

INTERNATIONAL STANDARD

**Information technology – UPnP Device Architecture –
Part 8-20: Internet Gateway Device Control Protocol – Wide Area Network Point-
to-Point Protocol Connection Service**

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INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 8-20: Internet Gateway Device Control Protocol – Wide Area Network Point-to-Point Protocol Connection Service

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The list of all currently available parts of the ISO/IEC 29341 series, under the general title *Universal plug and play (UPnP) architecture*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

ORIGINAL UPnP DOCUMENTS (informative)

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. 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
UPnP Basic:1 Device	ISO/IEC 29341-2
UPnP AV Architecture:1	ISO/IEC 29341-3-1
UPnP MediaRenderer:1 Device	ISO/IEC 29341-3-2
UPnP MediaServer:1 Device	ISO/IEC 29341-3-3
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: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
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11
UPnP ContentDirectory:2 Service	ISO/IEC 29341-4-12
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13
UPnP ScheduledRecording:1	ISO/IEC 29341-4-14
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
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UPnP HVAC_ZoneThermostat:1 Device	ISO/IEC 29341-6-2
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
UPnP HVAC_UserOperatingMode:1 Service	ISO/IEC 29341-6-17
UPnP BinaryLight:1 Device	ISO/IEC 29341-7-1
UPnP DimmableLight:1 Device	ISO/IEC 29341-7-2
UPnP Dimming:1 Service	ISO/IEC 29341-7-10
UPnP SwitchPower:1 Service	ISO/IEC 29341-7-11
UPnP InternetGatewayDevice:1 Device	ISO/IEC 29341-8-1
UPnP LANDevice:1 Device	ISO/IEC 29341-8-2
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 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 WANPPPConnection:1 Service	ISO/IEC 29341-8-20
UPnP WLANConfiguration:1 Service	ISO/IEC 29341-8-21
UPnP Printer:1 Device	ISO/IEC 29341-9-1
UPnP Scanner:1.0 Device	ISO/IEC 29341-9-2
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 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 QOS v2 Schema Files	ISO/IEC 29341-11-2

UPnP Document Title	ISO/IEC 29341 Part
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 RemoteUIClientDevice:1 Device	ISO/IEC 29341-12-1
UPnP RemoteUIServerDevice:1 Device	ISO/IEC 29341-12-2
UPnP RemoteUIClient:1 Service	ISO/IEC 29341-12-10
UPnP RemoteUIServer:1 Service	ISO/IEC 29341-12-11
UPnP DeviceSecurity:1 Service	ISO/IEC 29341-13-10
UPnP SecurityConsole:1 Service	ISO/IEC 29341-13-11

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1. Overview and Scope

This service definition is compliant with the UPnP Device Architecture version 1.0.

This service-type enables a UPnP control point to configure and control PPP connections on the WAN interface of a UPnP compliant *InternetGatewayDevice*^{*}. Any type of WAN interface (for e.g., DSL or POTS) that can support a PPP connection can use this service.

The service is REQUIRED if a PPP connection is used for WAN access, and is specified in

urn:schemas-upnp-org:device:WANConnectionDevice

one or more instances of which are specified under the device

urn:schemas-upnp-org:device:WANDevice

An instance of *WANDevice* is specified under the root device

urn:schemas-upnp-org:device:InternetGatewayDevice

Generally, Internet connections are set up from a WAN interface of the *InternetGatewayDevice* to Internet Service Providers (ISPs). However, an implementation MAY support PPP connections that are bridged or relayed (as in the case of some DSL modems) through the gateway device. *WANDevice* is a container for all UPnP services associated with a physical WAN device. It is assumed that clients are connected to *InternetGatewayDevice* via a LAN (IP-based network).

An instance of a *WANPPPConnection* service is activated (refer to SST below) for each actual Internet Connection instance on a *WANConnectionDevice*. *WANPPPConnection* service provides PPP-level connectivity with an ISP for networked clients on the LAN. More than one instance of *WANPPPConnection* service may be defined on a *WANConnectionDevice* – representing multiple user accounts using the same link (username / password) to an ISP.

Multiple instances of this service will be distinguished based on the ServiceID for each service instance.

In accordance with UPnP Architecture version 1.0, the maximum number of *WANPPPConnection* service instances is static and specified in the *InternetGatewayDevice* description document.

A *WANConnectionDevice* MAY include a *WAN{POTS/DSL/Cable/Ethernet}LinkConfig* service that encapsulates Internet access properties pertaining to the physical link of a particular WAN access type. These properties are common to all instances of *WANPPPConnection* in a *WANConnectionDevice*.

A *WANDevice* provides a *WANCommonInterfaceConfig* service that encapsulates Internet access properties common across all *WANConnectionDevice* instances.

* Refer to companion documents defined by the UPnP Internet Gateway working committee for more details on specific devices and services referenced in this document.

2. Service Modeling Definitions

2.1. ServiceType

The following service type identifies a service that is compliant with this template:

urn:schemas-upnp-org:service:*WANPPConnection:1.*

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2.2. State Variables

Table 1: State Variables

Variable Name	Req. or Opt. ¹	Data Type	Allowed Value ¹	Default Value ²	Eng. Units
ConnectionType	R	string	Depends on PossibleConnectionTypes	Not specified	N/A
PossibleConnectionTypes	R	string	See Table 1.1	Not specified	N/A
ConnectionStatus	R	string	See Table 1.2	Not specified	N/A
Uptime	R	ui4	Undefined	Not specified	seconds
UpstreamMaxBitRate	R	ui4	>= 0	Not specified	bitspersecond
DownstreamMaxBitRate	R	ui4	>= 0	Not specified	bitspersecond
LastConnectionError	R	string	See Table 1.3	Not specified	N/A
AutoDisconnectTime	O	ui4	>= 0	Not specified	seconds
IdleDisconnectTime	O	ui4	>= 0	Not specified	seconds
WarnDisconnectDelay	O	ui4	>= 0	Not specified	seconds
RSIPAvailable	R	boolean	0, 1	Not specified	N/A
NATEnabled	R	boolean	0,1	Not specified	N/A
UserName	O	string	Undefined	Empty string	N/A
Password	O	string	Undefined	Empty string	N/A
PPPEncryptionProtocol	O	string	Undefined	Empty string	N/A
PPPCompressionProtocol	O	string	Undefined	Empty string	N/A
PPPAuthenticationProtocol	O	string	Undefined	Empty string	N/A
ExternalIPAddress	R	string	String of the type "x.x.x.x"	Empty string	N/A
PortMappingNumberOfEntries	R	ui2	>=0	Not specified	N/A
PortMappingEnabled	R	boolean	0,1	Not specified	N/A
PortMappingLeaseDuration	R	ui4	0 to maximum value of ui4	Not specified	seconds
RemoteHost	R	string	String of the type "x.x.x.x" or empty string	Empty string	N/A
ExternalPort	R	ui2	Between 0 and 65535 inclusive	Not specified	N/A
InternalPort	R	ui2	Between 1 and 65535 inclusive	Not specified	N/A
PortMappingProtocol	R	string	See Table 1.4	Empty string	N/A
InternalClient	R	string	String of the type "x.x.x.x"	Empty string	N/A
PortMappingDescription	R	string	Undefined	Empty string	N/A
<i>Non-standard state variables implemented by an UPnP vendor go here.</i>	<i>X</i>	<i>TBD</i>	<i>TBD</i>	<i>TBD</i>	<i>TBD</i>

¹ R = Required, O = Optional, X = Non-standard.

² Values listed in this column are required. To specify standard optional values or to delegate assignment of values to the vendor, you must reference a specific instance of an appropriate table below.

NOTE: Default values are not specified in the DCP. A vendor may however choose to provide default values for SST variables where appropriate.

Table 1.1: AllowedValueList for PossibleConnectionTypes

PLEASE NOTE: PossibleConnectionTypes is defined as a comma-separated string. However, the values within the string are restricted to the list given in the table below. We have used the allowedValueList table format only as a convenience to represent these values.

Value	Req. or Opt.	Description
<i>Unconfigured</i>	<u>R</u>	Valid connection types cannot be identified. This may be due to the fact that the LinkType variable (if specified in the WAN*LinkConfig service) is unspecified. THIS VALUE IS DEPENDENT ON THE DEPLOYMENT AND TESTING SHOULD BE DEFERED TO THE VENDOR.
<i>IP_Routed</i>	<u>R</u>	The Internet Gateway is an IP router between the LAN and the WAN connection. THIS VALUE IS ONLY APPLICABLE FOR AN IGD DEVICE SUPPORTING NAT. SHOULD NOT BE TESTED IN OTHER DEVICE CONFIGURATIONS.
<i>DHCP_Spoofed</i>	<u>R</u>	The Internet Gateway is an IP router with a DHCP spoofer. This DHCP spoofer is a proxy between IPCP (the IP configuration mechanism used by PPP) or DHCP on the WAN connection and DHCP on the LAN. The IP address obtained via IPCP or DHCP from the ISP is relayed back as a DHCP response to a CP on the LAN.
<i>PPPoE_Bridged</i>	<u>R</u>	The Internet Gateway is an Ethernet bridge between the LAN and the WAN connection. A PPPoE RAS server at the end of the WAN connection terminates PPPoE connections initiated by control points on the LAN. ONLY VALID IF IGD SUPPORTS THE CONFIGURATION AS DESCRIBED.
<i>PPTP_Relay</i>	<u>R</u>	The Internet Gateway relays PPP sessions originating via PPTP on the LAN over the WAN configured as PPPoA. The gateway hosts a PPTP PNS to terminate the PPTP connection. ONLY VALID IF IGD SUPPORTS THE CONFIGURATION AS DESCRIBED.
<i>L2TP_Relay</i>	<u>R</u>	The Internet Gateway relays PPP sessions originating via L2TP on the LAN over the WAN configured as PPPoA. The gateway hosts a L2TP LNS to terminate the L2TP connection. ONLY VALID IF IGD SUPPORTS THE CONFIGURATION AS DESCRIBED.
<i>PPPoE_Relay</i>	<u>R</u>	The Internet Gateway relays a PPPoE tunnel on the LAN over the WAN configured as PPPoA. The gateway hosts a PPPoE server / access concentrator to terminate the PPPoE connection on the LAN. ONLY VALID IF IGD SUPPORTS THE CONFIGURATION AS DESCRIBED.

NOTE: Refer to the **WANConnectionDevice** specification for valid combinations of LinkType and PossibleConnectionTypes for different modems that can support PPP based connections.

The expected behavior of connection related actions for the different connection types is described in the Theory of Operation section.

Table 1.2: AllowedValueList for ConnectionStatus

Value	Req. or Opt.	Description
<i>Unconfigured</i>	<u>R</u>	This value indicates that other variables in the service table are either uninitialized or in an invalid state. Examples of such variables include <i>PossibleConnectionTypes</i> , <i>ConnectionType</i> , <i>UserName</i> and <i>Password</i> .
<i>Connecting</i>	<u>Q</u>	The WANConnectionDevice is in the process of initiating a connection for the first time after the connection became disconnected.
<i>Authenticating</i>	<u>Q</u>	The gateway is in the process of authenticating to the ISP for establishing the connection.
<i>Connected</i>	<u>R</u>	At least one client has successfully initiated an Internet connection using this instance.
<i>PendingDisconnect</i>	<u>Q</u>	The connection is active (packets are allowed to flow through), but will transition to <i>Disconnecting</i> state after a certain period (indicated by <i>WarnDisconnectDelay</i>).
<i>Disconnecting</i>	<u>Q</u>	The WANConnectionDevice is in the process of terminating a connection. On successful termination, <i>ConnectionStatus</i> transitions to <i>Disconnected</i> .
<i>Disconnected</i>	<u>R</u>	No ISP connection is active (or being activated) from this connection instance. No packets are transiting the gateway.

NOTE: Whether or not a control point gets notified of the intermediary states of a connection transition may depend on the gateway implementation.