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Part 28-2:

Multiscreen device control protocol — Screen device

Technologies de l'information — Architecture de dispositif UPnP — Partie 28-2: Protocole de contrôle de dispositif multi-écran — Dispositif écran





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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see http://www.iso.org/directives).

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For an explanation on the voluntary nature of Standard, the meaning of the ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword – Supplementary information

ISO/IEC 29341-28-2 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.

Introduction

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5 956 487 / US; 6 170 007 / US; 6 139 177 / US; 6 529 936 / US; 6 470 339 / US; 6 571 388 / US; 6 205 466 / US

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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 F	Part
UPnP Device Architecture 1.0 ISO/IEC 29341-1	1:2008
UPnP Device Architecture Version 1.0 ISO/IEC 29341-1	1:2011
UPnP Device Architecture 1.1 ISO/IEC 29341-1	1-1:2011
UPnP Device Architecture 2.0 ISO/IEC 29341-1	1-2
UPnP Basic:1 Device ISO/IEC 29341-2	2
UPnP AV Architecture:1 ISO/IEC 29341-3	3-1:2008
UPnP AV Architecture:1 ISO/IEC 29341-3	3-1:2011
UPnP AVTransport:1 Service ISO/IEC 29341-3	3-10
UPnP ConnectionManager:1 Service ISO/IEC 29341-3	3-11
UPnP ContentDirectory:1 Service ISO/IEC 29341-3	3-12
UPnP RenderingControl:1 Service ISO/IEC 29341-3	3-13
UPnP MediaRenderer:1 Device ISO/IEC 29341-3	3-2
UPnP MediaRenderer:2 Device ISO/IEC 29341-3	3-2:2011
UPnP MediaServer:1 Device ISO/IEC 29341-3	3-3
UPnP AVTransport:2 Service ISO/IEC 29341-4	4-10:2008
UPnP AVTransport:2 Service ISO/IEC 29341-4	4-10:2011
UPnP ConnectionManager:2 Service ISO/IEC 29341-4	4-11:2008
UPnP ConnectionManager:2 Service ISO/IEC 29341-4	4-11:2011
UPnP ContentDirectory:2 Service ISO/IEC 29341-4	4-12
UPnP RenderingControl:2 Service ISO/IEC 29341-4	4-13:2008
UPnP RenderingControl:2 Service ISO/IEC 29341-4	4-13:2011
UPnP ScheduledRecording:1 ISO/IEC 29341-4	4-14
UPnP ScheduledRecording:2 ISO/IEC 29341-4	4-14:2011
UPnP MediaRenderer:2 Device ISO/IEC 29341-4	4-2
UPnP MediaServer:2 Device ISO/IEC 29341-4	4-3
UPnP AV Datastructure Template:1 ISO/IEC 29341-4	4-4:2008
UPnP AV Datastructure Template:1 ISO/IEC 29341-4	4-4:2011
UPnP DigitalSecurityCamera:1 Device ISO/IEC 29341-5	5-1
UPnP DigitalSecurityCameraMotionImage:1 Service ISO/IEC 29341-5	5-10
UPnP DigitalSecurityCameraSettings:1 Service ISO/IEC 29341-5	5-11
UPnP DigitalSecurityCameraStillImage:1 Service ISO/IEC 29341-5	5-12
UPnP HVAC_System:1 Device ISO/IEC 29341-6	3-1
UPnP ControlValve:1 Service ISO/IEC 29341-6	3-10
UPnP HVAC_FanOperatingMode:1 Service ISO/IEC 29341-6	3-11
UPnP FanSpeed:1 Service ISO/IEC 29341-6	3-12
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UPnP HVAC_SetpointSchedule:1 Service ISO/IEC 29341-6	3-14
UPnP TemperatureSensor:1 Service ISO/IEC 29341-6	3-15
UPnP TemperatureSetpoint:1 Service ISO/IEC 29341-6	3-16
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UPnP HVAC_ZoneThermostat:1 Device ISO/IEC 29341-6	ô-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 29341-9-10
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
	ISO/IEC 29341-18-10:2011
UPnP InboundConnectionConfig:1 Service	
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
_	ISO/IEC 29341-20-12
UPnP ContentDirectory:4 Device	
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
<u> </u>	ISO/IEC 29341-26-11
UPnP MediaManagement:2 Service	
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
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 29341-29-10
UPnP IoT Management and Control Architecture Overview:1	
or in to management and control Atomicellule Overview.	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 defines a device type referred to as ScreenDevice version 1. This device specification is compliant with UPnP Device Architecture 1.0 [1].

The ScreenDevice provides various interactive services with other display device(s) which is (are) implemented with Screen Control Point(s). It is designed to be controlled by and interact with Screen Control Point(s). See the Multi-Screen Architecture:1 [2] for details.

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] – *Multi-Screen Architecture:1*, UPnP Forum, September 30, 2014. Available at: http://www.upnp.org/specs/ms/UPnP-ms-MultiScreenArchitecture-v1-20140930.pdf.

Latest version available at: http://www.upnp.org/specs/ms/UPnP-ms-MultiScreenArchitecture-v1.pdf.

[3] - ApplicationManagement:1, UPnP Forum, September 30, 2014.

Available at: http://www.upnp.org/specs/ms/UPnP-ms-ApplicationManagement-v1-Service-20140930.pdf.

Latest version available at: http://www.upnp.org/specs/ms/UPnP-ms-ApplicationManagement-v1-Service.pdf.

[4] - DeviceProtection:1, UPnP Forum, December 31, 2010.

Available at: http://www.upnp.org/specs/gw/UPnP-gw-DeviceProtection-v1-Service-20110224.pdf.

Latest version available at: http://www.upnp.org/specs/gw/UPnP-gw-DeviceProtection-v1-Service.pdf.

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms and definitions given in the UPnP Device Architecture:1 [1], the Multi-Screen Architecture:1 [2], and the ApplicationManagement:1 [3].

4 Notations and Conventions

See the Multi-Screen Architecture:1 [2].

5 Device Definitions

5.1 Device Type

The following device type identifies a device that is compliant with this specification:

urn:schemas-upnp-org:device:ScreenDevice:1

5.2 Device Model

ScreenDevice products shall implement minimum version numbers of all required embedded devices and services specified in the table below. A ScreenDevice may be either a <u>Root</u> device or may be <u>Embedded</u> in another UPnP device. A ScreenDevice (<u>Root</u> or <u>Embedded</u>) may in turn contain other standard or non-standard <u>Embedded</u> UPnP devices.

Table 1 — Device Requirements

DeviceType	Root	R/A a	ServiceType	R/A a	Service ID b
	Root or Embedded	R	ApplicationManagement:1	<u>R</u>	<u>ApplicationManagement</u>
			<u>DeviceProtection:1</u>	<u>0</u>	<u>DeviceProtection</u>
ScreenDevice:1			Standard non Multi-Screen services defined by UPnP (AV, Cloud, etc.) go here.	<u>o</u>	
			Non-standard services embedded by a UPnP vendor go here.	<u>X</u>	TBD
Standard devices embedded by a UPnP vendor go here	Embedded	<u>o</u>	Services as defined by the corresponding standard UPnP Device Definition go here		
Non-standard state variables implemented by a UPnP vendor go here	<u>Embedded</u>	<u>X</u>	TBD	TBD	TBD

a For a device this column indicates whether the state variable 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>).

5.2.1 Description of Device Requirements

Any instance of a ScreenDevice shall have an ApplicationManagement service. For a given instance (ScreenDevice), there shall only be one instance of these services. The DeviceProtection service [4] shall be present if the ApplicationManagement service implements the SECURITY feature. Other standard services, such as UPnP AV, Cloud, etc., may be added with semantics defined by the relevant specifications.

The ApplicationManagement service allows control points to manage applications of the ScreenDevices and the communications between applications providing various time-sensitive and interactive services including implementation-specific applications among various display devices.

6 XML Device Description

```
<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
   <specVersion>
      <major>1</major>
      <minor>0</minor>
   </specVersion>
   <URLBase>base URL for all relative URLs/URLBase>
   <device>
      <deviceType>
         urn: schemas-upnp-org:device: ScreenDevice: 1
      <deviceType>
      <friendlyName>short user-friendly title</friendlyName>
      <manufacturer name</manufacturer>
      <manufacturerURL>URL to manufacturer site</manufacturerURL>
      <modelDescription>long user-friendly title</modelDescription>
      <modelName>model name</modelName>
      <modelNumber>model number</modelNumber>
      <modelurL>URL to model site</modelurL>
      <serialNumber>manufacturer's serial number</serialNumber>
      <UDN>uuid:UUID</UDN>
      <up><upc>>Universal Product Code</upc>></up>
      < iconList>
          <icon>
             <mimetype</pre>>image/format</mimetype>
             <width>horizontal pixels</width>
```

b Prefixed by <u>urn:upnp-org:serviceld:</u>

```
<height>vertical pixels</height>
              <depth>color depth</depth>
              </icon>
           <!--XML to declare other icons, if any, go here-->
       </iconList>
       <<u>serviceList</u>>
          <service>
              <serviceType>
                 urn: <a href="mailto:schemas-upnp-org:service">schemas-upnp-org:service</a>: <a href="mailto:ApplicationManagement:1">ApplicationManagement:1</a>
              </serviceType>
              <<u>serviceId></u>
                 urn:upnp-org:serviceId:ApplicationManagement
              </serviceId>
              <<u>SCPDURL</u>>URL to service description</<u>SCPDURL</u>>
              <controlURL>URL for control</controlURL>
              <eventSubURL>URL for eventing
           </service>
           <service>
              <serviceType>
                 urn: schemas-upnp-org:service: DeviceProtection: 1
              </serviceType>
              <serviceId>
                 urn: <u>upnp-org:serviceId</u>: <u>DeviceProtection</u>
              </serviceId>
              <<u>SCPDURL</u>>URL to service description</<u>SCPDURL</u>>
              <controlURL>URL for control</controlURL>
              <eventSubURL>URL for eventing
          </service>
          <!--Declarations for standard non Multi-Screen services defined by
          UPnP (if any) go here-->
          <!--Declarations for other services added by UPnP vendor
          (if any) go here-->
       </serviceList>
       <deviceList>
       <!--Description of embedded devices added by UPnP vendor (if any) go
       </deviceList>
       entationURL>URL for presentation</presentationURL>
   </device>
</<u>root</u>>
```

