3GPP TS 32.416 V11.1.0 (2013-06)

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 11)**

Keywords
GSM, UMTS, management, performance,
CORBA, XML, SOAP

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Contents

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

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x the first digit:

1 presented to TSG for information;

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

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 V11.0.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
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.

IS Parameters	OMG CORBA Structured Event attribute	Qualifier	Comment
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;
};

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;
};
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,
                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
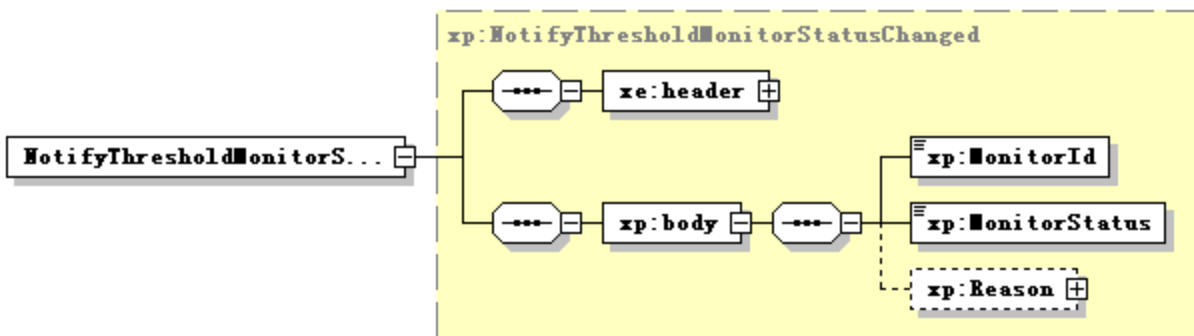
B.3.3 XML Schema "pMIRPNotif.xsd"

```xml
<?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>
```
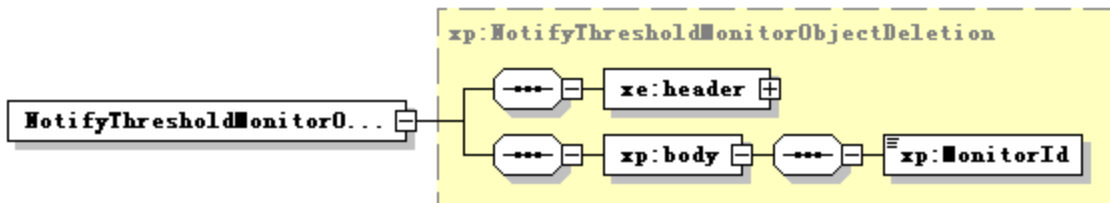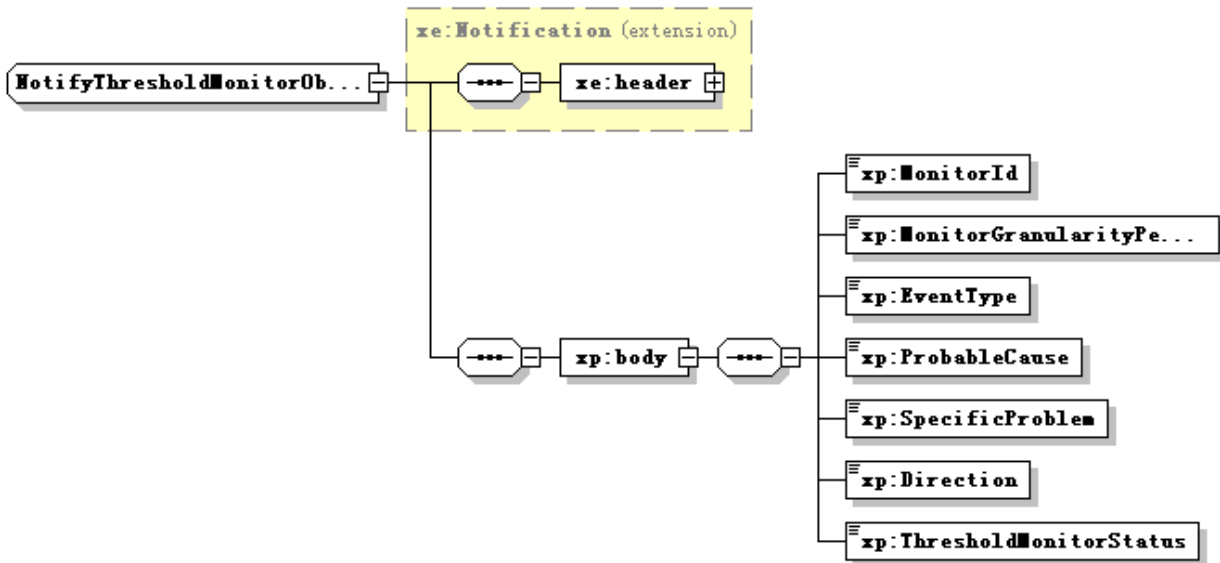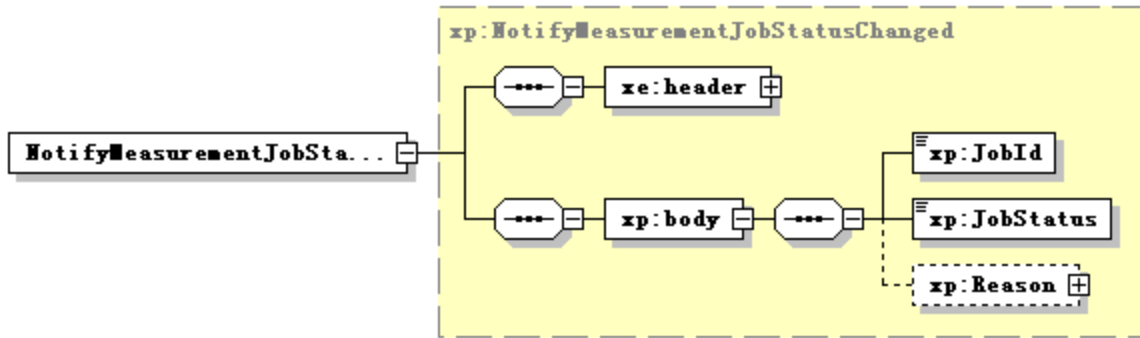
B.3.4   XML Schema "pMIRPIOCs.xsd"

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!--
    3GPP TS 32.415 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>
    <!-- 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"/>
    <!-- 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

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

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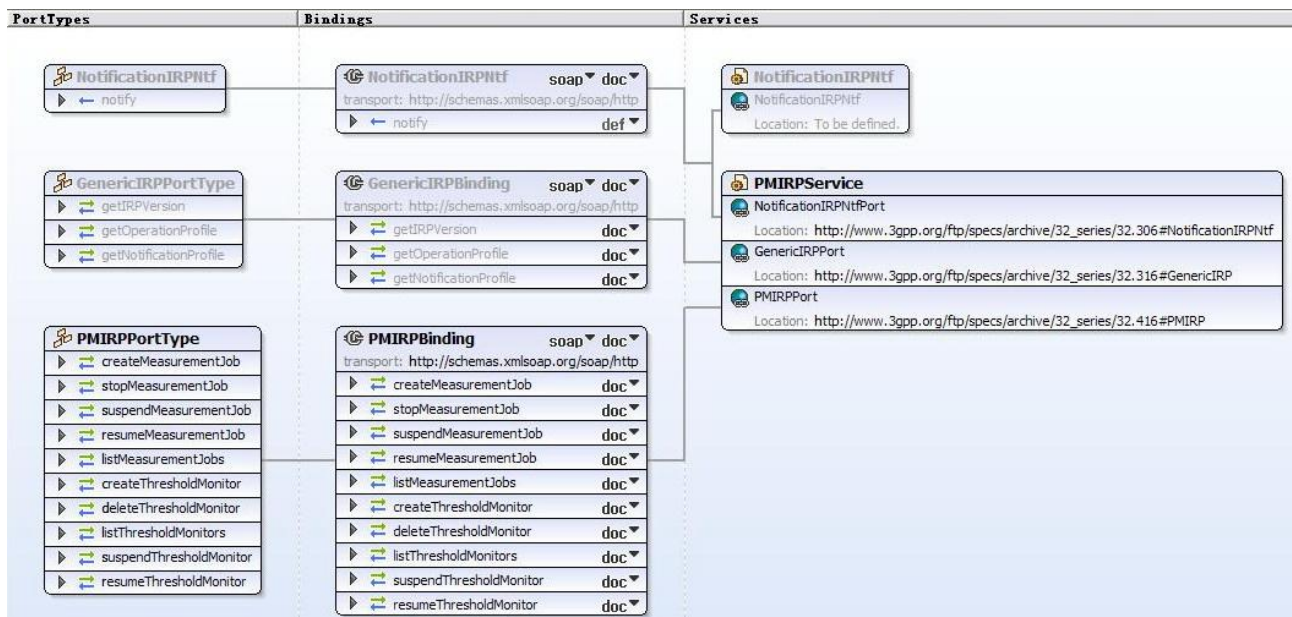
Figure C.3.2: Performance Management IRP SOAP Solution Set WSDL structure

C.3.3 WSDL specification "PMIRPSystem.wsdl"

```xml
<?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#NotificationIRPNtfSyst
em"
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: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"/>
            </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="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"/>
```

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        </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	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2010-09	SA#49	SP-100518	--	--	Presentation to SA for Information and Approval	---	1.0.0
2010-10	--	--	--	--	Publication	1.0.0	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	10.0.0	10.1.0
2012-09	SA-57	-	-	-	Automatic upgrade from previous Release version 10.1.0	10.1.0	11.0.0
2013-06	SA-60	SP-130266	003	-	PM IRP SS Remove iRPId	11.0.0	11.1.0