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Information technology — UPnP Device Architecture

Part 26-13: Telephony device control protocol —
Level 2 — Phone management service

National foreword

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**Information technology — UPnP
Device Architecture —**

**Part 26-13:
Telephony device control protocol —
Level 2 — Phone management service**

Technologies de l'information — Architecture de dispositif UPnP —

*Partie 26-13: Protocole de contrôle de dispositif de téléphonie —
Niveau 2 — Service de gestion du téléphone*





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Foreword

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ISO/IEC 29341-26-13 was prepared by UPnP Forum and adopted, under the PAS procedure, by joint technical committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

The list of all currently available parts of ISO/IEC 29341 series, under the general title *Information technology — UPnP Device Architecture*, can be found on the [ISO web site](#).

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Original UPnP Document

Reference may be made in this document to original UPnP documents. These references are retained in order to maintain consistency between the specifications as published by ISO/IEC and by UPnP Implementers Corporation and later by UPnP Forum. The following table indicates the original UPnP document titles and the corresponding part of ISO/IEC 29341:

UPnP Document Title	ISO/IEC 29341 Part
UPnP Device Architecture 1.0	ISO/IEC 29341-1:2008
UPnP Device Architecture Version 1.0	ISO/IEC 29341-1:2011
UPnP Device Architecture 1.1	ISO/IEC 29341-1-1:2011
UPnP Device Architecture 2.0	ISO/IEC 29341-1-2
UPnP Basic:1 Device	ISO/IEC 29341-2
UPnP AV Architecture:1	ISO/IEC 29341-3-1:2008
UPnP AV Architecture:1	ISO/IEC 29341-3-1:2011
UPnP AVTransport:1 Service	ISO/IEC 29341-3-10
UPnP ConnectionManager:1 Service	ISO/IEC 29341-3-11
UPnP ContentDirectory:1 Service	ISO/IEC 29341-3-12
UPnP RenderingControl:1 Service	ISO/IEC 29341-3-13
UPnP MediaRenderer:1 Device	ISO/IEC 29341-3-2
UPnP MediaRenderer:2 Device	ISO/IEC 29341-3-2:2011
UPnP MediaServer:1 Device	ISO/IEC 29341-3-3
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10:2008
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10:2011
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11:2008
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11:2011
UPnP ContentDirectory:2 Service	ISO/IEC 29341-4-12
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13:2008
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13:2011
UPnP ScheduledRecording:1	ISO/IEC 29341-4-14
UPnP ScheduledRecording:2	ISO/IEC 29341-4-14:2011
UPnP MediaRenderer:2 Device	ISO/IEC 29341-4-2
UPnP MediaServer:2 Device	ISO/IEC 29341-4-3
UPnP AV Datastructure Template:1	ISO/IEC 29341-4-4:2008
UPnP AV Datastructure Template:1	ISO/IEC 29341-4-4:2011
UPnP DigitalSecurityCamera:1 Device	ISO/IEC 29341-5-1
UPnP DigitalSecurityCameraMotionImage:1 Service	ISO/IEC 29341-5-10
UPnP DigitalSecurityCameraSettings:1 Service	ISO/IEC 29341-5-11
UPnP DigitalSecurityCameraStillImage:1 Service	ISO/IEC 29341-5-12
UPnP HVAC_System:1 Device	ISO/IEC 29341-6-1
UPnP ControlValve:1 Service	ISO/IEC 29341-6-10
UPnP HVAC_FanOperatingMode:1 Service	ISO/IEC 29341-6-11
UPnP FanSpeed:1 Service	ISO/IEC 29341-6-12
UPnP HouseStatus:1 Service	ISO/IEC 29341-6-13
UPnP HVAC_SetpointSchedule:1 Service	ISO/IEC 29341-6-14
UPnP TemperatureSensor:1 Service	ISO/IEC 29341-6-15
UPnP TemperatureSetpoint:1 Service	ISO/IEC 29341-6-16

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UPnP HVAC_UserOperatingMode:1 Service	ISO/IEC 29341-6-17
UPnP HVAC_ZoneThermostat:1 Device	ISO/IEC 29341-6-2
UPnP BinaryLight:1 Device	ISO/IEC 29341-7-1
UPnP Dimming:1 Service	ISO/IEC 29341-7-10
UPnP SwitchPower:1 Service	ISO/IEC 29341-7-11
UPnP DimmableLight:1 Device	ISO/IEC 29341-7-2
UPnP InternetGatewayDevice:1 Device	ISO/IEC 29341-8-1
UPnP LANHostConfigManagement:1 Service	ISO/IEC 29341-8-10
UPnP Layer3Forwarding:1 Service	ISO/IEC 29341-8-11
UPnP LinkAuthentication:1 Service	ISO/IEC 29341-8-12
UPnP RadiusClient:1 Service	ISO/IEC 29341-8-13
UPnP WANCableLinkConfig:1 Service	ISO/IEC 29341-8-14
UPnP WANCommonInterfaceConfig:1 Service	ISO/IEC 29341-8-15
UPnP WANDSLLinkConfig:1 Service	ISO/IEC 29341-8-16
UPnP WANEthernetLinkConfig:1 Service	ISO/IEC 29341-8-17
UPnP WANIPConnection:1 Service	ISO/IEC 29341-8-18
UPnP WANPOTSLinkConfig:1 Service	ISO/IEC 29341-8-19
UPnP LANDevice:1 Device	ISO/IEC 29341-8-2
UPnP WANPPPConnection:1 Service	ISO/IEC 29341-8-20
UPnP WLANConfiguration:1 Service	ISO/IEC 29341-8-21
UPnP WANDevice:1 Device	ISO/IEC 29341-8-3
UPnP WANConnectionDevice:1 Device	ISO/IEC 29341-8-4
UPnP WLANAccessPointDevice:1 Device	ISO/IEC 29341-8-5
UPnP Printer:1 Device	ISO/IEC 29341-9-1
UPnP ExternalActivity:1 Service	ISO/IEC 29341-9-10
UPnP Feeder:1.0 Service	ISO/IEC 29341-9-11
UPnP PrintBasic:1 Service	ISO/IEC 29341-9-12
UPnP Scan:1 Service	ISO/IEC 29341-9-13
UPnP Scanner:1.0 Device	ISO/IEC 29341-9-2
UPnP QoS Architecture:1.0	ISO/IEC 29341-10-1
UPnP QosDevice:1 Service	ISO/IEC 29341-10-10
UPnP QosManager:1 Service	ISO/IEC 29341-10-11
UPnP QosPolicyHolder:1 Service	ISO/IEC 29341-10-12
UPnP QoS Architecture:2	ISO/IEC 29341-11-1
UPnP QosDevice:2 Service	ISO/IEC 29341-11-10
UPnP QosManager:2 Service	ISO/IEC 29341-11-11
UPnP QosPolicyHolder:2 Service	ISO/IEC 29341-11-12
UPnP QOS v2 Schema Files	ISO/IEC 29341-11-2
UPnP RemoteUIClientDevice:1 Device	ISO/IEC 29341-12-1
UPnP RemoteUIClient:1 Service	ISO/IEC 29341-12-10
UPnP RemoteUIServer:1 Service	ISO/IEC 29341-12-11
UPnP RemoteUIServerDevice:1 Device	ISO/IEC 29341-12-2
UPnP DeviceSecurity:1 Service	ISO/IEC 29341-13-10
UPnP SecurityConsole:1 Service	ISO/IEC 29341-13-11
UPnP ContentDirectory:3 Service	ISO/IEC 29341-14-12:2011
UPnP MediaServer:3 Device	ISO/IEC 29341-14-3:2011

UPnP ContentSync:1	ISO/IEC 29341-15-10:2011
UPnP Low Power Architecture:1	ISO/IEC 29341-16-1:2011
UPnP LowPowerProxy:1 Service	ISO/IEC 29341-16-10:2011
UPnP LowPowerDevice:1 Service	ISO/IEC 29341-16-11:2011
UPnP QoS Architecture:3	ISO/IEC 29341-17-1:2011
UPnP QosDevice:3 Service	ISO/IEC 29341-17-10:2011
UPnP QosManager:3 Service	ISO/IEC 29341-17-11:2011
UPnP QosPolicyHolder:3 Service	ISO/IEC 29341-17-12:2011
UPnP QosDevice:3 Addendum	ISO/IEC 29341-17-13:2011
UPnP RemoteAccessArchitecture:1	ISO/IEC 29341-18-1:2011
UPnP InboundConnectionConfig:1 Service	ISO/IEC 29341-18-10:2011
UPnP RADAConfig:1 Service	ISO/IEC 29341-18-11:2011
UPnP RADASync:1 Service	ISO/IEC 29341-18-12:2011
UPnP RATAConfig:1 Service	ISO/IEC 29341-18-13:2011
UPnP RAClient:1 Device	ISO/IEC 29341-18-2:2011
UPnP RAServer:1 Device	ISO/IEC 29341-18-3:2011
UPnP RADiscoveryAgent:1 Device	ISO/IEC 29341-18-4:2011
UPnP SolarProtectionBlind:1 Device	ISO/IEC 29341-19-1:2011
UPnP TwoWayMotionMotor:1 Service	ISO/IEC 29341-19-10:2011
UPnP AV Architecture:2	ISO/IEC 29341-20-1
UPnP AVTransport:3 Service	ISO/IEC 29341-20-10
UPnP ConnectionManager:3 Service	ISO/IEC 29341-20-11
UPnP ContentDirectory:4 Device	ISO/IEC 29341-20-12
UPnP RenderingControl:3 Service	ISO/IEC 29341-20-13
UPnP ScheduledRecording:2 Service	ISO/IEC 29341-20-14
UPnP MediaRenderer:3 Service	ISO/IEC 29341-20-2
UPnP MediaServer:4 Device	ISO/IEC 29341-20-3
UPnP AV Datastructure Template:1	ISO/IEC 29341-20-4
UPnP InternetGatewayDevice:2 Device	ISO/IEC 29341-24-1
UPnP WANIPConnection:2 Service	ISO/IEC 29341-24-10
UPnP WANIPv6FirewallControl:1 Service	ISO/IEC 29341-24-11
UPnP WANConnectionDevice:2 Service	ISO/IEC 29341-24-2
UPnP WANDevice:2 Device	ISO/IEC 29341-24-3
UPnP Telephony Architecture:2	ISO/IEC 29341-26-1
UPnP CallManagement:2 Service	ISO/IEC 29341-26-10
UPnP MediaManagement:2 Service	ISO/IEC 29341-26-11
UPnP Messaging:2 Service	ISO/IEC 29341-26-12
UPnP PhoneManagement:2 Service	ISO/IEC 29341-26-13
UPnP AddressBook:1 Service	ISO/IEC 29341-26-14
UPnP Calendar:1 Service	ISO/IEC 29341-26-15
UPnP Presense:1 Service	ISO/IEC 29341-26-16
UPnP TelephonyClient:2 Device	ISO/IEC 29341-26-2
UPnP TelephonyServer:2 Device	ISO/IEC 29341-26-3
UPnP Friendly Info Update:1 Service	ISO/IEC 29341-27-1
UPnP MultiScreen MultiScreen Architecture:1	ISO/IEC 29341-28-1
UPnP MultiScreen Application Management:1 Service	ISO/IEC 29341-28-10

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UPnP MultiScreen Screen:1 Device	ISO/IEC 29341-28-2
UPnP MultiScreen Application Management:2 Service	ISO/IEC 29341-29-10
UPnP MultiScreen Screen:2 Device	ISO/IEC 29341-29-2
UPnP IoT Management and Control Architecture Overview:1	ISO/IEC 29341-30-1
UPnP DataStore:1 Service	ISO/IEC 29341-30-10
UPnP IoT Management and Control Data Model:1 Service	ISO/IEC 29341-30-11
UPnP IoT Management and Control Transport Generic:1 Service	ISO/IEC 29341-30-12
UPnP IoT Management and Control:1 Device	ISO/IEC 29341-30-2
UPnP Energy Management:1 Service	ISO/IEC 29341-31-1

1 Scope

This document specifies the PhoneManagement profile of the ConfigurationManagement Service defined in [7].

The PhoneManagement profile can be used for managing the configuration of the UPnP TelephonyServer device (i.e. a telephone), with tasks such as managing an address book, configuring the settings of the phone, configuring the ringing modes, checking the battery level of the phone. This profile is compliant with the UPnP Telephony Architecture defined in [9].

PhoneManagement defines

- A profile of the CMS in order to satisfy the requirements for PhoneManagement (see clause 5).
- The *Phone Data Model* to perform configuration management of the specific features of a phone (see Annex A) by reusing the CMS data model (see [7], Annex B).

The ConfigurationManagement service offers a general purpose data model and a set of configuration management operations for retrieving and managing the actual configuration parameters of a device. These features are completely reused from CMS in the PhoneManagement.

The ConfigurationManagement service defines the functions for manipulating the configuration and status parameters that are exposed by the device hosting the ConfigurationManagement service. These actions and state variables defined in the ConfigurationManagement service are reused in order to manage the configuration parameters of a TelephonyServer device for e.g. phone, defined in the data model of the PhoneManagement.

The main goal of this specification is to define the data model (called herein as *Phone Data Model*) for the TelephonyServer device like Phone, according to the rules defined by the ConfigurationManagement service for defining a new data model.

The *Phone Data Model* is organized as a hierarchical tree of parameter sets, where each set represent a feature of a TelephonyServer (e.g. address book, ringing modes etc) that can be managed by a TelCP.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[1] – UPnP Device Architecture, version 1.0, UPnP Forum, October 15, 2008. Available at: <http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0-20081015.pdf>. Latest version available at: <http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0.pdf>.

[2] – Data elements and interchange formats – Information interchange -- Representation of dates and times, International Standards Organization, December 21, 2000. Available at: [ISO 8601:2000](http://www.iso.org/iso/8601).

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[3] – IETF RFC 2119, Key words for use in RFCs to Indicate Requirement Levels, S. Bradner, 1997. Available at: <http://www.faqs.org/rfcs/rfc2119.html>.

[4] – IETF RFC 3339, Date and Time on the Internet: Timestamps, G. Klyne, Clearswift Corporation, C. Newman, Sun Microsystems, July 2002. Available at: <http://www.ietf.org/rfc/rfc3339.txt>.

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[6] – XML Schema Part 2: Data Types, Second Edition, Paul V. Biron, Ashok Malhotra, W3C Recommendation, 28 October 2004. Available at: <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028>.

[7] – *ConfigurationManagement:1 Service*, UPnP Forum, July 5, 2010. Available at: <http://www.upnp.org/specs/dm/UPnP-dm-ConfigurationManagement-v1-Service.pdf>. Latest version available at: <http://www.upnp.org/specs/dm/UPnP-dm-ConfigurationManagement-Service.pdf>.

[8] – IETF RFC 2426, vCard MIME Directory Profile, F. Dawson, Lotus Development Corporation, T. Howes, Netscape Communications, September 1998. Available at: <http://www.ietf.org/rfc/rfc2426.txt>.

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms and definitions given in [1] and the following apply.

3.1 Provisioning terms

3.1.1

conditionally allowed

CA

The definition or behavior depends on a condition. If the specified condition is met, then the definition or behavior is allowed, otherwise it is not allowed.

3.1.2

conditionally required

CR

The definition or behavior depends on a condition. If the specified condition is met, then the definition or behavior is required, otherwise it is not allowed.

3.1.3

not allowed

The definition or behavior is prohibited by this specification. Opposite of required.

3.2 Symbols

3.2.1

::

signifies a hierarchical parent-child (parent::child) relationship between the two objects separated by the double colon. This delimiter is used in multiple contexts, for example: Service::Action(), Action()::Argument, parentProperty::childProperty.

3.3 Abbreviated terms

3.3.1

A
allowed

3.3.2

CSV list
CSV

comma separated value list
list—or one-dimensional array—of values contained in a string and separated by commas

3.3.3

CMS
Configuration Management Service

3.3.4

TC
Telephony Client

3.3.5

TelCP
Telephony Control Point

3.3.6

TS
Telephony Server

4 Notations and conventions

4.1 Notation

- Strings that are to be taken literally are enclosed in “double quotes”.
- Words that are emphasized are printed in *italic*.
- Keywords that are defined by the UPnP Working Committee are printed using the *forum* character style.
- Keywords that are defined by [1] are printed using the *arch* character style.

4.1.1 Data Types

This specification uses data type definitions from two different sources. The UPnP Device Architecture defined data types are used to define state variable and action argument data types [1]. The XML Schema namespace is used to define property data types [6].

For UPnP Device Architecture defined Boolean data types, it is strongly recommended to use the value “0” for false, and the value “1” for true. The values “*true*”, “*yes*”, “*false*”, or “*no*” may also be used but are not recommended. The values “*yes*” and “*no*” are deprecated and shall not be sent out by devices but shall be accepted on input.

For XML Schema defined Boolean data types, it is strongly recommended to use the value “0” for false, and the value “1” for true. The values “*true*”, “*yes*”, “*false*”, or “*no*” may also be used but are not recommended. The values “*yes*” and “*no*” are deprecated and shall not be sent out by devices but shall be accepted on input.

4.2 Vendor-defined Extensions

Whenever vendors create additional vendor-defined state variables, actions or properties, their assigned names and XML representation shall follow the naming conventions and XML rules as specified in [1], 2.5.

5 ConfigurationManagement Service Profile

The PhoneManagement is a **profile** of the ConfigurationManagement service [7] which specifies:

- The requirements on the attributes and the related actions of the ConfigurationManagement service.
- The required state variables for the PhoneManagement which are allowed in the CMS.
- The required actions for the PhoneManagement which are allowed in the CMS.

PhoneManagement is conditionally required if the *Phone Data Model* is supported by the TelephonyServer.

5.1 Service Type

This specification reuse the ConfigurationManagement service exactly as specified in [7] by the UPnP Device Management WC:

urn:schemas-upnp-org:service:ConfigurationManagement:1

PhoneManagement defined in this specification refers to the same service type.

5.2 PhoneManagement Architecture

The PhoneManagement is used by the TelephonyServer (TS) device to offer the management of the parameters defined in the *Phone Data Model* by profiling the CMS.

The internal architecture of the PhoneManagement is in line with the Telephony architecture.

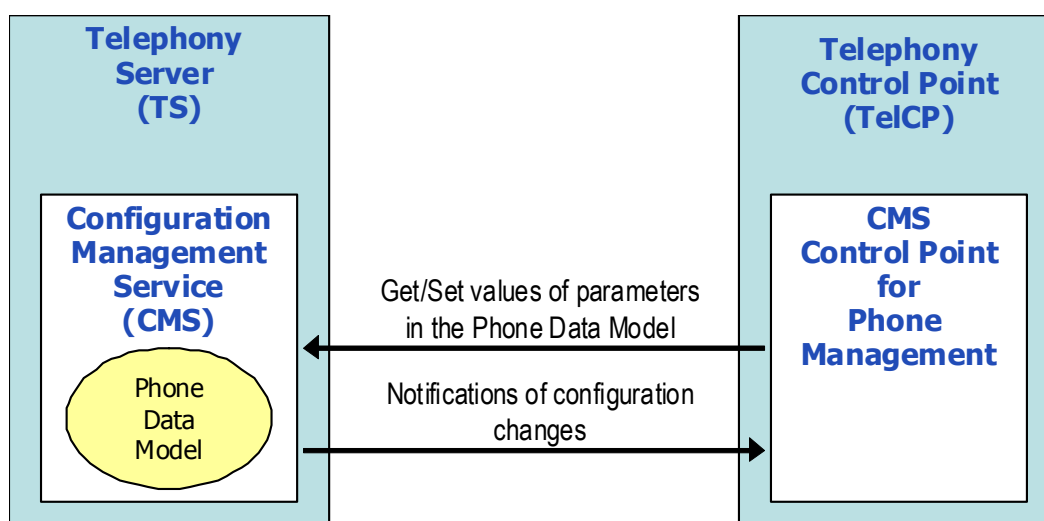


Figure 1 — PhoneManagement via CMS and *Phone Data Model*

5.2.1 Phone Management

The *PhoneManagement* is a set of procedures that implements the following general requirements of the UPnP Telephony:

- Managing the configuration of parameters like:
- Specific properties of the *TelephonyServer* (e.g. to manage capabilities related to the interfaces of a telephone like GSM, UMTS etc).
- Relevant concepts of the *TelephonyServer* to other Telephony services (e.g. the *AddressBook*).
- Retrieving the values of configuration parameters, status parameters for the diagnostics or troubleshooting purpose, and the counters for the monitoring (e.g. the current power supply source or the telephone battery status).
- Receiving the notifications of configuration parameters updates.

To fulfil the above requirements a TelCP can invoke the CMS actions for:

- Discovering the supported data model.
- Reading the current value of the configuration and status parameters.
- Managing the current configuration parameters for e.g. updating existing values in the *Phone Data Model*, creating new values in the *Phone Data Model*, or deleting the existing values from the *Phone Data Model*.

Any updates in the values of *Phone Data Model* parameters will be evented via a state variable.

5.2.2 Phone Data Model

The *Phone Data Model* defines a structure of list of configuration *Parameters* for the *PhoneManagement* in accordance to the rules specified by the CMS. The *Phone Data Model* includes the following parameters and information:

- Parameters for the *Address Book* in a form of a table, where each row corresponds to a contact with the associated relevant properties like name, mobile number, address, etc. The properties of a contact can be read or changed, the new contact can be added or existing contact can be deleted from the *Address Book*. The *Address Book* is the required feature in the *PhoneManagement* service.
- Parameters associated with an *answering machine* for setting the voice messages and to manage voice message items.
- Parameters for managing the *ringing alert* in the phone like *ringing mode (melody/vibrator or both)*, ring tones (melody).
- Parameters for reading the *GPS information* from a GPS receiver equipped in a telephone
- Parameter for configuring the *telephone profiles*, which are a set of meta information related to look and feel of a phone, service preferences (online, offline etc), and including personalized ring tones settings
- Parameters for reading the current *operational status* of the phone and for changing the administrative status (for e.g. enabling / disabling the telecommunication capabilities) of the phone.
- Parameters for tracking the level and status of the *battery* of a telephone.
- Personal profile information: User's own information for e.g. contact information, status image etc. which is also known as Personal Contact Card (PCC)

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- Parameters for service settings and service settings profile for the WAN side services like Messaging, and Call.
- Parameters for the *Telephony* related settings and the profile for Telephony services like [Messaging](#) Service and [CallManagement](#) Service
- Connected home device information and device capability information like hardware capabilities, software capabilities of the device etc.

5.2.2.1 Attributes of Phone Data Model Parameters

The *Phone Data Model* is defined in compliance with the data models of CMS. The CMS have defined different attributes of the parameters in the data models. The [PhoneManagement](#) profiles these attributes based on the requirements by the *Phone Data Model*.

In compliance with the CMS, the following attributes shall be supported by all CMS implementations (see [7] for further details about their meaning, usage and constraints):

- [Type](#): describes the type of a *Parameter*, making use of a limited subset of the SOAP data types.
- [Access](#): describes the level of accessibility of a particular *Parameter*, e.g. specifies whether a TelCP can change the value of a *Parameter* or not, whether TelCP can create new *Instance*, or can delete a particular *Instance Node*.

The following attributes are allowed for the CMS, but these attribute shall be supported by [PhoneManagement](#):

- [EventOnChange](#): indicates whether to update the [ConfigurationUpdate](#) state variable when the *Parameter* or the *MultInstance Node* in the data model is changed (and therefore the event shall be generated). The *Phone Data Model* in Annex A defines the list of *Parameters* which shall support [EventOnChange](#) attribute and their default value.

In order to provide some more sophisticated behavior, the [PhoneManagement](#) may support the following allowed attribute:

- [Version](#): when a *Parameter* supporting this attribute changes its *Parameter* value (and the [CurrentConfigurationVersion](#) state variable is consequently updated), the [Version](#) attribute for such *Parameter* assumes the value of [CurrentConfigurationVersion](#). (details can be found in [7], 2.4.22, Relationships Between State Variables). If the TS supports this attribute, is conditionally required to support also the [GetSelectedValues\(\)](#) allowed action.

5.3 State Variables

The [PhoneManagement](#) reuses some of the state variables defined in the [ConfigurationManagement](#) service.

The Table 1 below lists all the eventable state variables used in the [PhoneManagement](#). These state variables are defined in the CMS. The table also indicates the required/allowed constraint for the [PhoneManagement](#).

All the required state variables from the CMS shall be implemented by [PhoneManagement](#), as specified in [1]. It is up to the implementation to choose whether to support allowed state variables.

The [AttributeValuesUpdate](#) state variable should be supported if the CMS implementation support the [SetAttributeValues\(\)](#) for changing attribute values (i.e. the values of [EventOnChange](#) and [Version](#), when it is also supported).

The [PhoneManagement](#) supports the A_ARG_TYPE state variables defined in the CMS depending on the required/allowed constraint of the respective actions for the

PhoneManagement. The A_ARG_TYPE_ state variables are not listed in this document, refer to the [7] for the details.

Table 1 — State Variables for Eventing

Variable Name	CMS R/A ^a	TS R/A ^a
<u>ConfigurationUpdate</u>	<u>R</u>	<u>R</u>
<u>CurrentConfigurationVersion</u>	<u>R</u>	<u>R</u>
<u>SupportedDataModelsUpdate</u>	<u>R</u>	<u>R</u>
<u>SupportedParametersUpdate</u>	<u>R</u>	<u>R</u>
<u>AttributeValuesUpdate</u>	<u>A</u>	<u>A</u>
<u>InconsistentStatus</u>	<u>A</u>	<u>A</u>
^a <u>R</u> = required, <u>A</u> = allowed, <u>CR</u> = conditionally required, <u>CA</u> = conditionally allowed, <u>X</u> = Non-standard, add <u>-D</u> when deprecated (e.g., <u>R-D</u> , <u>A-D</u>).		

Note: For first-time reader, it may be more insightful to read the theory of operations first and then the action definitions before reading the state variable definitions.

5.4 Actions

5.4.1 Introduction

The PhoneManagement reuses the actions defined in the CMS. Some of the actions are allowed in CMS but those are required or conditionally required for PhoneManagement.

Table 2 below lists all the CMS actions, with the following additional information:

- The column “CMS R/A” indicates whether the action is required or allowed in [7]; all the required actions from the CMS shall be implemented by the device supporting PhoneManagement.
- The column “TS R/A” indicates whether the action is either required or allowed for PhoneManagement; some of the allowed actions are required for the PhoneManagement.
- The column “TelCP R/A” indicates whether the TelCP shall support the action to be fully compliant with the TS.

Refer to [7] for more detailed information on each action. The remaining subclauses of 5.4 give additional information on some of the actions as used by the PhoneManagement profile.

Table 2 — Actions

Name	CMS R/A ^a	TS R/A ^b	TelCP R/A ^c
<u>GetSupportedDataModels()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetSupportedParameters()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetInstances()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetValues()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetSelectedValues()</u>	<u>A</u>	<u>CR</u>	<u>CR</u>
<u>SetValues()</u>	<u>A</u>	<u>R</u>	<u>R</u>
<u>CreateInstance()</u>	<u>A</u>	<u>R</u>	<u>R</u>
<u>DeleteInstance()</u>	<u>A</u>	<u>R</u>	<u>R</u>

Name	CMS R/A ^a	TS R/A ^b	TelCP R/A ^c
<u>GetAttributes()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>SetAttributes()</u>	<u>A</u>	<u>A</u>	<u>A</u>
<u>GetInconsistentStatus()</u>	<u>A</u>	<u>A</u>	<u>A</u>
<u>GetConfigurationUpdate()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetCurrentConfigurationVersion()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetSupportedDataModelsUpdate()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetSupportedParametersUpdate()</u>	<u>R</u>	<u>R</u>	<u>R</u>
<u>GetAttributeValuesUpdate()</u>	<u>A</u>	<u>A</u>	<u>A</u>
^a For a device this column indicates whether the action shall be implemented or not, where <u>R</u> = required, <u>A</u> = allowed, <u>CR</u> = conditionally required, <u>CA</u> = conditionally allowed, <u>X</u> = Non-standard, add <u>-D</u> when deprecated (e.g., <u>R-D</u>, <u>A-D</u>). ^b For a device this column indicates whether the action shall be implemented or not, where <u>R</u> = required, <u>A</u> = allowed, <u>CR</u> = conditionally required, <u>CA</u> = conditionally allowed, <u>X</u> = Non-standard, add <u>-D</u> when deprecated (e.g., <u>R-D</u>, <u>A-D</u>). ^c For a control point this column indicates whether a control point shall be capable of invoking this action, where <u>R</u> = required, <u>A</u> = allowed, <u>CR</u> = conditionally required, <u>CA</u> = conditionally allowed, <u>X</u> = Non-standard, add <u>-D</u> when deprecated (e.g., <u>R-D</u>, <u>A-D</u>).			

5.4.2 [GetSelectedValues\(\)](#)

If [PhoneManagement](#) implementation supports the [Version](#) attribute in the *Phone Data Model*, then the [GetSelectedValues\(\)](#) action shall be supported.

The [Version](#) attribute allows a TS to indicate a TelCP about the change in the respective *Parameter* value, or *MultilInstance Node* value. The [GetSelectedValues\(\)](#) action is used to retrieve the actual change in the *Parameter* value or *MultilInstance Node* value. Refer to B.3.3 for detail mechanism for retrieving the changes.

5.4.3 [SetValues\(\)](#)

The [SetValues\(\)](#) action is an allowed action for the CMS, but the [PhoneManagement](#) perspective it is a required action and shall be implemented by all the implementation of the [PhoneManagement](#).

This action is required because the *Phone Data Model* supports *Parameters* with write access permission. This action allows a TelCP to change the values of such *Parameters*. For the examples on the *Parameter* change refer to Annex B.

5.4.4 [CreateInstance\(\)](#)

The [CreateInstance\(\)](#) action is an allowed action for the CMS, but the [PhoneManagement](#) perspective it is a required action and shall be implemented by all the implementation of the [PhoneManagement](#).

The *Phone Data Model* in the [PhoneManagement](#) supports *MultilInstance Nodes*, having write access permission e.g. *Address Book*. This action allows a TelCP to create a new *Instance* in the *Phone Data Model*, e.g. creating a new entry for a particular contact in the *Address Book*. For the example on the creating *Instances* in the *Phone Data Model* refer to Annex B.

5.4.5 DeleteInstance()

The DeleteInstance() action is an allowed action for the CMS, but the PhoneManagement perspective it is a required action and shall be implemented by all the implementation of the PhoneManagement.

The *Phone Data Model* includes some *MultInstance Nodes* information which can be deleted by a TelCP, e.g. contact entries in the *Address Book*. This action therefore allows a TelCP to delete existing *Instance Nodes* from the *Phone Data Model*. For the example on the deleting an *Instance* in the *Phone Data Model* refer to Annex B.

5.4.6 SetAttributes()

The SetAttributes() action is an allowed action for the CMS, but the PhoneManagement perspective it is a conditionally required action and should be implemented by all the implementation of the PhoneManagement.

The PhoneManagement defines some of the allowed *Parameters* which requires EventOnChange attribute. This action allows a TelCP to enable or disable a ConfigurationUpdate event for those particular *Parameters*. If PhoneManagement implementation supports such *Parameters* then this action shall be supported in the implementation. Examples can be found in Annex B.

6 XML Service Description

The service description is specified in [7].

Annex A (normative)

Phone Data Model

A.1 Introduction

Annex A defines the data model for the *TelephonyServer* device called as *Phone Data Model*.

The *Phone Data Model* defines the set of *Parameters* which are defined in compliance with the rules for data model definition specified in the CMS. The *Phone Data Model* does not require any support of the *Common Objects* defined in [7].

The following rules are defined in accordance with [7]:

- All *Parameter* names defined in Table A.1 shall be prefixed by /UPnP/PHONE/.
- Vendor specific *Parameters* to extend the capabilities of *Phone Data Model* shall begin with /.../X_ concatenated by the vendor domain name. For example: /UPnP/PHONE/X_MyCompany/ should be the prefix for all MyCompany specific parameters.
- The list of supported data models returned by *CMS::GetSupportedDataModels()* action (see *A_ARG_TYPE_SupportedDataModels* in [7]) shall include a row with the following information:
 - **URI:** urn:UPnP:phone:2:pdm:2.
 - **Location:** /UPnP/PHONE/.
 - **URL:** http://www.upnp.org/specs/phone/UPnP-phone-PhoneManagement-v2-Service.pdf.
 - **Description:** Telephony: phone data model.
 - **SourceLocation:** Not applicable.

Column descriptions in Table A.1 are identical to those given in [7], B.3, with the following addition:

In column *EOC*, a dash “-” means that the support for that attribute is allowed. The “0” means that the support for that attribute is required and its default value should be 0 (false). The “1” means that the support for that attribute is required and its default value should be 1 (true).

A.2 MIMEType and Value Management

The *MIMEType* and *Value* are a pair of *Parameters* which is used quite intensively in the following data model. They allow the management of Multi Media resources (e.g.: images, ring tones, voice messages and so on), whereas:

- *MIMEType*: describes *Value*'s content type using IANA registered formats. The text/plain *MIMEType* shall be used when *Value* contains a reference to the resource (URI). Other specific IANA registered formats shall be used when *Value* contains the string encoded resource (e.g.: image/jpg for encoded jpg images).
- *Value*: contains either a reference to the resource (URI) or the resource value (properly encoded to be stored in a string type parameter). In case *Value* contains the reference, setting, deleting or changing its value does not imply the management of the resource

itself. The management of the referenced resource is implementation dependant and is out of scope of this protocol (e.g.: a new reference might be created for a non existing resource). In case *Value* contains the encoded value of the resource, setting, deleting or changing its value therefore implies setting, deleting or changing the resource itself.

Furthermore, since *MIMEType* and *Value* can be separately set by the TelCP, and there is no syntax check to their values, the set operation can be done in a not consistent way, for example the *MIMEType* might be set to text/plain and *Value* might contain some string encoded audio/video data. It's up to the PHONE device implementation to check and manage possible inconsistencies. For example, an extremely smart application might try to adapt the right *MIMEType* to the *Value* provided, whereas a simple application might simply return an error to the TelCP.

A.3 Phone Data Model Overview

Figure A.1 gives a structure overview of the *Phone Data Model* including *SingleInstance* (e.g. Identification), *MultilInstance* (e.g. AddressBook) and *InstanceAlias* (i.e. the '#' symbol) *Nodes*. *Parameters* are not included for sake of readability.

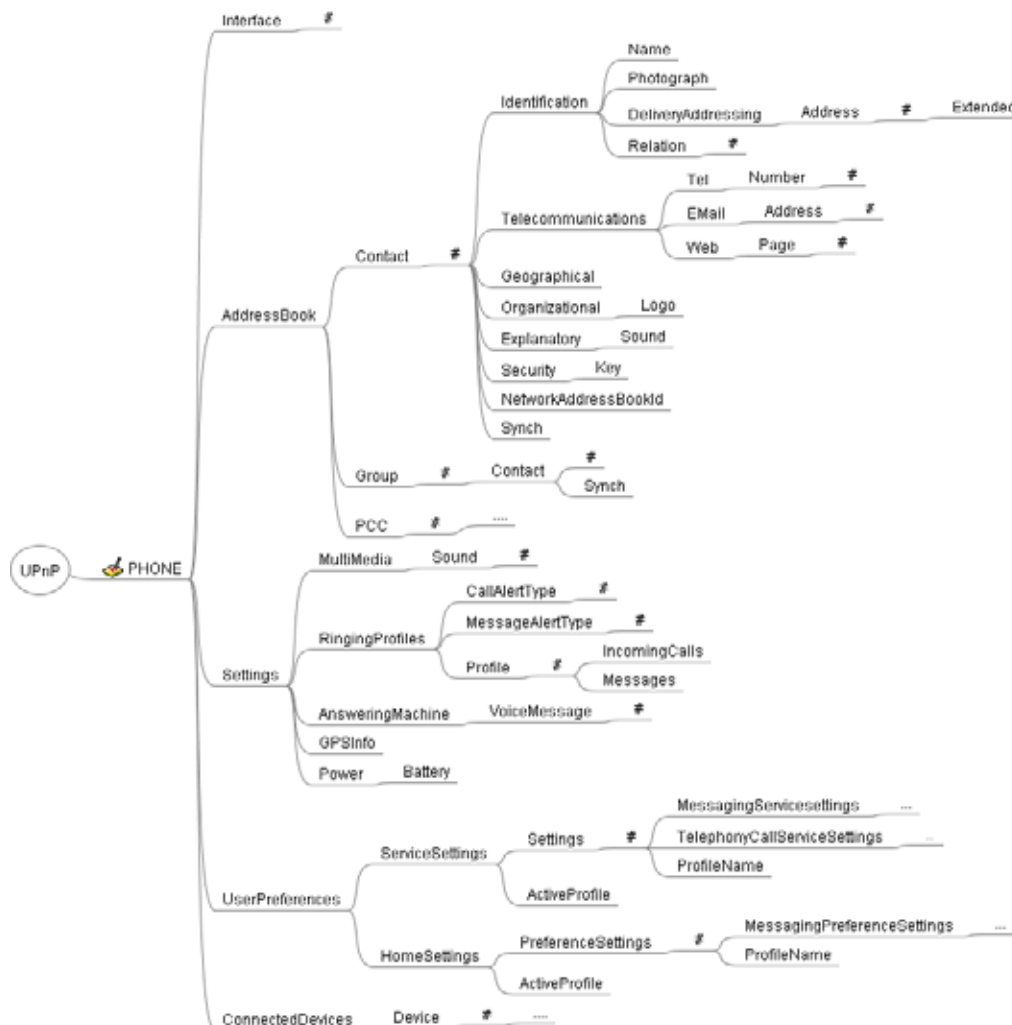


Figure A.1 — Overview of the *Phone Data Model*

Table A.1 — The Phone Data Model

Name	Type	Acc.	Req	Description	EOC	Ver
/UPnP/PHONE/ InterfaceNumberOfEntries	SingleInstance unsignedInt	-	R	The root node of the Phone Data Model.	-	-
/UPnP/PHONE/Interface/#/	MultiInstance	-	CR	Number of interfaces. It shall be provided when the /UPnP/PHONE/Interface/#/ is supported.	0	R
Name	string(64)	-	A	Table that lists all the available "interfaces" on the Telephony Server, both at network transmission level and at telephony connectivity level, in order to allow status check and administration tasks (for enabling and disabling the single interface).	-	-
Enable	boolean	-	R	Name of this interface, as provided by the Telephony Server.	-	-
Status	string	W	R	Command parameter in order to Enable (1) or Disable (0) this interface. The current value indicates if this interface it is Enabled (1) or Disabled (0). Disabling and then enabling an interface causes the restart of all that interface and all the supported connections.	0	R
		-	R	Current operational status of this interface. Some of the allowed values are: "Initializing" "Registering" "Active" "Unregistering" "Error" "Testing" "Quiescent" "Disabled"	-	-

Name	Type	Acc.	Req	Description	EOC	Ver
Type	string	-	R	The type of this interface. Some of the allowed values are: "GSM/GPRS" "UMTS/WCDMA" "HSPA" "WiFi" "Bluetooth" "USB" "Ethernet" "PSTN/ISDN" "VoIP"	-	-
StartTime	dateTime	-	R	The absolute date Time of the last successful restart of this interface.	-	-
/UPnP/PHONE/AddressBook/	SingleInstance	-	R	Container of Address Book management parameters	-	-
MaxContactsSupported	unsignedInt	-	R	This parameter declares the maximum number of contacts (entries, rows) that the Address Book can contain. If there is no upper limit, the value declared shall be 0.	0	-
MaxGroupsSupported	unsignedInt	-	R	This parameter declares the maximum number of groups (entries, rows) that the Address Book can contain. If there is no upper limit, the value declared shall be 0.	0	-
StorageLocation	string	-	R	It defines whether the Address Book is locally stored on the TS or other options. Possible values are the following: "local" "remote"	0	-
ContactNumberOfEntries	unsignedInt	-	R	Number of contacts in the AddressBook.	0	R
GroupNumberOfEntries	unsignedInt	-	CR	Number of groups. It shall be provided when the /UPnP/PHONE/AddressBook/Group/#/ is supported.	0	-

Name	Type	Acc.	Req	Description	EOC	Ver
/UPnP/PHONE/AddressBook/Contact#/ NetworkAddressBookId	MultiInstance String	W	R	A table where each row is a contact. A contact can be created, updated, deleted, read. Each contact (row) shall be defined in terms of its properties (i.e. parameters): vCard specification [8] is a source for such properties. Each contact in this table of contacts is uniquely identified by the Instance identifier (see the primary key description in ConfigurationManagement:1 Service). In case one or more of the following values is not defined, the empty string shall be used to represent "NO value defined". Constraints are specified in specific parameters' description, when needed. Element specifies the network address book with which this contact is associated. For e.g. GMAIL or FACEBOOK etc. If the contact belongs to multiple network address book, then this element includes all the identifiers of the network address books as a comma separated values. When setting this parameter the TS implementation should update the corresponding network address books.	-	-
/UPnP/PHONE/AddressBook/Contact#/Identification/ FormattedName	SingleInstance string(64)	-	R	This SingleInstance is used in the table of contacts to capture information associated with the identification and naming of this contact. Specifies the formatted text corresponding to the name of the contact. For example: Mr. John Q. Public\, Esq. Note that the COMMA character (ASCII decimal 44) is escaped as well as the "n" for the newline. [From [8]] In the vCard this field is assumed to be writeable. In the Phone Data Model, this parameter is populated by the TS according to the details provided in the /Identification/Name/ parameters. The TS rule for populate this parameter is out of scope.	-	-
NickName	string(64)	W	R	Specifies the text corresponding to the nickname of the contact. The nickname is the descriptive name given instead of or in addition to the one belonging to a person, place, or thing. It can also be used to specify a familiar form of a proper name specified by the FormattedName or Name. One or more text values separated by a COMMA character (ASCII decimal 44). For example: Jim,Jimmie. [From [8]]	0	-
BirthDay	dateTime	W	A	Specifies the birth date of the contact.	0	-