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**Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
State management data definition
Integration Reference Point (IRP);
Solution Set (SS) definitions
(3GPP TS 28.626 version 13.1.0 Release 13)**



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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:

- 28.624 State Management Data Definition Integration Reference Point (IRP); Requirements.
- 28.625 State Management Data Definition Integration Reference Point (IRP); Information Service (IS).
- 28.626 State Management Data Definition Integration Reference Point (IRP); Solution Set (SS) definitions.**

1 Scope

The present document specifies the Solution Set (SS) definitions for the IRP whose semantics is specified in State Management Data Definition IRP: Information Service (IS) (3GPP TS 28.625 [2]).

This Solution Set definitions specification is related to 3GPP TS 28.625 V13.0.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.
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- [1] 3GPP TS 28.623: "Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".
- [2] 3GPP TS 28.625: "Telecommunication management; State Management Data Definition Integration Reference Point (IRP): Information Service (IS)".
- [3] ITU-T Recommendation X.721: "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- [4] ITU-T Recommendation M.3100: "Generic network information model".
- [5] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Information Service (IS)".
- [6] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".
- [7] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".
- [8] Void.
- [9] W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures..
- [10] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes.
- [11] W3C REC-xml-names-20060816: "Namespaces in XML 1.1 (Second Edition)".
- [12] ITU-T Recommendation X.721: "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- [13] 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 defined in 3GPP TS 32.672 [2] apply, and the following XML terms and definitions apply:

XML file: See definition of [1].

XML document: See definition of [1].

XML declaration: See definition of [1].

XML element: See definition of [1].

empty XML element: See definition of [1].

XML content (of an XML element): See definition of [1].

XML start-tag: See definition of [1].

XML end-tag: See definition of [1].

XML empty-element tag: See definition of [1].

XML attribute specification: See definition of [1].

DTD: See definition of [1].

XML schema: See definition of [1].

XML namespace: See definition of [1].

XML complex type: See definition of [1].

XML element type: See definition of [1].

3.2 Abbreviations

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

| | |
|-------|--|
| CM | Configuration Management |
| CORBA | Common Object Request Broker Architecture |
| DTD | Document Type Definition |
| EDGE | Enhanced Data for GSM Evolution |
| GERAN | GSM/EDGE Radio Access Network |
| GSM | Global System for Mobile communication |
| IDL | Interface Definition Language |
| IOC | Information Object Class |
| IRP | Integration Reference Point |
| IS | Information Service |
| NE | Network Element |
| NRM | Network Resource Model |
| OMG | Object Management Group |
| SS | Solution Set |
| UMTS | Universal Mobile Telecommunications System |
| UTRAN | Universal Terrestrial Radio Access Network |
| XML | eXtensible Markup Language |

4 Solution Set definitions

This specification defines the following 3GPP State Management Data Definition IRP Solution Set definitions:

- 3GPP State Management Data Definition IRP CORBA SS (Annex A)
- 3GPP State Management Data Definition IRP XML definitions (Annex B)

Annex A (normative): CORBA Solution Set

A.1 Architectural Features

The overall architectural feature of State Management Data Definition IRP is specified in 3GPP TS 28.625 [2].

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 [13].

A.2 Mapping

A.2.1 General mapping

None.

A.2.2 Information Object Class (IOC) mapping

Table 1 provides the mapping of the information object classes defined in the IS of the State Management IRP [2] to the equivalent of this CORBA Solution Set.

Table 1: Mapping of IOCs

| IOCs defined in State Management Data Definition IRP IS [2] | CORBA SS Method |
|---|---|
| StateManagementEntity | No mapping applicable for this <<Archetype>> class. |

Table 2: Mapping of Attributes

| Attributes defined in State Management Data Definition IRP IS [2] | CORBA SS Method attributes | Qualifier |
|---|---|-----------|
| operationalState | OperationalState (ITU-T Recommendation X.721 [3]) | M |
| operationalState | OperationalStateTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| usageState | UsageState (ITU-T Recommendation X.721 [3]) | M |
| usageState | UsageStateTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| administrativeState | AdministrativeState (ITU-T Recommendation X.721 [3]) | M |
| administrativeState | AdministrativeStateTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| alarmStatus | AlarmStatus (ITU-T Recommendation M.3100 [4]) | M |
| alarmStatus | AlarmStatusTypeOpt (ITU-T Recommendation M.3100 [4]) | O |
| proceduralStatus | ProceduralStatus (ITU-T Recommendation X.721 [3]) | M |
| proceduralStatus | ProceduralStatusTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| availabilityStatus | AvailabilityStatus (ITU-T Recommendation X.721 [3]) | M |
| availabilityStatus | AvailabilityStatusTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| controlStatus | ControlStatus (ITU-T Recommendation X.721 [3]) | M |
| controlStatus | ControlStatusTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| standbyStatus | StandbyStatus (ITU-T Recommendation X.721 [3]) | M |
| standbyStatus | StandbyStatusTypeOpt (ITU-T Recommendation X.721 [3]) | O |
| unknownStatus | UnknownStatus (ITU-T Recommendation X.721 [3]) | M |
| unknownStatus | UnknownStatusTypeOpt (ITU-T Recommendation X.721 [3]) | O |

A.3 Solution Set definitions

A.3.1 IDL definition structure

Clause A.3.2 contains const definitions for State Management Data Definition IRP.

Clause A.3.3 contains commonly used optional definitions for State Management Data Definition IRP.

Clause A.3.4 contains commonly used definitions for State Management Data Definition IRP.

A.3.2 IDL specification "StateManagementIRPConstDefs.idl"

```
//File:- StateManagementIRPConstDefs.idl
#ifndef _STATE_MANAGEMENT_IRP_CONST_DEFS_IDL_
#define _STATE_MANAGEMENT_IRP_CONST_DEFS_IDL_

#include "CosNotification.idl"
#include "ManagedGenericIRPConstDefs.idl"
#include <StateManagementIRPCommonConstDefs.idl>
#include <StateManagementIRPOptConstDefs.idl>

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

/* ## Module: StateManagementIRPConstDefs
This module contains commonly used definitions for State Management IRP
=====
*/
module StateManagementIRPConstDefs
{
/*
Constant definitions for state management notifications uses when populating the
Cos::Structured event.
The "name" party of the structured event carries the following constant definitions
appropriate to the state being notified.
Refer to TS 32.666 regarding how to populate the structured event
*/
interface AttributeNameValue {
const string OPERATIONAL_STATE = "operationalState";
const string USAGE_STATE = "usageState";
const string ADMINISTRATIVE_STATE = "administrativeState";
const string ALARM_STATUS = "alarmStatus";
const string PROCEDURAL_STATUS = "proceduralStatus";
const string AVAILABILITY_STATUS = "availabilityStatus";
const string CONTROL_STATUS = "controlStatus";
const string STANDBY_STATUS = "standbyStatus";
const string UNKNOWN_STATUS = "unknownStatus";
};

/*
The following structures provide the new state value,
and the optional old state value
The structures are passed in the value part of the cos structured event
*/
struct OperationalStateOldNewValue{
StateManagementIRPCommonConstDefs::OperationalState new;
StateManagementIRPOptConstDefs::OperationalStateTypeOpt old;
};

struct UsageStateOldNewValue{
StateManagementIRPCommonConstDefs::UsageState new;
StateManagementIRPOptConstDefs::UsageStateTypeOpt old;
};

struct AdministrativeStateOldNewValue{
StateManagementIRPCommonConstDefs::AdministrativeState new;
StateManagementIRPOptConstDefs::AdministrativeStateTypeOpt old;
};

struct AlarmStatusOldNewValue{
StateManagementIRPCommonConstDefs::AlarmStatus new;
StateManagementIRPOptConstDefs::AlarmStatusTypeOpt old;
};

struct ProceduralStatusOldNewValue{
StateManagementIRPCommonConstDefs::ProceduralStatusValues new;
StateManagementIRPOptConstDefs::ProceduralStatusTypeOpt old;
};

struct AvailabilityStatusOldNewValue{
```

```
    StateManagementIRPCommonConstDefs::AvailabilityStatusValues new;  
    StateManagementIRPOptConstDefs:: AvailabilityStatusTypeOpt old;  
};  
  
struct ControlStatusOldNewValue{  
    StateManagementIRPCommonConstDefs::ControlStatusValues new;  
    StateManagementIRPOptConstDefs::ControlStatusTypeOpt old;  
};  
  
struct StandbyStatusOldNewValue{  
    StateManagementIRPCommonConstDefs::StandbyStatus new;  
    StateManagementIRPOptConstDefs::StandbyStatusTypeOpt old;  
};  
  
struct UnknownStatusOldNewValue{  
    StateManagementIRPCommonConstDefs::UnknownStatus new;  
    StateManagementIRPOptConstDefs::UnknownStatusTypeOpt old;  
};  
  
};  
#endif // _STATE_MANAGEMENT_IRP_CONST_DEFS_IDL_
```

A.3.3 IDL specification “StateManagementIRPOptConstDefs.idl”

```
//File:-StateManagementIRPOptConstDefs.idl
#ifndef _STATE_MANAGEMENT_IRP_OPT_CONST_DEFS_IDL_
#define _STATE_MANAGEMENT_IRP_OPT_CONST_DEFS_IDL_

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

/* ## Module: StateManagementIRPOptConstDefs
This module contains commonly used optional definitions for State Management IRP
=====
*/
module StateManagementIRPOptConstDefs
{

    /*
    Definition of Operational State based on X.721 [3], if optional.
    */
    union OperationalStateTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::OperationalState operational_state;
    };

    /*
    Definition of Usage State based on X.721 [3], if optional.
    */
    union UsageStateTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::UsageState usage_state;
    };

    /*
    Definition of Administrative State based on X.721 [3], if optional.
    */
    union AdministrativeStateTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::AdministrativeState administrative_state;
    };

    /*
    Definition of Alarm Status based on M.3100 [4], if optional.
    */
    union AlarmStatusTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::AlarmStatus alarm_status;
    };

    /*
    Definition of Procedural Status based on X.721 [3], if optional.
    */
    union ProceduralStatusTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::ProceduralStatus procedural_status;
    };

    /*
    Definition of Availability Status based on X.721 [3], if optional.
    */
    union AvailabilityStatusTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::AvailabilityStatus availability_status;
    };

    /*
    Definition of Control Status based on X.721 [3], if optional.
    */
    union ControlStatusTypeOpt switch(boolean)
    {
        case TRUE: StateManagementIRPCommonConstDefs::ControlStatus control_status;
    };

    /*
    Definition of Standby Status based on X.721 [3], if optional.

```

```
*/
union StandbyStatusTypeOpt switch(boolean)
{
    case TRUE: StateManagementIRPCommonConstDefs::StandbyStatus standby_status;
};

/*
Definition of Unknown Status based on X.721 [3], if optional.
*/
union UnknownStatusTypeOpt switch(boolean)
{
    case TRUE: StateManagementIRPCommonConstDefs::UnknownStatus unknown_status;
};

};
#endif // _STATE_MANAGEMENT_IRP_OPT_CONST_DEFS_IDL_
```

A.3.4 IDL specification

“StateManagementIRPCommonConstDefs.idl”

```
//File: StateManagementIRPCommonConstDefs.idl
#ifndef _STATE_MANAGEMENT_IRP_COMMON_CONST_DEFS_IDL_
#define _STATE_MANAGEMENT_IRP_COMMON_CONST_DEFS_IDL_

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

/* Module: StateManagementIRPCommonConstDefs
This module contains commonly used definitions for State Management IRP
=====
*/
module StateManagementIRPCommonConstDefs
{
    /*
    Definition of Operational State based on X.721 [3], if mandatory.
    */
    enum OperationalState
    {
        Disabled, Enabled
    };

    /*
    Definition of Usage State based on X.721 [3], if mandatory.
    */
    enum UsageState
    {
        Idle, Active, Busy
    };

    /*
    Definition of Administrative State based on X.721 [3], if mandatory.
    */
    enum AdministrativeState
    {
        Locked, Unlocked, ShuttingDown
    };

    /*
    Definition of Alarm Status based on M.3100 [4], if mandatory.
    */
    enum AlarmStatus
    {
        CLEARED, INDETERMINATE, WARNING, MINOR, MAJOR, CRITICAL
    };

    /*
    Definition of Procedural Status based on X.721 [3], if mandatory.
    */
    enum ProceduralStatusValues
    {
        InitializationRequired, NotInitialized, Initializing, Reporting,
        Terminating
    };
    typedef sequence <ProceduralStatusValues,5> ProceduralStatus;

    /*
    Definition of Availability Status based on X.721 [3], if mandatory.
    */
    enum AvailabilityStatusValues
    {
        InTest, Failed, PowerOff, OffLine, OffDuty, Dependency, Degraded,
        NotInstalled, LogFull
    };
    typedef sequence <AvailabilityStatusValues,9> AvailabilityStatus;

    /*
    Definition of Control Status based on X.721 [3], if mandatory.
    */
    enum ControlStatusValues
    {
        SubjectToTest, PartOfServicesLocked, ReservedForTest, Suspended
    };
    typedef sequence <ControlStatusValues,4> ControlStatus;
}
```

```
/*
Definition of Standby Status based on X.721 [3], if mandatory.
*/
enum StandbyStatus
{
    HotStandby, ColdStandby, ProvidingService
};

/*
Definition of Unknown Status based on X.721 [3], if mandatory
(if switch is TRUE then value equal to TRUE implies "unknown status").
*/
union UnknownStatus switch(boolean)
{
    case TRUE: boolean value;
};

};
#endif // _STATE_MANAGEMENT_IRP_COMMON_CONST_DEFS_IDL_
```

Annex B (normative): XML definitions

B.0 General

This annex specifies the XML file format definition for the Bulk Configuration Management IRP IS [5] for the IRP whose semantics is specified in State Management Data Definition IRP: Information Service (IS) (3GPP TS 28.625 [2]).

The XML file formats are based on XML [7], XML Schema [9][10] and XML Namespace [11] standards.

B.1 Architectural features

B.1.0 Introduction

The overall architectural feature of State Management IRP is specified in 3GPP TS 28.625 [2].

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 [5].

B.2 Mapping

The mapping is not present in the current version of this specification.

B.3 Solution Set definitions

B.3.1 XML definition structure

The overall description of the file format of configuration data XML files is provided by 3GPP TS 32.616 [6].

Clause B.3.2 defines the XML schema `stateManagementIRP.xsd` for the State Management IRP: Information Service (IS) defined in 3GPP TS 28.625 [2].

The definition of the XML element types complies with the generic mapping rules defined in 3GPP TS 32.616 [6].

B.3.2 XML schema “stateManagementIRP.xsd”

```

<?xml version="1.1" encoding="UTF-8"?>
<!--
3GPP TS 28.626 State Management IRP
Bulk CM Configuration data file XML schema
stateManagementIRP.xsd
-->
<schema
targetNamespace=
  "http://www.3gpp.org/ftp/specs/archive/28_series/28.626#stateManagementIRP"
elementFormDefault="qualified"
xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:sm=
  "http://www.3gpp.org/ftp/specs/archive/28_series/28.626#stateManagementIRP"
>
<!-- State Management IRP related XML types -->
<simpleType name="operationalStateType">
  <restriction base="string">
    <enumeration value="enabled"/>
    <enumeration value="disabled"/>
  </restriction>
</simpleType>
<simpleType name="usageStateType">
  <restriction base="string">
    <enumeration value="idle"/>
    <enumeration value="active"/>
    <enumeration value="busy"/>
  </restriction>
</simpleType>
<simpleType name="administrativeStateType">
  <restriction base="string">
    <enumeration value="locked"/>
    <enumeration value="unlocked"/>
    <enumeration value="shuttingDown"/>
  </restriction>
</simpleType>
<simpleType name="alarmStatusType">
  <restriction base="string">
    <enumeration value="cleared"/>
    <enumeration value="indeterminate"/>
    <enumeration value="warning"/>
    <enumeration value="minor"/>
    <enumeration value="major"/>
    <enumeration value="critical"/>
  </restriction>
</simpleType>
<simpleType name="proceduralStatusElementType">
  <restriction base="string">
    <enumeration value="initializationRequired"/>
    <enumeration value="notInitialized"/>
    <enumeration value="initializing"/>
    <enumeration value="reporting"/>
    <enumeration value="terminating"/>
  </restriction>
</simpleType>
<complexType name="proceduralStatusType">
  <sequence minOccurs="0" maxOccurs="5">
    <element name="proceduralStatusElement" type="sm:proceduralStatusElementType"/>
  </sequence>
</complexType>
<simpleType name="availabilityStatusElementType">
  <restriction base="string">
    <enumeration value="inTest"/>
    <enumeration value="failed"/>
    <enumeration value="powerOff"/>
    <enumeration value="offLine"/>
    <enumeration value="offDuty"/>
    <enumeration value="dependency"/>
    <enumeration value="degraded"/>
    <enumeration value="notInstalled"/>
    <enumeration value="logFull"/>
  </restriction>
</simpleType>
<complexType name="availabilityStatusType">
  <sequence minOccurs="0" maxOccurs="9">

```

```
<element name="availabilityStatusElement" type="sm:availabilityStatusElementType"/>
</sequence>
</complexType>
<simpleType name="controlStatusElementType">
  <restriction base="string">
    <enumeration value="subjectToTest"/>
    <enumeration value="partOfServicesLocked"/>
    <enumeration value="reservedForTest"/>
    <enumeration value="suspended"/>
  </restriction>
</simpleType>
<complexType name="controlStatusType">
  <sequence minOccurs="0" maxOccurs="4">
    <element name="controlStatusElement" type="sm:controlStatusElementType"/>
  </sequence>
</complexType>
<simpleType name="standbyStatusType">
  <restriction base="string">
    <enumeration value="hotStandby"/>
    <enumeration value="coldStandby"/>
    <enumeration value="providingService"/>
  </restriction>
</simpleType>
<simpleType name="unknownStatusType">
  <restriction base="boolean">
    <pattern value="true"/>
    <pattern value="false"/>
  </restriction>
</simpleType>
<element name="operationalState" type="sm:operationalStateType"/>
<element name="usageState" type="sm:usageStateType"/>
<element name="administrativeState" type="sm:administrativeStateType"/>
<element name="alarmStatus" type="sm:alarmStatusType"/>
<element name="proceduralStatus" type="sm:proceduralStatusType"/>
<element name="availabilityStatus" type="sm:availabilityStatusType"/>
<element name="controlStatus" type="sm:controlStatusType"/>
<element name="standbyStatus" type="sm:standbyStatusType"/>
<element name="unknownStatus" type="sm:unknownStatusType"/>
</schema>
```

Annex C (Informative): Change history

| Change history | | | | | | | |
|----------------|-------|-----------|-----|-----|---|--------|--------|
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Old | New |
| 2014-06 | SA#64 | SP-140332 | 001 | - | upgrade XSD | 11.0.0 | 11.1.0 |
| | | SP-140358 | 002 | - | remove the feature support statements | | |
| 2014-09 | SA#65 | SP-140560 | 003 | - | Update the link from Solution Set to Information Service due to the end of Release 12 | 11.1.0 | 12.0.0 |
| 2016-01 | SA#70 | | | | Upgrade to Rel-13(MCC) | 12.0.0 | 13.0.0 |

| Change history | | | | | | | |
|----------------|---------|-----------|-----|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2016-06 | SA#72 | SP-160407 | 004 | - | F | Update the link from IRP Solution Set to IRP Information Service | 13.1.0 |

History

| Document history | | |
|-------------------------|--------------|-------------|
| V13.0.0 | January 2016 | Publication |
| V13.1.0 | August 2016 | Publication |
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