportedMeasurement" type="pMIRPData:UnsupportedMeasurement2" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<!-- createMeasurementJob Request-->

<element name="createMeasurementJob">

<complexType>

<sequence>

<element name="iOCName" type="xn:dn"/>

<element name="iOCInstanceList" type="xn:dnList"/>

<element name="measurementCategoryList" type="pMIRPData:MeasurementCategoryList"/>

<element name="granularityPeriod" type="xpi:JobGranularityPeriod"/>

<element name="reportingPeriod" type="xpi:JobReportingPeriod"/>

<element name="startTime" type="xpi:JobStartTime" minOccurs="0"/>

<element name="stopTime" type="xpi:JobStopTime" minOccurs="0"/>

<element name="schedule" type="xpi:JobSchedule" minOccurs="0"/>

<element name="priority" type="xpi:JobPriority" minOccurs="0"/>  
 <element name="reliability" type="xpi:JobReliability" minOccurs="0"/>

</sequence>

</complexType>

</element>

<!-- createMeasurementJob Response -->

<element name="createMeasurementJobResponse">

<complexType>

<sequence>

<element ref="xpi:jobId"/>

<element name="unsupportedList" type="pMIRPData:UnsupportedList1"/>

<element name="status" type="pMIRPData:OperationStatusThree"/>

</sequence>

</complexType>

</element>

<!-- createMeasurementJob Fault -->

<element name="createMeasurementJobFault">

<simpleType>

<restriction base="string">

<enumeration value="InvalidStartTime"/>

<enumeration value="InvalidStopTime"/>

<enumeration value="InvalidSchedule"/>

<enumeration value="InvalidGranularityPeriod"/>

<enumeration value="InvalidReportingPeriod"/>

<enumeration value="HighWorkLoad"/>

<enumeration value="InvalidPriority"/>  
 <enumeration value="InvalidReliability"/>

<enumeration value="NovalidMeasurementTypeName"/>

</restriction>

</simpleType>

</element>

<!-- stopMeasurementJob Request -->

<element name="stopMeasurementJob">

<complexType>

<sequence>

<element ref="xpi:jobId"/>

</sequence>

</complexType>

</element>

<!-- stopMeasurementJob Response -->

<element name="stopMeasurementJobResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- stopMeasurementJob Fault -->

<element name="stopMeasurementJobFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownJob"/>

<enumeration value="JobCannotBeStopped"/>

</restriction>

</simpleType>

</element>

<!-- suspendMeasurementJob Request -->

<element name="suspendMeasurementJob">

<complexType>

<sequence>

<element ref="xpi:jobId"/>

</sequence>

</complexType>

</element>

<!-- suspendMeasurementJob Response -->

<element name="suspendMeasurementJobResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- suspendMeasurementJob Fault -->

<element name="suspendMeasurementJobFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownJob"/>

<enumeration value="JobAlreadySuspended"/>

</restriction>

</simpleType>

</element>

<!-- resumeMeasurementJob Request -->

<element name="resumeMeasurementJob">

<complexType>

<sequence>

<element ref="xpi:jobId"/>

</sequence>

</complexType>

</element>

<!-- resumeMeasurementJob Response -->

<element name="resumeMeasurementJobResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- resumeMeasurementJob Fault -->

<element name="resumeMeasurementJobFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownJob"/>

<enumeration value="JobIsNotSuspended"/>

<enumeration value="HighWorkLoad"/>

</restriction>

</simpleType>

</element>

<!-- listMeasurementJobs Request -->

<element name="listMeasurementJobs">

<complexType>

<sequence>

<element name="jobIdList" type="pMIRPData:JobIdList"/>

</sequence>

</complexType>

</element>

<!-- listMeasurementJobs Response -->

<element name="listMeasurementJobsResponse">

<complexType>

<sequence>

<element name="jobInfoList" type="pMIRPData:JobInfoList"/>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- listMeasurementJobs Fault -->

<element name="listMeasurementJobsFault">

<simpleType>

<restriction base="string">

<enumeration value="InvalidJobIdList"/>

</restriction>

</simpleType>

</element>

<!-- createThresholdMonitor Request -->

<element name="createThresholdMonitor">

<complexType>

<sequence>

<element name="iOCName" type="string"/>

<element name="iOCInstanceList" type="xn:dnList"/>

<element name="thresholdInfoList" type="pMIRPData:ThresholdInfoList"/>

<element ref="xpi:monitorGranularityPeriod"/>

</sequence>

</complexType>

</element>

<!-- createThresholdMonitor Response -->

<element name="createThresholdMonitorResponse">

<complexType>

<sequence>

<element ref="xpi:monitorId"/>

<element name="unsupportedList" type="pMIRPData:UnsupportedList2"/>

<element name="status" type="pMIRPData:OperationStatusThree"/>

</sequence>

</complexType>

</element>

<!-- createThresholdMonitor Fault -->

<element name="createThresholdMonitorFault">

<simpleType>

<restriction base="string">

<enumeration value="InvalidClassOrInstances"/>

<enumeration value="InvalidGranularityPeriod"/>

<enumeration value="NoValidMeasurementType"/>

<enumeration value="InvalidNumberOfThresholdPackElements"/>

<enumeration value="InvalidOrderOfThresholdPackElements"/>

<enumeration value="InvalidDirection"/>

</restriction>

</simpleType>

</element>

<!-- deleteThresholdMonitor Request -->

<element name="deleteThresholdMonitor">

<complexType>

<sequence>

<element ref="xpi:monitorId"/>

</sequence>

</complexType>

</element>

<!-- deleteThresholdMonitor Response -->

<element name="deleteThresholdMonitorResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- deleteThresholdMonitor Fault -->

<element name="deleteThresholdMonitorFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownThresholdMonitor"/>

</restriction>

</simpleType>

</element>

<!-- listThresholdMonitors Request -->

<element name="listThresholdMonitors">

<complexType>

<sequence>

<element name="monitorIdList" type="pMIRPData:MonitorIdList"/>

</sequence>

</complexType>

</element>

<!-- listThresholdMonitors Response -->

<element name="listThresholdMonitorsResponse">

<complexType>

<sequence>

<element name="monitorInfoList" type="pMIRPData:MonitorInfoList"/>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- listThresholdMonitors Fault -->

<element name="listThresholdMonitorsFault">

<simpleType>

<restriction base="string">

<enumeration value="InvalidMonitorIdList"/>

</restriction>

</simpleType>

</element>

<!-- suspendThresholdMonitor Request -->

<element name="suspendThresholdMonitor">

<complexType>

<sequence>

<element ref="xpi:monitorId"/>

</sequence>

</complexType>

</element>

<!-- suspendThresholdMonitor Response -->

<element name="suspendThresholdMonitorResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- suspendThresholdMonitor Fault -->

<element name="suspendThresholdMonitorFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownThresholdMonitor"/>

<enumeration value="ThresholdMonitorAlreadySuspended"/>

</restriction>

</simpleType>

</element>

<!-- resumeThresholdMonitor Request -->

<element name="resumeThresholdMonitor">

<complexType>

<sequence>

<element ref="xpi:monitorId"/>

</sequence>

</complexType>

</element>

<!-- resumeThresholdMonitor Response -->

<element name="resumeThresholdMonitorResponse">

<complexType>

<sequence>

<element name="status" type="pMIRPData:OperationStatusTwo"/>

</sequence>

</complexType>

</element>

<!-- resumeThresholdMonitor Fault -->

<element name="resumeThresholdMonitorFault">

<simpleType>

<restriction base="string">

<enumeration value="UnknownThresholdMonitor"/>

<enumeration value="ThresholdMonitorIsNotSuspended"/>

</restriction>

</simpleType>

</element>

</schema>

</types>

<message name="createMeasurementJob">

<part name="parameter" element="pMIRPData:createMeasurementJob"/>

</message>

<message name="createMeasurementJobResponse">

<part name="parameter" element="pMIRPData:createMeasurementJobResponse"/>

</message>

<message name="createMeasurementJobFault">

<part name="parameter" element="pMIRPData:createMeasurementJobFault"/>

</message>

<message name="stopMeasurementJob">

<part name="parameter" element="pMIRPData:stopMeasurementJob"/>

</message>

<message name="stopMeasurementJobResponse">

<part name="parameter" element="pMIRPData:stopMeasurementJobResponse"/>

</message>

<message name="stopMeasurementJobFault">

<part name="parameter" element="pMIRPData:stopMeasurementJobFault"/>

</message>

<message name="suspendMeasurementJob">

<part name="parameter" element="pMIRPData:suspendMeasurementJob"/>

</message>

<message name="suspendMeasurementJobResponse">

<part name="parameter" element="pMIRPData:suspendMeasurementJobResponse"/>

</message>

<message name="suspendMeasurementJobFault">

<part name="parameter" element="pMIRPData:suspendMeasurementJobFault"/>

</message>

<message name="resumeMeasurementJob">

<part name="parameter" element="pMIRPData:resumeMeasurementJob"/>

</message>

<message name="resumeMeasurementJobResponse">

<part name="parameter" element="pMIRPData:resumeMeasurementJobResponse"/>

</message>

<message name="resumeMeasurementJobFault">

<part name="parameter" element="pMIRPData:resumeMeasurementJobFault"/>

</message>

<message name="listMeasurementJobs">

<part name="parameter" element="pMIRPData:listMeasurementJobs"/>

</message>

<message name="listMeasurementJobsResponse">

<part name="parameter" element="pMIRPData:listMeasurementJobsResponse"/>

</message>

<message name="listMeasurementJobsFault">

<part name="parameter" element="pMIRPData:listMeasurementJobsFault"/>

</message>

<message name="createThresholdMonitor">

<part name="parameter" element="pMIRPData:createThresholdMonitor"/>

</message>

<message name="createThresholdMonitorResponse">

<part name="parameter" element="pMIRPData:createThresholdMonitorResponse"/>

</message>

<message name="createThresholdMonitorFault">

<part name="parameter" element="pMIRPData:createThresholdMonitorFault"/>

</message>

<message name="deleteThresholdMonitor">

<part name="parameter" element="pMIRPData:createThresholdMonitorFault"/>

</message>

<message name="deleteThresholdMonitorResponse">

<part name="parameter" element="pMIRPData:deleteThresholdMonitorResponse"/>

</message>

<message name="deleteThresholdMonitorFault">

<part name="parameter" element="pMIRPData:deleteThresholdMonitorFault"/>

</message>

<message name="listThresholdMonitors">

<part name="parameter" element="pMIRPData:listThresholdMonitors"/>

</message>

<message name="listThresholdMonitorsResponse">

<part name="parameter" element="pMIRPData:listThresholdMonitorsResponse"/>

</message>

<message name="listThresholdMonitorsFault">

<part name="parameter" element="pMIRPData:listThresholdMonitorsFault"/>

</message>

<message name="suspendThresholdMonitor">

<part name="parameter" element="pMIRPData:suspendThresholdMonitor"/>

</message>

<message name="suspendThresholdMonitorResponse">

<part name="parameter" element="pMIRPData:suspendThresholdMonitorResponse"/>

</message>

<message name="suspendThresholdMonitorFault">

<part name="parameter" element="pMIRPData:suspendThresholdMonitorFault"/>

</message>

<message name="resumeThresholdMonitor">

<part name="parameter" element="pMIRPData:resumeThresholdMonitor"/>

</message>

<message name="resumeThresholdMonitorResponse">

<part name="parameter" element="pMIRPData:resumeThresholdMonitorResponse"/>

</message>

<message name="resumeThresholdMonitorFault">

<part name="parameter" element="pMIRPData:resumeThresholdMonitorFault"/>

</message>

<portType name="PMIRPPortType">

<operation name="createMeasurementJob">

<input message="pMIRPSystem:createMeasurementJob"/>

<output message="pMIRPSystem:createMeasurementJobResponse"/>

<fault name="createMeasurementJobFault" message="pMIRPSystem:createMeasurementJobFault"/>

</operation>

<operation name="stopMeasurementJob">

<input message="pMIRPSystem:stopMeasurementJob"/>

<output message="pMIRPSystem:stopMeasurementJobResponse"/>

<fault name="stopMeasurementJobFault" message="pMIRPSystem:stopMeasurementJobFault"/>

</operation>

<operation name="suspendMeasurementJob">

<input message="pMIRPSystem:suspendMeasurementJob"/>

<output message="pMIRPSystem:suspendMeasurementJobResponse"/>

<fault name="suspendMeasurementJobFault" message="pMIRPSystem:suspendMeasurementJobFault"/>

</operation>

<operation name="resumeMeasurementJob">

<input message="pMIRPSystem:resumeMeasurementJob"/>

<output message="pMIRPSystem:resumeMeasurementJobResponse"/>

<fault name="resumeMeasurementJobFault" message="pMIRPSystem:resumeMeasurementJobFault"/>

</operation>

<operation name="listMeasurementJobs">

<input message="pMIRPSystem:listMeasurementJobs"/>

<output message="pMIRPSystem:listMeasurementJobsResponse"/>

<fault name="listMeasurementJobsFault" message="pMIRPSystem:listMeasurementJobsFault"/>

</operation>

<operation name="createThresholdMonitor">

<input message="pMIRPSystem:createThresholdMonitor"/>

<output message="pMIRPSystem:createThresholdMonitorResponse"/>

<fault name="createThresholdMonitorFault" message="pMIRPSystem:createThresholdMonitorFault"/>

</operation>

<operation name="deleteThresholdMonitor">

<input message="pMIRPSystem:deleteThresholdMonitor"/>

<output message="pMIRPSystem:deleteThresholdMonitorResponse"/>

<fault name="deleteThresholdMonitorFault" message="pMIRPSystem:deleteThresholdMonitorFault"/>

</operation>

<operation name="listThresholdMonitors">

<input message="pMIRPSystem:listThresholdMonitors"/>

<output message="pMIRPSystem:listThresholdMonitorsResponse"/>

<fault name="listThresholdMonitorsFault" message="pMIRPSystem:listThresholdMonitorsFault"/>

</operation>

<operation name="suspendThresholdMonitor">

<input message="pMIRPSystem:suspendThresholdMonitor"/>

<output message="pMIRPSystem:suspendThresholdMonitorResponse"/>

<fault name="suspendThresholdMonitorFault" message="pMIRPSystem:suspendThresholdMonitorFault"/>

</operation>

<operation name="resumeThresholdMonitor">

<input message="pMIRPSystem:resumeThresholdMonitor"/>

<output message="pMIRPSystem:resumeThresholdMonitorResponse"/>

<fault name="resumeThresholdMonitorFault" message="pMIRPSystem:resumeThresholdMonitorFault"/>

</operation>

</portType>

<binding name="PMIRPBinding" type="pMIRPSystem:PMIRPPortType">

<soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>

<operation name="createMeasurementJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#createMeasurementJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="createMeasurementJobFault">

<soap:fault name="createMeasurementJobFault" use="literal"/>

</fault>

</operation>

<operation name="stopMeasurementJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#stopMeasurementJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="stopMeasurementJobFault">

<soap:fault name="stopMeasurementJobFault" use="literal"/>

</fault>

</operation>

<operation name="suspendMeasurementJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#suspendMeasurementJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="suspendMeasurementJobFault">

<soap:fault name="suspendMeasurementJobFault" use="literal"/>

</fault>

</operation>

<operation name="resumeMeasurementJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#resumeMeasurementJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="resumeMeasurementJobFault">

<soap:fault name="resumeMeasurementJobFault" use="literal"/>

</fault>

</operation>

<operation name="listMeasurementJobs">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#listMeasurementJobs" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="listMeasurementJobsFault">

<soap:fault name="listMeasurementJobsFault" use="literal"/>

</fault>

</operation>

<operation name="createThresholdMonitor">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#createThresholdMonitor" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="createThresholdMonitorFault">

<soap:fault name="createThresholdMonitorFault" use="literal"/>

</fault>

</operation>

<operation name="deleteThresholdMonitor">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#deleteThresholdMonitor" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="deleteThresholdMonitorFault">

<soap:fault name="deleteThresholdMonitorFault" use="literal"/>

</fault>

</operation>

<operation name="listThresholdMonitors">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#listThresholdMonitors" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="listThresholdMonitorsFault">

<soap:fault name="listThresholdMonitorsFault" use="literal"/>

</fault>

</operation>

<operation name="suspendThresholdMonitor">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#suspendThresholdMonitor" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="suspendThresholdMonitorFault">

<soap:fault name="suspendThresholdMonitorFault" use="literal"/>

</fault>

</operation>

<operation name="resumeThresholdMonitor">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#resumeThresholdMonitor" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="resumeThresholdMonitorFault">

<soap:fault name="resumeThresholdMonitorFault" use="literal"/>

</fault>

</operation>

</binding>

<service name="PMIRPService">

<port name="PMIRPPort" binding="pMIRPSystem:PMIRPBinding">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.416#PMIRP"/>

</port>

<port name="GenericIRPPort" binding="genericIRPSystem:GenericIRPBinding">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRP"/>

</port>

<port name="NotificationIRPNtfPort" binding="ntfIRPNtfSystem:NotificationIRPNtf">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtf"/>

</port>

</service>

</definitions>

Annex D (informative):   
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2010-09 | SA#49 | SP-100518 | -- | -- |  | Presentation to SA for Information and Approval | 1.0.0 |
| 2010-10 | -- | -- | -- | -- |  | Publication | 10.0.0 |
| 2011-03 | SA-51 | SP-110095 | 001 | 1 |  | Add the missing exception in create measurement operation - Align with 32.412 PM IRP Information Service | 10.1.0 |
| 2012-09 | SA-57 | - | - | - |  | Automatic upgrade from previous Release version 10.1.0 | 11.0.0 |
| 2013-06 | SA-60 | SP-130266 | 003 | - |  | PM IRP SS Remove iRPId | 11.1.0 |
| 2014-09 | SA-65 | SP-140559 | 004 | - |  | Update the link from Solution Set to Information Service due to the end of Release 12 | 12.0.0 |
| 2016-01 | - | - | - | - |  | Update to Rel-13 version (MCC) | 13.0.0 |
| 2016-06 | SA#72 | SP-160407 | 0005 | - | F | Update the link from IRP Solution Set to IRP Information Service | 13.1.0 |
| 2017-03 | SA#75 | SP-170141 | 0006 | 3 | B | Add attributes corresponding to updated IS for operation "Create measurement job" related to measurement job reliability | 14.0.0 |
| 2018-06 | - | - | - | - | - | Update to Rel-15 version (MCC) | **15.0.0** |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | **16.0.0** |