CloudProxy:1 Device

For UPnP Version 2.0

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1 SCOPE

1.1 INTRODUCTION

This document defines the device CloudProxy:1, which identifies version 1 of the device named CloudProxy. This Publicly Available Specification is applicable to Standardized DCPs of the UPnP Forum which include this device.

This device is compliant with the UPnP Device Architecture version 2.0. It defines a device type referred to herein as CloudProxy:1 device.

This specification defines a general purpose device that can be used to generate a UPnP Cloud Capable Device (UCA UCCD) from a local (UDA only) device. See [UDA] for explanation of terminology. It provides the capability to:

- Discovery and interact (securely if available) with local (UDA) devices via an embedded control point,

- Act as an HTTP Client to support transport actions for proxied devices,

- Act as an XMPP Client to connect a local (proxied) device as a UCCD to a UCS (XMPP Server).

- In general, to be useful, it is cabable of support multiple XMPP Client connections to multiple UCSs and for multiple *Cloud Account*s.

Figure 1-1 CloudProxy Device Overview
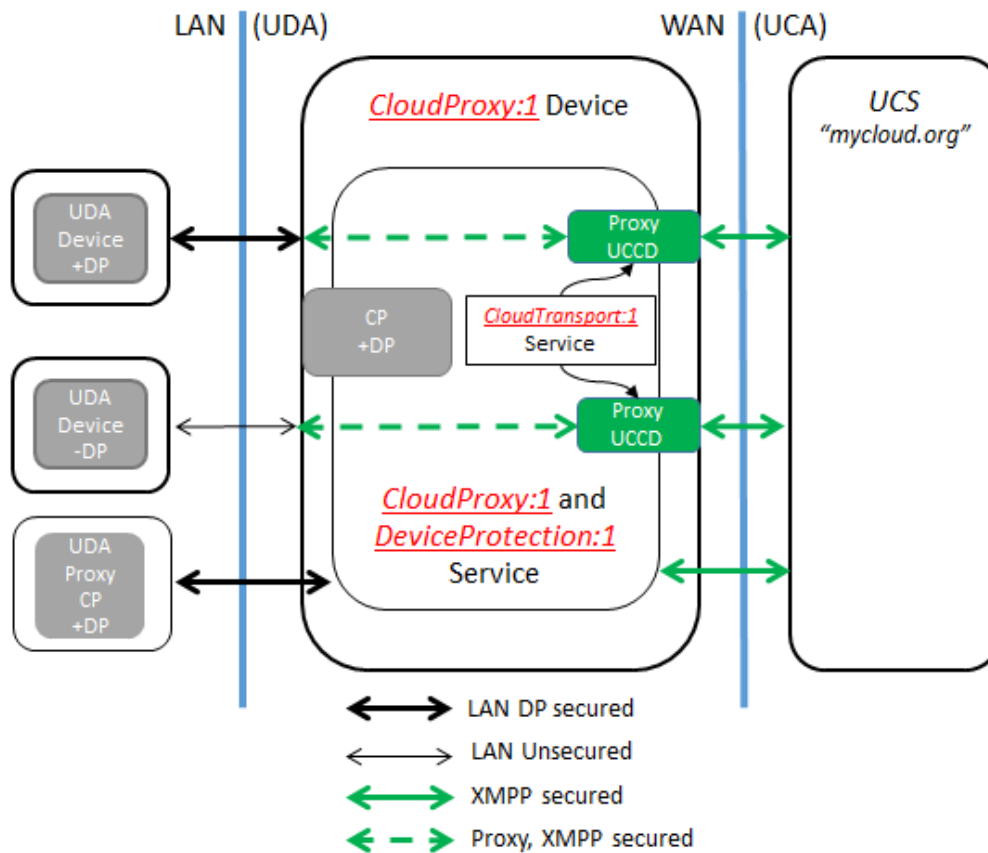
This service definition is compliant with the UPnP Device Architecture, version 2.0.

2 NORMATIVE REFERENCES

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

[UDA] UPnP Device Architecture, version 2.0, UPnP Forum, February 20, 2015. Available at: http://upnp.org/specs/arch/UPnPDA10_20000613.pdf. Latest version available at: http://upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v2.0.pdf.

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[CDS4] UPnP Content Directory Service, version 4.0, UPnP Forum, June 30, 2015. Available at http://www.upnp.org/specs/av/ContentDirectory-av-v4-Service-201150630.pdf. Latest version available at: http://www.upnp.org/specs/av/ContentDirectory-av-v4-Service.pdf.

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[XML 1.0] Extensible Markup Language (XML) 1.0 (Third Edition), François Yergeau, Tim Bray, Jean Paoli, C. M. Sperberg-McQueen, Eve Maler, eds., W3C Recommendation, February 4, 2004. Available at: http://www.w3.org/TR/2004/REC-xml-20040204.

[XSD 2.0] 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.

[PROXY] UPnP CloudProxy:1 Device, UPnP Forum July 1, 2013. Available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudProxy-v1-Device-20151231.pdf.   Latest version available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudProxy-v1-Device.pdf.

[DP] UPnP DeviceProtection:1 Service, UPnP Forum, February 24, 2011. 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.

[CPROXY] UPnP CloudProxy:1 Service, UPnP Forum, December 31, 2015. Available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudProxy-v1-Service-20151231.pdf. Latest version available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudProxy-v1-Service.pdf.

[CTS] UPnP CloudTransport:1 Service, UPnP Forum, December 31, 2015. Available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudTransport-v1-Service-20151231.pdf. Latest version available at: http://www.upnp.org/specs/cloud/UPnP-cloud-CloudTransport-v1-Service.pdf.

[XSD_CPU] XML Schema UPnP CloudProxy Update IDs, UPnP Forum, December 31, 2015. Available at: http://www.upnp.org/schemas/cloud/cloudproxyupdate-v1-20151231.xsd. Latest version available at: http://www.upnp.org/schemas/cloud/cloudproxyupdate.xsd.

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[XSD_CPUL] XML Schema UPnP CloudProxy UCS List, UPnP Forum, December 31, 2015. Available at: http://www.upnp.org/schemas/cloud/ucslist-v1-20151231.xsd. Latest version available at: http://www.upnp.org/schemas/cloud/ucslist.xsd.

3 TERMS, DEFINITIONS AND ABBREVIATIONS

For the purposes of this document, the terms, definitions and abbreviations given in [CDS4], [DP], [UDA], [CTS] and [PROXY] apply.

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 the UPnP Device Architecture are printed using the **arch** character style.

- Keywords that are defined specific to the UPnP Device Architecture Annex C are printed using **UCA** character style.

- Keywords that are defined specific to XMPP are printed using **XMPP** character style.

- A double colon delimiter, "::", 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.

4.2 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 UPnP Device Architecture, version 2.0 [UDA]. The XML Schema namespace is used to define property data types XML Schema Part 2: Data Types, Second Edition [XSD 2.0].

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.

4.3 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 UPnP Device Architecture, version 2.0 [UDA], Clause 2.5, "Description: Non-standard vendor extensions".

5 DEVICE DEFINITIONS

The requirements in this section apply when *CloudProxy* device is used.

5.1 DEVICE TYPE

The following URN identifies a service that is compliant with this specification:

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

CloudProxy device is used herein to refer to this device type.

5.2 DEVICE MODEL

The CloudProxy device shall implement the minimum version numbers of all required and embedded devices and services in Table 5-1. A CloudProxy device should be a **Root** device but may be an **Embedded** device in another UPnP device. A CloudProxy device (**Root** or **Embedded**) may in turn contain other standard or non-standard **Embedded** UPnP devices.

Table 5-1 Device Requirements

DeviceType	Root	R/A [a]	ServiceType	R/A [a]	Service ID [b]
CloudProxy:1	*Root* Or *Embedded*	*R*	*CloudProxy:1*	*R*	*CloudProxy*
			DeviceProtection:1	*R*	*DeviceProtection*
			CloudTransport:1	*CR* [c]	*CloudTransport*
			Standard non-cloud services defined by UPnP (QoS, CDS, etc) go here - not recommended.	*X* [d]	*TBD*
			Non-standard services embedded by the UPnP vendor go here - not recommended.	*X* [d]	*TBD*
Standard devices embedded by a UPnP vendor go here - not recommended.	*Embedded*	*A* [d]	*services as defined by the corresponding standard UPnP Device Definition go here - not recommended.*		
Non-standard devices embedded by a UPnP vendor go here - not recommended.	*Embedded*	*X* [d]	*TBD*	*TBD*	*TBD*

	NOTES:
[a]	For a device this column indicates whether the state variable shall be implemented or not, where *R* = required, *A* = allowed, *CR* = conditionally required, *CA* = conditionally allowed, *X* = Non-standard, add *-D* when deprecated (e.g., *R-D*, *A-D*).
[b]	Prefixed with urn:**upnp-org**:**servicesId**:
[c]	According to [CPROXY] a proxied local device shall have a CloudTransport service on its proxied UCA interface (UCCD). This service is supplied by the CloudProxy device for local devices that do not support this service directly. It is Allowed on the CloudProxy device.
[d]	Although embedded devices and other services are allowed it is recommended that they not be implemented with a CloudProxy device.

5.2.1 Description of Device Requirements

Any instance of the CloudProxy device shall have two services: A single instance of the CloudProxy service [CPROXY] and a single instance of the DeviceProtection service [DP]. For each UCCD generated by the CloudProxy service there shall be a single instance of the CloudTransport service [CTS] included in the UCCD. If this instance of the CloudTransport service is not native to the proxied device then it shall be added by the CloudProxy Service to the UCCD.

The DeviceProtection service implemented for the CloudProxy device shall support the *Public*, *Basic* and *Admin Roles*. It shall also support the following allowed actions:

- *GetUserLoginChallenge()*,
- *UserLogin()*,
- *UserLogout()*.

and should support the following allowed actions:

- *GetACLData()*,
- *AddIdentityList()*,
- *RemoveIdentityList()*,
- *SetUserLoginPassword()*,
- *AddRolesForIdentify()*,
- *RemoveRolesForIdentity(*).

If the CloudProxy device is to be controlled by a CloudProxy UCC-CP then it should be configured with a *User* Identity, preferably `Administration`, assigned the *Admin* Role.

In general the embedded control point for the CloudProxy device will interact with local devices over a UDA to maintain the CloudProxy service state variables up to date. If secured connections for devices to be proxied are to be used for the UCCD generated then the embedded control point supporting DeviceProtection will need to gain the required privileges with each local device as described in [DP]. The CloudProxy device may provide its on built-in UCS or use an external UCS. Once Cloud Accounts are configured local devices can be proxied via actions from a local CloudProxy control point. The CloudProxy device itself can be proxied as well via the same control point. It is then available for control through its own UCCD interface.

5.2.2 Device Security Considerations

Allowing control of the CloudProxy device and specifically the CloudTransport service on a UCCD interface should be done only when strong password protection is in place as this may allow exposure of local devices to external interaction.

Each proxied device's communication should be secured separately on the UCA interface, for example, if two devices are proxied, two separate XMPP client (UCCD) streams should be authenticated and connected to the UCS, one for each proxied device.

The embedded control point authenticating to more than one distinct device on the local network shall maintain separate [DP] credentials for each local device.

6 XML SERVICE DESCRIPTION

```xml
<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0"
      configId="configuration number">
   <specVersion>
       <major>1</major>
       <minor>0</minor>
   </specVersion>
   <URLBase>base URL for all relative URLs</URLBase>
   <device>
       <deviceType>
          urn:schemas-upnp-org:device:CloudProxy:1
       </deviceType>
       <friendlyName>short user-friendly title</friendlyName>
       <manufacturer>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>
       <UPC>Universal Product Code</UPC>
       <iconList>
```

```
                <icon>
                    <mimetype>image/format</mimetype>
                    <width>horizontal pixels</width>
                    <height>vertical pixels</height>
                    <depth>color depth</depth>
                    <url>URL to icon</url>
                </icon>
                XML to declare other icons, if any, go here
            </iconList>
            <serviceList>
                <service>
                    <serviceType>
                        urn:schemas-upnp-org:service:CloudProxy:1
                    </serviceType>
                    <serviceId>
                        urn:upnp-org:serviceId:CloudProxy
                    </serviceId>
                    <SCPDURL>URL to service description</SCPDURL>
                    <controlURL>URL for control</controlURL>
                    <eventSubURL>URL for eventing</eventSubURL>
                </service>
                <service>
                    <serviceType>
                        urn:schemas-upnp-org:service:DeviceProtection:1
                    </serviceType>
                    <serviceId>
                        urn:upnp-org:serviceId:DeviceProtection
                    </serviceId>
                    <SCPDURL>URL to service description</SCPDURL>
                    <controlURL>URL for control</controlURL>
                    <eventSubURL>URL for eventing</eventSubURL>
                </service>
                Declarations for standard non-AV 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 here
            </deviceList>
            <presentationURL>URL for presentation</presentationURL>
        </device>
</root>
```

For each local device the above *CloudProxy* service proxies to a *Cloud Account*, the following service shall appear once in the CloudProxy service generated UCCD.

```
<service>
    <serviceType>
        urn:schemas-upnp-org:service:CloudTransport:1
    </serviceType>
    <serviceId>
        urn:upnp-org:serviceId:CloudTransport
    </serviceId>
    <SCPDURL>URL to service description</SCPDURL>
    <controlURL>URL for control</controlURL>
    <eventSubURL>URL for eventing</eventSubURL>
</service>
```