

3GPP TS 32.126 V11.0.0 (2012-09)

Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Telecommunication management;
Advanced Alarm Management (AAM)
Integration Reference Point (IRP);
Solution Set (SS) definitions
(Release 11)**



The present document has been developed within the 3rd Generation Partnership Project (3GPP™) and may be further elaborated for the purposes of 3GPP.. The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification. Specifications and reports for implementation of the 3GPP™ system should be obtained via the 3GPP Organizational Partners' Publications Offices.

Keywords

Alarm management, CORBA, XML, SOAP

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

Copyright Notification

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

© 2012, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC).
All rights reserved.

UMTS™ is a Trade Mark of ETSI registered for the benefit of its members
3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners
LTE™ is a Trade Mark of ETSI currently being registered for the benefit of its Members and of the 3GPP Organizational Partners
GSM® and the GSM logo are registered and owned by the GSM Association

Contents

Foreword	4
Introduction	4
1 Scope	5
2 References.....	5
3 Definitions and abbreviations	6
3.1 Definitions	6
3.2 Abbreviations.....	7
4 Solution Set definitions	7
Annex A (normative): CORBA Solution Set.....	8
A.1 Architectural features.....	8
A.1.1 Syntax for Distinguished Names	8
A.1.2 Notifications	8
A.2 Mapping	8
A.2.1 General mappings.....	8
A.2.2 Operation and notification mapping	8
A.2.3 Operation parameter mapping	9
A.2.4 Notification parameter mapping	9
A.3 Solution Set definitions	10
A.3.1 IDL definition structure.....	10
A.3.2 IDL specification (file name "AAMConstDefs.idl").....	11
A.3.3 IDL specification (file name "AAMSystem.idl")	13
Annex B (normative): XML definitions.....	15
B.1 Architectural Features	15
B.1.1 Syntax for Distinguished Names	15
B.1.2 Notification Services.....	15
B.1.3 IOC definitions.....	15
B.2 Mapping	15
B.3 Solution Set definitions	15
B.3.1 XML definition structure	15
B.3.2 Graphical Representation.....	16
B.3.3 XML Schema "aamIRPIOCs.xsd"	17
Annex C (normative): SOAP Solution Set.....	19
C.1 Architectural features.....	19
C.1.1 Syntax for Distinguished Names	19
C.1.2 Notification Services.....	19
C.1.3 Supported W3C specifications	19
C.1.4 Prefixes and namespaces.....	19
C.2 Mapping	20
C.2.1 Operation and notification mapping	20
C.2.2 Operation parameter mapping.....	20
C.2.3 Notification parameter mapping	20
C.3 Solution Set definitions	21
C.3.1 WSDL definition structure.....	21
C.3.2 Graphical Representation.....	21
C.3.3 WSDL specification "AAMIRPSystem.wsdl"	22

Annex D (informative):	Change history.....	25
-------------------------------	----------------------------	-----------

Foreword

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

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

Version x.y.z

where:

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

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

- 32.121: Advanced Alarm Management (AAM) Integration Reference Point (IRP): Requirements.
- 32.122: Advanced Alarm Management (AAM) Integration Reference Point (IRP): Information Service (IS).
- 32.126: Advanced Alarm Management (AAM) Integration Reference Point (IRP): Solution Set (SS) definitions.**

The Itf-N interface is built up by a number of IRPs and a related Name Convention, which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in 3GPP TS 32.150 [4].

A single network fault may generate a large number of alarms over space and time. In a large and complex network, simultaneous network faults may occur, causing the network operator to be flooded with high volume of alarms. The high volume of alarms, typically the one received by an IRPManager via the getAlarmList or alarm notifications of Alarm IRP specification, greatly inhibits the operator ability to quickly identify and locate the responsible network faults. Advanced Alarm Management IRP is intended to provide methods to improve this situation.

1 Scope

The present specifies the Solution Set definitions for the IRP whose semantics are specified in the Advanced Alarm Management (AAM) IRP Information Service (3GPP TS 32.122 [6]).

This Solution Set specification is related to TS 32.122 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 TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".
- [3] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [4] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".
- [5] 3GPP TS 32.121: "Telecommunication management; Advanced Alarm Management (AAM) Integration Reference Point (IRP): Requirements".
- [6] 3GPP TS 32.122: "Telecommunication management; Advanced Alarm Management (AAM) Integrations Reference Point (IRP); Information Service (IS)".
- [7] W3C REC-xml-20001006: "Extensible Markup Language (XML) 1.0 (Second Edition)".
- [8] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".
- [9] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".
- [10] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".
- [11] W3C REC-xml-names-19990114: "Namespaces in XML".
- [12] W3C SOAP 1.1 specification (<http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>)
- [13] W3C XPath 1.0 specification (<http://www.w3.org/TR/1999/REC-xpath-19991116>)
- [14] W3C WSDL 1.1 specification (<http://www.w3.org/TR/2001/NOTE-wsdl-20010315>)
- [15] W3C SOAP 1.2 specification (<http://www.w3.org/TR/soap12-part1/>)
- [16] 3GPP TS 32.306: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Solution Set definitions".
- [17] 3GPP TS 32.312: "Telecommunication management; Generic Integration Reference Point (IRP) management; Information Service (IS)"
- [18] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], 3GPP TS 32.101 [2], 3GPP TS 32.102 [3], 3GPP TS 32.150 [4] apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

Alike Alarm: Two alarms are considered alike, if the corresponding alarm notifications are issued by the same object instance with the same alarmType, same perceivedSeverity, same probableCause and same specificProblem (if present).

Lower Edge of Time Window: The point in time which determines the begin of a time span.

Upper Edge of Time Window: The point in time which determines the end of a time span

XML file: file containing an XML document

XML document: composed of the succession of an optional XML declaration followed by a root XML element

NOTE: See [7]; in the scope of the present document.

XML declaration: it specifies the version of XML being used

NOTE: See [7].

XML element: has a type, is identified by a name, may have a set of XML attribute specifications and is either composed of the succession of an XML start-tag followed by the XML content of the XML element followed by an XML end-tag, or composed simply of an XML empty-element tag; each XML element may contain other XML elements

NOTE: See [7].

empty XML element: having an empty XML content; an empty XML element still possibly has a set of XML attribute specifications; an empty XML element is either composed of the succession of an XML start-tag directly followed by an XML end-tag, or composed simply of an XML empty-element tag

NOTE: See [7].

XML content (of an XML element): empty if the XML element is simply composed of an XML empty-element tag; otherwise the part, possibly empty, of the XML element between its XML start-tag and its XML end-tag

XML start-tag: the beginning of a non-empty XML element is marked by an XML start-tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [7].

XML end-tag: the end of a non-empty XML element is marked by an XML end-tag containing the name of the XML element

NOTE: See [7].

XML empty-element tag: composed simply of an empty-element tag containing the name and the set of XML attribute specifications of the XML element.

NOTE: See [7].

XML attribute specification: has a name and a value

NOTE: See [7].

DTD: defines structure and content constraints to be respected by an XML document to be valid with regard to this DTD

NOTE: See [7].

XML schema: more powerful than a DTD, an XML schema defines structure and content constraints to be respected by an XML document to conform with this XML schema; through the use of XML namespaces several XML schemas can be used together by a single XML document; an XML schema is itself also an XML document that shall conform with the XML schema for XML schemas

NOTE: See [8], [9] and [10].

XML namespace: enables qualifying element and attribute names used in XML documents by associating them with namespaces identified by different XML schemas

NOTE: See [11], in the scope of the present document.

XML complex type: defined in an XML schema; cannot be directly used in an XML document; can be the concrete type or the derivation base type for an XML element type or for another XML complex type; ultimately defines constraints for an XML element on its XML attribute specifications and/or its XML content

NOTE: See [8], [9] and [10].

XML element type: declared by an XML schema; can be directly used in an XML document; as the concrete type of an XML element, directly or indirectly defines constraints on its XML attribute specifications and/or its XML content; can also be the concrete type or the derivation base type for another XML element type

NOTE: See [8], [9] and [10].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], in 3GPP TS 32.101 [2], 3GPP TS 32.102 [3], 3GPP TS 32.150 [4], and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

AAM	Advanced Alarm Management
AAMRule	Advanced Alarm Management Rule
CM	Configuration Management
EM	Element Manager
IOC	Information Object Class
IRP	Integration Reference Point
IS	Information Service
Itf-N	Interface N
MIB	Management Information Base
NE	Network Element
XML	eXtensible Markup Language

4 Solution Set definitions

This specification defines the following 3GPP Advance Alarm Management IRP Solution Set definitions:

Annex A provides the CORBA Solution Set.

Annex B provides the XML Definitions.

Annex C provides the SOAP Solution Set.

Annex A (normative): CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in AAM IRP: Information Service (3GPP TS 32.122 [6]).

A.1 Architectural features

The overall architectural feature of Advanced Alarm Management IRP is specified in 3GPP TS 32.122 [6]

A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300[18]

A.1.2 Notifications

Notifications are sent according to the Notification IRP: CORBA SS (see 3GPP TS 32.306 [16]).

Currently there are no AAM IRP notifications defined in 3GPP TS 32.122 [6].

A.2 Mapping

A.2.1 General mappings

Not applicable.

A.2.2 Operation and notification mapping

The AAM IS (3GPP TS 32.122 [6]) defines semantics of operations visible across the Itf-N.

Table A.2.2-1 indicates mapping of these operations and notifications to their equivalents defined in this CORBA SS.

Table A.2.2-1: Mapping from IS Operation to SS equivalents

IS Operation / Notification (3GPP TS 32.122)	SS Method	Qualifier
activateAAMRule	activate_aam_rule	M
getAAMRules	get_aam_rules	M
deactivateAAMRule	deactivate_aam_rule	M

A.2.3 Operation parameter mapping

The AAM IS (3GPP TS 32.122 [6]) defines semantics of parameters carried in operations across the Itf-N. The following tables indicate the mapping of these parameters, as per operation, to their equivalents defined in this CORBA SS.

Table A.2.3-1: Mapping from IS `activate_aam_rule` parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
aam_rule_type	AAMConstDefs::AAMRuleType	M
aam_rule_parameter_list	AAMConstDefs::AAMRuleParameterList	M
filter	AdvancedAlarmManagementConstDefs::FilterType	M
status	Exceptions: AAMConstDefs::ActivateAAMRule, AAMConstDefs::AAMRuleAlreadyActive, GenericIRPManagementSystem::ParameterNotSupported, GenericIRPManagementSystem::InvalidParameter, GenericIRPManagementSystem::ValueNotSupported, GenericIRPManagementSystem::OperationNotSupported	M
aam_rule_identifier	AAMConstDefs::AAMRuleIdentifier	M

Table A.2.3-2: Mapping from IS `get_advanced_alarm_management_rules` parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
aam_rule_list	AAMConstDefs::AAMRuleList	M
Status	Exceptions: AAMConstDefs::GetAAMRules, GenericIRPManagementSystem::ParameterNotSupported, GenericIRPManagementSystem::InvalidParameter, GenericIRPManagementSystem::ValueNotSupported, GenericIRPManagementSystem::OperationNotSupported	M

Table A.2.3-3: Mapping from IS `deactivate_aam_rule` parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
aam_rule_identifier	AAMConstDefs::AAMRuleIdentifier	M
Status	Exceptions: AAMConstDefs::DeactivateAAMRule, AAMConstDefs::SpecifiedRuleNotExisting, GenericIRPManagementSystem::ParameterNotSupported, GenericIRPManagementSystem::InvalidParameter, GenericIRPManagementSystem::ValueNotSupported, GenericIRPManagementSystem::OperationNotSupported	M

A.2.4 Notification parameter mapping

None.

A.3 Solution Set definitions

A.3.1 IDL definition structure

Clause A.3.2 defines the constants and types used by the AAM IRP.

Clause A.3.3 defines the operations which are performed by the AAM IRP agent.

A.3.2 IDL specification (file name "AAMConstDefs.idl")

```
// File: AAMConstDefs.idl
#ifndef _AAM_CONST_DEFS_IDL_
#define _AAM_CONST_DEFS_IDL_

// This statement must appear after all include statements
#pragma prefix "3gppsa5.org"

/* ## Module: AAMConstDefs */

module AAMConstDefs
{

/*****
/* definition of types used in several operations for Advanced Alarm Management */
*****/

enum AAMRuleType {
    THRESHOLD_RULE,
    TRANSIENT_RULE,
    TOGGLE_RULE,
    VENDOR_SPECIFIC_RULE
};

enum Status {SUCCESS, FAILURE, AAM_RULE_ALREADY_ACTIVE };

typedef string AAMRuleIdentifier;

/*****
/* types used in operation activateAAMRule and */
/* types used in operation getAAMRules */
*****/

typedef string FilterType;

typedef string TimeSpan;
typedef string AlarmOccurrenceThreshold;
typedef string SlidingTimeWindow;

struct AAMRuleParameterListForTransientRule
{
    TimeSpan time_span;
};

struct AAMRuleParameterListForThresholdRule
{
    AlarmOccurrenceThreshold alarm_occurrence_threshold;
    SlidingTimeWindow sliding_time_window;
};

struct AAMRuleParameterListForToggleRule
{
    AlarmOccurrenceThreshold alarm_occurrence_threshold;
    SlidingTimeWindow sliding_time_window_toggling_started;
    SlidingTimeWindow sliding_time_window_toggling_settled;
};

typedef string VendorSpecificParameterIdentifier;
typedef string VendorSpecificParameterValue;

struct VendorSpecificParameter
{
    VendorSpecificParameterIdentifier vendor_specific_parameter_identifier;
    VendorSpecificParameterValue vendor_specific_parameter_value;
};

typedef sequence <VendorSpecificParameter> AAMRuleParameterListForVendorSpecificRule;
```

```
/* The AAMRuleParameterList may contain a list of          */
/* AAMParameters with different content depending on the */
/* AAMRuleType. */
union AAMRuleParameterList switch (AAMRuleType)
{
    case THRESHOLD_RULE: AAMRuleParameterListForTransientRule
                        aam_rule_parameter_list_for_transient_rule;
    case TRANSIENT_RULE: AAMRuleParameterListForThresholdRule
                        aam_rule_parameter_list_for_threshold_rule;
    case TOGGLE_RULE: AAMRuleParameterListForToggleRule
                     aam_rule_parameter_list_for_toggle_rule;
    case VENDOR_SPECIFIC_RULE: AAMRuleParameterListForVendorSpecificRule
                              aam_rule_parameter_list_for_vendor_specificRule;
};

struct AAMRule
{
    AAMRuleIdentifier aam_rule_identifier;
    AAMRuleType aam_rule_type;
    AAMRuleParameterList aam_rule_parameter_list;
    FilterType filter;
};

typedef sequence <AAMRule> AAMRuleList;

/*****
/* types used in operation deactivateAAMRule only */
*****/

/* none */

};

#endif // _AAM_CONST_DEFS_IDL_
```

A.3.3 IDL specification (file name "AAMSystem.idl")

```

//File: AAMSystem.idl
#ifndef _AAM_SYSTEM_IDL_
#define _AAM_SYSTEM_IDL_

#include <AAMConstDefs.idl>
#include <GenericIRPManagementSystem.idl>

// This statement must appear after all include statements
#pragma prefix "3gppsa5.org"

/* ## Module: AAMSystem */

module AdvancedAlarmManagementIRPOperation_1
{

    /*
    If the system fails to complete an operation, then it can provide a reason
    to qualify the exception. The semantics carried in this reason are outside
    the scope of the present document.
    */

    exception ActivateAAMRule { string reason; };
    exception AAMRuleAlreadyActive { string reason; };
    exception GetAAMRules { string reason; };
    exception DeactivateAAMRule { string reason; };
    exception SpecifiedRuleNotExisting { string reason; };

    interface AdvancedAlarmManagement
    {

        AAMConstDefs::Status activate_aam_rule
        /* for the purpose of this operation see 3GPP TS 32.322 */
        (
            in AAMConstDefs::AAMRuleType
                aam_rule_type,
            in AAMConstDefs::AAMRuleParameterList
                aam_rule_parameter_list,
            in AAMConstDefs::FilterType filter,
            out AAMConstDefs::AAMRuleIdentifier
                aam_rule_identifier
        )
        raises
        (
            ActivateAAMRule,
            AAMRuleAlreadyActive,
            GenericIRPManagementSystem::ParameterNotSupported,
            GenericIRPManagementSystem::InvalidParameter,
            GenericIRPManagementSystem::ValueNotSupported,
            GenericIRPManagementSystem::OperationNotSupported
        );

        AAMConstDefs::Status get_aam_rules
        /* for the purpose of this operation see 3GPP TS 32.322 */
        (
            out AAMConstDefs::AAMRuleList
                aam_rule_list
        )
        raises
        (
            GetAAMRules,
            GenericIRPManagementSystem::ParameterNotSupported,
            GenericIRPManagementSystem::InvalidParameter,
            GenericIRPManagementSystem::ValueNotSupported,
            GenericIRPManagementSystem::OperationNotSupported
        );

        AAMConstDefs::Status deactivate_aam_rule
        /* for the purpose of this operation see 3GPP TS 32.322 */
        (
            in AAMConstDefs::AAMRuleIdentifier
                aam_rule_identifier
        )
    }
}

```

```
    raises
    (
        DeactivateAAMRule,
        SpecifiedRuleNotExisting,
        GenericIRPManagementSystem::ParameterNotSupported,
        GenericIRPManagementSystem::InvalidParameter,
        GenericIRPManagementSystem::ValueNotSupported,
        GenericIRPManagementSystem::OperationNotSupported
    );

};

};
#endif // _AAM_SYSTEM_IDL_
```

Annex B (normative): XML definitions

This annex contains the XML Definitions for the Advance Alarm Management Integration Reference Point (AAM IRP) as it applies to Itf-N, in accordance with AAM IRP IS definitions [6]

B.1 Architectural Features

The overall architectural feature of AAM IRP is specified in 3G TS 32.122 [6]. This clause specifies features that are specific to the XML definitions.

B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300[18].

B.1.2 Notification Services

Currently there are no AAM IRP notifications defined in 3GPP TS 32.122 [6].

B.1.3 IOC definitions

This annex defines the XML syntax for the IOC definitions of the AAM IRP IS [6], which are used by the XML definitions for the AAM IRP notifications and the AAM IRP IS operations.

B.2 Mapping

Not present in the current version of this specification.

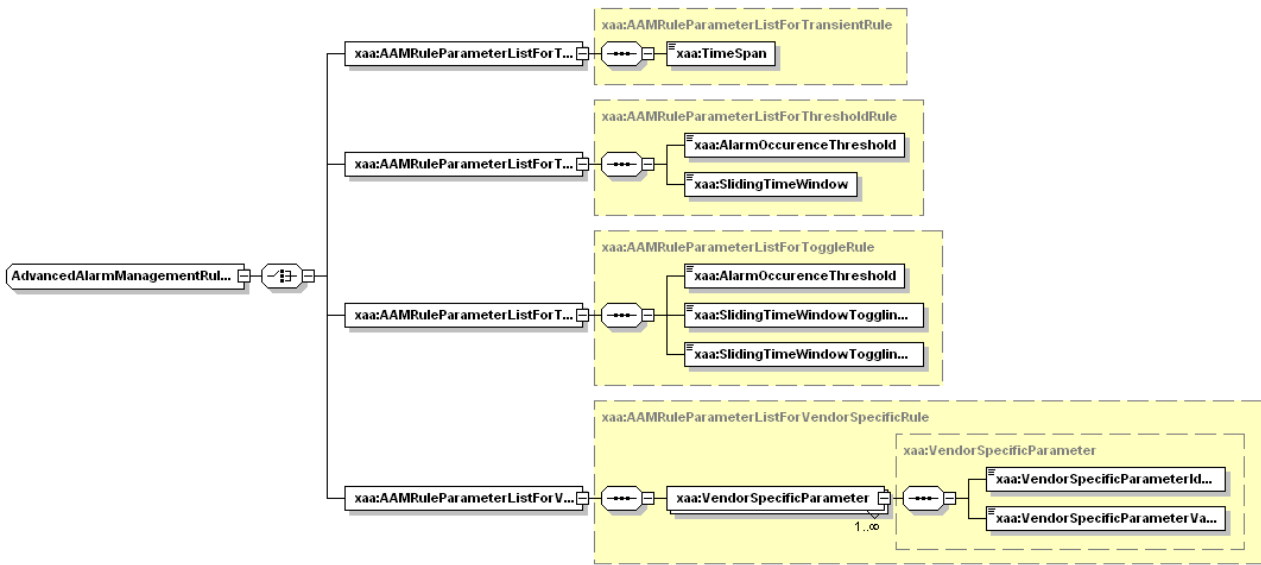
B.3 Solution Set definitions

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 AAM IOC as defined in [6].

B.3.2 Graphical Representation



B.3.3 XML Schema “aamIRPIOCs.xsd”

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
 3GPP TS 32.126 AAMIRP IOC XML Schema
 aamIRPIOCs.xsd
-->
<schema xmlns:xaa="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#aamIRPIOCs"
 xmlns="http://www.w3.org/2001/XMLSchema"
 targetNamespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#aamIRPIOCs"
 elementFormDefault="qualified" attributeFormDefault="unqualified">
  <simpleType name="AdvancedAlarmManagementRuleIdentifier">
    <restriction base="string">
      <length value="64"/>
    </restriction>
  </simpleType>
  <simpleType name="AdvancedAlarmManagementRuleType">
    <restriction base="string">
      <enumeration value="THRESHOLD_RULE"/>
      <enumeration value="TRANSIENT_RULE"/>
      <enumeration value="TOGGLE_RULE"/>
      <enumeration value="VENDOR_SPECIFIC_RULE"/>
    </restriction>
  </simpleType>
  <simpleType name="TimeSpan">
    <restriction base="string">
      <length value="3"/>
    </restriction>
  </simpleType>
  <complexType name="AAMRuleParameterListForTransientRule">
    <sequence>
      <element name="TimeSpan" type="xaa:TimeSpan"/>
    </sequence>
  </complexType>
  <simpleType name="AlarmOccurenceThreshold">
    <restriction base="string">
      <length value="3"/>
    </restriction>
  </simpleType>
  <simpleType name="SlidingTimeWindow">
    <restriction base="string">
      <length value="3"/>
    </restriction>
  </simpleType>
  <complexType name="AAMRuleParameterListForThresholdRule">
    <sequence>
      <element name="AlarmOccurenceThreshold" type="xaa:AlarmOccurenceThreshold"/>
      <element name="SlidingTimeWindow" type="xaa:SlidingTimeWindow"/>
    </sequence>
  </complexType>
  <complexType name="AAMRuleParameterListForToggleRule">
    <sequence>
      <element name="AlarmOccurenceThreshold" type="xaa:AlarmOccurenceThreshold"/>
      <element name="SlidingTimeWindowTogglingStarted" type="xaa:SlidingTimeWindow"/>
      <element name="SlidingTimeWindowTogglingSettled" type="xaa:SlidingTimeWindow"/>
    </sequence>
  </complexType>
  <simpleType name="VendorSpecificParameterIdentifier">
    <restriction base="string">
      <length value="64"/>
    </restriction>
  </simpleType>
  <simpleType name="VendorSpecificParameterValue">
    <restriction base="string">
      <length value="64"/>
    </restriction>
  </simpleType>
  <complexType name="VendorSpecificParameter">
    <sequence>
      <element name="VendorSpecificParameterIdentifier"
 type="xaa:VendorSpecificParameterIdentifier"/>
      <element name="VendorSpecificParameterValue" type="xaa:VendorSpecificParameterValue"/>
    </sequence>
  </complexType>
  <complexType name="AAMRuleParameterListForVendorSpecificRule">
    <sequence>

```

```
        <element name="VendorSpecificParameter" type="xaa:VendorSpecificParameter"
maxOccurs="unbounded"/>
      </sequence>
    </complexType>
    <complexType name="AdvancedAlarmManagementRuleParameterList">
      <choice>
        <element name="AAMRuleParameterListForTransientRule"
type="xaa:AAMRuleParameterListForTransientRule"/>
        <element name="AAMRuleParameterListForThresholdRule"
type="xaa:AAMRuleParameterListForThresholdRule"/>
        <element name="AAMRuleParameterListForToggleRule"
type="xaa:AAMRuleParameterListForToggleRule"/>
        <element name="AAMRuleParameterListForVendorSpecificRule"
type="xaa:AAMRuleParameterListForVendorSpecificRule"/>
      </choice>
    </complexType>
    <simpleType name="Filter">
      <restriction base="string">
        <length value="256"/>
      </restriction>
    </simpleType>
    <!-- Attributes of the advancedAlarmManagementRule IOC -->
    <element name="advancedAlarmManagementRuleIdentifier"
type="xaa:AdvancedAlarmManagementRuleIdentifier"/>
    <element name="advancedAlarmManagementRuleType" type="xaa:AdvancedAlarmManagementRuleType"/>
    <element name="advancedAlarmManagementRuleParameterList"
type="xaa:AdvancedAlarmManagementRuleParameterList"/>
    <element name="filter" type="xaa:Filter"/>
  </schema>
```

Annex C (normative): SOAP Solution Set

This annex specifies the SOAP Solution Set for the IRP whose semantics are specified in AAM IRP: Information Service (3GPP TS 32.122 [6]).

C.1 Architectural features

The overall architectural feature of the AAM IRP is specified in 3GPP TS 32.122 [6]. This clause specifies features that are specific to the SOAP Solution Set.

C.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300[18].

C.1.2 Notification Services

Currently there are no AAM IRP notifications defined in 3GPP TS 32.122 [6].

C.1.3 Supported W3C specifications

The overall architectural feature of the Advanced Alarm Management IRP is specified in 3GPP TS 32.122 [6]. This clause specifies features that are specific to the SOAP solution set.

The SOAP 1.1 specification [12] and WSDL 1.1 specification [14] are supported.

The SOAP 1.2 specification [15] 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 [13]). IRP Agents may throw a FilterComplexityLimit fault when a given filter is too complex.

C.1.4 Prefixes and namespaces

This specification uses a number of namespace prefixes throughout that are listed in Table C.1.4.

Table C.1.4: Prefixes and Namespaces used in this specification

PREFIX	NAMESPACE
(no prefix)	http://schemas.xmlsoap.org/wsdl/
soap	http://schemas.xmlsoap.org/wsdl/soap/
aamIRPSystem	http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRPSystem
aamIRPData	http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRPData
aam	http://www.3gpp.org/ftp/specs/archive/32_series/32.126#aamIRP
xn	http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNm
genericIRPSystem	http://www.3gpp.org/ftp/specs/archive/32_series/32.316#GenericIRPSystem
ntfIRPntfSystem	http://www.3gpp.org/ftp/specs/archive/32_series/32.306#NotificationIRPntfSystem

C.2 Mapping

C.2.1 Operation and notification mapping

The Advanced Alarm Management IRP IS (3GPP TS 32.122 [6]) defines semantics of operation and notification visible across the Itf-N. Table C.2.1 indicates mapping of these operations and notifications to their equivalents defined in this SS.

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

IS Operations in 3GPP TS 32.122 [6]	SS Operations	Qualifier
activateAAMRule	activateAAMRule	M
getAAMRules	getAAMRules	M
deactivateAAMRule	deactivateAAMRule	M
getIRPVersion (note 1)	getIRPVersion	M
getOperationProfile (note 1)	getOperationProfile	O
getNotificationProfile (note 1)	getNotificationProfile	O
NOTE 1: These 3 operations are operations of ManagedGenericIRP IOC specified in 3GPP TS 32.312 [17]. The AdvancedAlarmManagementIRP IOC of 3GPP TS 32.122 [6] inherits from it.		

C.2.2 Operation parameter mapping

The Advanced Alarm Management IRP IS (3GPP TS 32.122 [6]) 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.

Table C.2.2.1: Mapping from IS activateAAMRule parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
aAMRuleType	aAMRuleType	M
aAMRuleParameterList	aAMRuleParameterList	M
filter	filter	M
aAMRuleIdentifier	aAMRuleIdentifier	M
status	status	M

Table C.2.2.2: Mapping from IS getAAMRules parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
aAMRuleList	aAMRuleList	M
status	status	M

Table C.2.2.3: Mapping from IS deactivateAAMRule parameters to SS equivalents

IS Operation parameter	SS Method parameter	Qualifier
advancedAlarmManagementRuleIdentifier	advancedAlarmManagementRuleIdentifier	M
status	status	M

C.2.3 Notification parameter mapping

The Advance Alarm Management IRP IS (3GPP TS 32.122 [6]) does not currently define any notifications.

C.3 Solution Set definitions

C.3.1 WSDL definition structure

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

Clause C.3.3 defines the services which are supported the AAM 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.

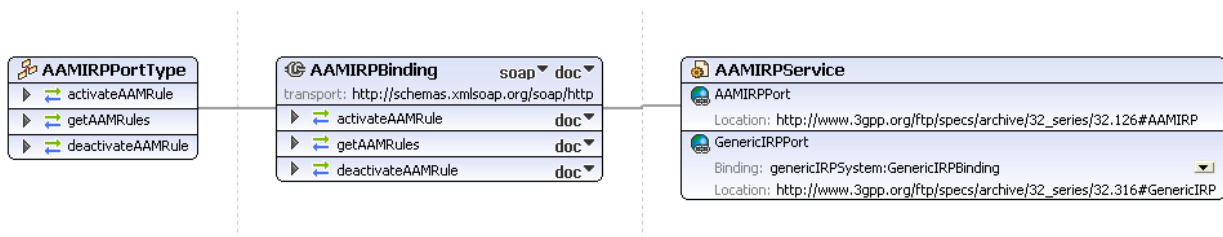


Figure C.3.2: Advance Alarm IRP SOAP Solution Set WSDL structure

C.3.3 WSDL specification "AAMIRPSystem.wsdl"

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
  3GPP TS 32.126 Advanced Alarm Management (AAM) IRP SOAP Solution Set
-->
<definitions xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:aamIRPSystem="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRPSystem"
  xmlns:aamIRPData="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRPData"
  xmlns:xaa="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#aamIRPIOCs"
  xmlns:genericIRPSystem="http://www.3gpp.org/ftp/specs/archive/32_series/32.316#GenericIRPSystem"
  targetNamespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRPSystem">
<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/32.126#AAMIRPData"
      xmlns="http://www.w3.org/2001/XMLSchema">
      <import namespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#aamIRPIOCs"/>
      <!-- The following types are defined for the AAM IRP operations -->
      <complexType name="AdvancedAlarmRule">
        <sequence>
          <element name="AdvancedAlarmRuleIdentifier"
            type="xaa:AdvancedAlarmManagementRuleIdentifier"/>
          <element name="AdvancedAlarmRuleType" type="xaa:AdvancedAlarmManagementRuleType"/>
          <element name="AdvancedAlarmManagementRuleParameterList"
            type="xaa:AdvancedAlarmManagementRuleParameterList"/>
          <element name="Filter" type="xaa:Filter"/>
        </sequence>
      </complexType>
      <complexType name="AdvancedAlarmRuleList">
        <sequence>
          <element name="AdvancedAlarmRule" type="aamIRPData:AdvancedAlarmRule"
            maxOccurs="unbounded"/>
        </sequence>
      </complexType>
      <simpleType name="Status">
        <restriction base="string">
          <enumeration value="Success"/>
          <enumeration value="AAMRuleAlreadyActive"/>
          <enumeration value="SpecifiedRuleNotExisting"/>
          <enumeration value="Failure"/>
        </restriction>
      </simpleType>
      <!-- activateAAMRule Request-->
      <element name="activateAAMRule">
        <complexType>
          <sequence>
            <element name="advancedAlarmManagementRuleType"
              type="xaa:AdvancedAlarmManagementRuleType"/>
            <element name="advancedAlarmManagementRuleParameterList"
              type="xaa:AdvancedAlarmManagementRuleParameterList"/>
            <element name="filter" type="xaa:Filter"/>
          </sequence>
        </complexType>
      </element>
      <!-- activateAAMRule Response -->
      <element name="activateAAMRuleResponse">
        <complexType>
          <sequence>
            <element name="advancedAlarmManagementRuleIdentifier"
              type="xaa:AdvancedAlarmManagementRuleIdentifier"/>
            <element name="status" type="aamIRPData:Status"/>
          </sequence>
        </complexType>
      </element>
      <!-- activateAAMRule Fault -->
      <element name="activateAAMRuleFault">
        <simpleType>
          <restriction base="string">
            <enumeration value="OPERATION_FAILED"/>
          </restriction>
        </simpleType>
      </element>
      <!-- getAAMRules Request-->
      <element name="getAAMRules">
        <!-- no input parameter -->

```

```

    <complexType>
      <sequence>
        <element name="dummy" type="string" minOccurs="0"/>
      </sequence>
    </complexType>
  </element>
  <!-- getAAMRules Response -->
  <element name="getAAMRulesResponse">
    <complexType>
      <sequence>
        <element name="advancedAlarmRuleList" type="aamIRPData:AdvancedAlarmRuleList"/>
        <element name="status" type="aamIRPData:Status"/>
      </sequence>
    </complexType>
  </element>
  <!-- getAAMRules Fault -->
  <element name="getAAMRulesFault">
    <simpleType>
      <restriction base="string">
        <enumeration value="OPERATION_FAILED"/>
      </restriction>
    </simpleType>
  </element>
  <!-- deactivateAAMRule Request-->
  <element name="deactivateAAMRule">
    <complexType>
      <sequence>
        <element name="advancedAlarmManagementRuleIdentifier"
type="xaa:AdvancedAlarmManagementRuleIdentifier"/>
      </sequence>
    </complexType>
  </element>
  <!-- deactivateAAMRule Response -->
  <element name="deactivateAAMRuleResponse">
    <complexType>
      <sequence>
        <element name="status" type="aamIRPData:Status"/>
      </sequence>
    </complexType>
  </element>
  <!-- deactivateAAMRule Fault -->
  <element name="deactivateAAMRuleFault">
    <simpleType>
      <restriction base="string">
        <enumeration value="OPERATION_FAILED"/>
      </restriction>
    </simpleType>
  </element>
</schema>
</types>
<message name="activateAAMRule">
  <part name="parameter" element="aamIRPData:activateAAMRule"/>
</message>
<message name="activateAAMRuleResponse">
  <part name="parameter" element="aamIRPData:activateAAMRuleResponse"/>
</message>
<message name="activateAAMRuleFault">
  <part name="parameter" element="aamIRPData:activateAAMRuleFault"/>
</message>
<message name="getAAMRules">
  <part name="parameter" element="aamIRPData:getAAMRules"/>
</message>
<message name="getAAMRulesResponse">
  <part name="parameter" element="aamIRPData:getAAMRulesResponse"/>
</message>
<message name="getAAMRulesFault">
  <part name="parameter" element="aamIRPData:getAAMRulesFault"/>
</message>
<message name="deactivateAAMRule">
  <part name="parameter" element="aamIRPData:deactivateAAMRule"/>
</message>
<message name="deactivateAAMRuleResponse">
  <part name="parameter" element="aamIRPData:deactivateAAMRuleResponse"/>
</message>
<message name="deactivateAAMRuleFault">
  <part name="parameter" element="aamIRPData:deactivateAAMRule"/>
</message>
<portType name="AAMIRPPortType">

```

```

    <operation name="activateAAMRule">
      <input message="aamIRPSystem:activateAAMRule"/>
      <output message="aamIRPSystem:activateAAMRuleResponse"/>
      <fault name="activateAAMRuleFault" message="aamIRPSystem:activateAAMRuleFault"/>
    </operation>
    <operation name="getAAMRules">
      <input message="aamIRPSystem:getAAMRules"/>
      <output message="aamIRPSystem:getAAMRulesResponse"/>
      <fault name="getAAMRulesFault" message="aamIRPSystem:getAAMRulesFault"/>
    </operation>
    <operation name="deactivateAAMRule">
      <input message="aamIRPSystem:deactivateAAMRule"/>
      <output message="aamIRPSystem:deactivateAAMRuleResponse"/>
      <fault name="deactivateAAMRuleFault" message="aamIRPSystem:deactivateAAMRuleFault"/>
    </operation>
  </portType>
  <binding name="AAMIRPBinding" type="aamIRPSystem:AAMIRPPortType">
    <soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
    <operation name="activateAAMRule">
      <soap:operation
soapAction="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#activateAAMRule"
style="document"/>
      <input>
        <soap:body use="literal"/>
      </input>
      <output>
        <soap:body use="literal"/>
      </output>
      <fault name="activateAAMRuleFault">
        <soap:fault name="activateAAMRuleFault" use="literal"/>
      </fault>
    </operation>
    <operation name="getAAMRules">
      <soap:operation
soapAction="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#getAAMRules" style="document"/>
      <input>
        <soap:body use="literal"/>
      </input>
      <output>
        <soap:body use="literal"/>
      </output>
      <fault name="getAAMRulesFault">
        <soap:fault name="getAAMRulesFault" use="literal"/>
      </fault>
    </operation>
    <operation name="deactivateAAMRule">
      <soap:operation
soapAction="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#deactivateAAMRule"
style="document"/>
      <input>
        <soap:body use="literal"/>
      </input>
      <output>
        <soap:body use="literal"/>
      </output>
      <fault name="deactivateAAMRuleFault">
        <soap:fault name="deactivateAAMRuleFault" use="literal"/>
      </fault>
    </operation>
  </binding>
  <service name="AAMIRPService">
    <port name="AAMIRPPort" binding="aamIRPSystem:AAMIRPBinding">
      <soap:address location="http://www.3gpp.org/ftp/specs/archive/32_series/32.126#AAMIRP"/>
    </port>
    <port name="GenericIRPPort" binding="genericIRPSystem:GenericIRPBinding">
      <soap:address
location="http://www.3gpp.org/ftp/specs/archive/32_series/32.316#GenericIRP"/>
    </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-100505	--	--	Presentation to SA for Information and Approval	---	1.0.0
2010-10	--	--	--	--	Publication	1.0.0	10.0.0
2011-06	SA#52	SP-110291	001	--	Correct syntax errors in AAM IRP schema and wsdI	10.0.0	10.1.0
09-2012	SA#57	-	-	-	Automatic upgrade from previous Release version 10.1.0	10.1.0	11.0.0