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Edition 1.0 2008-11

# INTERNATIONAL STANDARD

## Information technology – UPnP Device Architecture – Part 8-17: Internet Gateway Device Control Protocol – Wide Area Network Ethernet Link Configuration Service



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## Information technology – UPnP Device Architecture – Part 8-17: Internet Gateway Device Control Protocol – Wide Area Network Ethernet Link Configuration Service

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## Part 8-17: Internet Gateway Device Control Protocol – Wide Area Network Ethernet Link Configuration 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.

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# ORIGINAL UPNP DOCUMENTS
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| **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 |
| UPnP HVAC_System:1 Device | ISO/IEC 29341-6-1 |
| 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 |

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| 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 models physical and link layer properties of a WAN Ethernet interface used for Internet access on an ***InternetGatewayDevice***. A gateway device that offers Internet connectivity via an external, Ethernet-attached cable or DSL modem would offer this service.

The service is OPTIONAL (for an ***InternetGatewayDevice*** that has an Ethernet WAN interface) 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***

**NOTE**: A ***WANDevice*** also provides a ***WANCommonInterfaceConfig*** service that encapsulates Internet access properties common across all WAN interfaces.

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# 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:***WANEthernetLinkConfig:1*.

## 2.2. State Variables

**Table 1: State Variables**

| Variable Name | Req. or Opt.[1] | Data Type | Allowed Value | Default Value [2] | Eng. Units |
|---|---|---|---|---|---|
| `EthernetLinkStatus` | R | string | *See table 1.1* | Not specified | N/A |
| *Non-standard state variables implemented by an UPnP vendor go here.* | *X* | *TBD* | *TBD* | *TBD* | *TBD* |

[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 `EthernetLinkStatus`**

| Value | Req. or Opt. |
|---|---|
| *Up* | *R* |
| *Down* | *R* |
| *Unavailable* | *O* |

### 2.2.1. EthernetLinkStatus

This variable indicates the status of the WAN Ethernet link. This only indicates the status of the physical link between the ***InternetGatewayDevice*** and an externally attached modem, and NOT the status of the external link of the modem itself. It is a **Read-only** variable.

### 2.2.2. Relationships Between State Variables

None.

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## 2.3. Eventing and Moderation

**Table 2: Event Moderation**

| Variable Name | Evented | Moderated Event | Max Event Rate[1] | Logical Combination | Min Delta per Event[2] |
|---|---|---|---|---|---|
| `EthernetLinkStatus` | Yes | No | N/A | N/A | N/A |
| *Non-standard state variables implemented by an UPnP vendor go here.* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* |

[1] Determined by N, where Rate = (Event)/(N secs).
[2] (N) * (allowedValueRange Step).

### 2.3.1. Event Model

If `EthernetLinkStatus` changes, subscribed control points are notified. A status change indicates presence or absence of connectivity to an externally attached modem.

## 2.4. Actions

Immediately following this table is detailed information about these actions, including short descriptions of the actions, the effects of the actions on state variables, and error codes defined by the actions.

**Table 3: Actions**

| Name | Req. or Opt. [1] |
|---|---|
| `GetEthernetLinkStatus` | *R* |
| *Non-standard actions implemented by an UPnP vendor go here.* | X |

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

### 2.4.1. GetEthernetLinkStatus

This action retrieves the link status of the Ethernet connection to an externally attached modem.

#### *2.4.1.1. Arguments*

**Table 4: Arguments for `GetEthernetLinkStatus`**

| Argument | Direction | relatedStateVariable |
|---|---|---|
| `NewEthernetLinkStatus` | *OUT* | `EthernetLinkStatus` |

#### *2.4.1.2. Dependency on State (if any)*

#### *2.4.1.3. Effect on State (if any)*

None.

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#### *2.4.1.4. Errors*

| errorCode | errorDescription | Description |
|---|---|---|
| 402 | Invalid Args | One of following: not enough IN arguments, too many IN arguments, no IN argument by that name, one or more IN arguments are of the wrong data type. See also the UPnP Device Architecture. |
| 501 | Action Failed | May be returned in current state if service prevents invoking of that action. |

### 2.4.2. Non-Standard Actions Implemented by a UPnP Vendor

To facilitate certification, non-standard actions implemented by UPnP vendors should be included in this service template. The UPnP Device Architecture lists naming requirements for non-standard actions (see the section on Description).

### 2.4.3. Relationships Between Actions

None.

### 2.4.4. Common Error Codes

The following table lists error codes common to actions for this service type. If an action results in multiple errors, the most specific error should be returned.

**Table 5: Common Error Codes**

| errorCode | errorDescription | Description |
|---|---|---|
| 401 | Invalid Action | See UPnP Device Architecture section on Control. |
| 402 | Invalid Args | See UPnP Device Architecture section on Control. |
| 404 | Invalid Var | See UPnP Device Architecture section on Control. |
| 501 | Action Failed | See UPnP Device Architecture section on Control. |
| 600-699 | TBD | Common action errors. Defined by UPnP Forum Technical Committee. |
| 701-799 | | Common action errors defined by the UPnP Forum working committees. |
| *800-899* | *TBD* | *(Specified by UPnP vendor.)* |

## 2.5. Theory of Operation

As mentioned earlier, this service is implemented if an ***InternetGatewayDevice*** supports an external, Ethernet-attached modem. If the modem type identification and control operations are possible through other proprietary mechanisms, a vendor may choose to implement a more specific link configuration service; for example ***WANDSLLinkConfig*** or ***WANCableLinkConfig***.

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# 3. XML Service Description

```
<?xml version="1.0"?>
<scpd xmlns="urn:schemas-upnp-org:service-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <actionList>
    <action>
    <name>GetEthernetLinkStatus</name>
      <argumentList>
        <argument>
          <name>NewEthernetLinkStatus</name>
          <direction>out</direction>
         <relatedStateVariable>EthernetLinkStatus</relatedStateVariable>
        </argument>
      </argumentList>
    </action>
    <!-- Declarations for other actions added by UPnP vendor (if any) go
here -->
  </actionList>
  <serviceStateTable>
    <stateVariable sendEvents="yes">
      <name>EthernetLinkStatus</name>
      <dataType>string</dataType>
      <allowedValueList>
        <allowedValue>Up</allowedValue>
        <allowedValue>Down</allowedValue>
        <allowedValue>Unavailable</allowedValue>
      </allowedValueList>
    </stateVariable>
    <!-- Declarations for other state variables added by UPnP vendor (if
any) go here -->
  </serviceStateTable>
</scpd>
```

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# 4. Test

No semantic tests have been defined for this service.

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