SwitchPower:1 Service Template Version 1.02

For UPnP Version 1.0
Status: Standardized DCP
Date: May 1, 2011

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</tr>
</thead>
<tbody>
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1. Overview and Scope

This service definition is compliant with the UPnP Device Architecture version 1.0 and Version 1.01 of the UPnP Standard Service Template.

This service-type enables the following functions:

- basic power switching for embedding devices.

This service template does not address:

- It is assumed that implementations of this service will not disable themselves as a side effect of driving their output load to a disabled state.

1.1. Change Log

<table>
<thead>
<tr>
<th>Spec Version - Date</th>
<th>Changes from Previous Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>v1-20031123</td>
<td>Initial version</td>
</tr>
<tr>
<td>v1-20110501</td>
<td>Fixed naming of SetTarget argument (<em>newTargetValue</em>) with lower case starting letter</td>
</tr>
</tbody>
</table>
2. **Service Modeling Definitions**

2.1. **ServiceType**

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

```
```

2.2. **State Variables**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Req. or Opt.</th>
<th>Data Type</th>
<th>Allowed Value</th>
<th>Default Value</th>
<th>Eng. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>R</td>
<td>Boolean</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>R</td>
<td>Boolean</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-standard state variables implemented by an UPnP vendor go here.</strong></td>
<td>X</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

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.

2.2.1. **Target**

Set to 0 to request a power-off state or to 1 to request a power-on state.

2.2.2. **Status**

This reflects the actual state of the power control output state.

This value will typically follow the requested state changes to Target but may be different because of delays within the actual implementation or because of a hard failure.

Simple implementations can implement the constant function: Status = Target.
2.3. Eventing and Moderation

Table 2-2: Event Moderation

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Evented</th>
<th>Moderated Event</th>
<th>Max Event Rate&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Logical Combination</th>
<th>Min Delta per Event&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>No</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Yes</td>
<td>No</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Non-standard state variables implemented by an UPnP vendor go here.</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

<sup>1</sup> Determined by N, where Rate = (Event)/(N secs).
<sup>2</sup> (N) * (allowedValueRange Step).

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 2-3: Actions

<table>
<thead>
<tr>
<th>Name</th>
<th>Req. or Opt. &lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>SetTarget</td>
<td>R</td>
</tr>
<tr>
<td>GetTarget</td>
<td>R</td>
</tr>
<tr>
<td>GetStatus</td>
<td>R</td>
</tr>
<tr>
<td>Non-standard actions implemented by an UPnP vendor go here.</td>
<td>X</td>
</tr>
</tbody>
</table>

<sup>1</sup> R = Required, O = Optional, X = Non-standard.

2.4.1. SetTarget

2.4.1.1. Arguments

Table 2-4: Arguments for SetTarget

<table>
<thead>
<tr>
<th>Argument</th>
<th>Direction</th>
<th>relatedStateVariable</th>
</tr>
</thead>
<tbody>
<tr>
<td>newTargetValue</td>
<td>IN</td>
<td>Target</td>
</tr>
</tbody>
</table>

2.4.1.2. Effect on State (if any)

Requests the Power Switch Service instance output to be driven to the state indicated by newTargetValue.
2.4.1.3. Errors

Table 2-5: Error Codes for SetTarget

<table>
<thead>
<tr>
<th>ErrorCode</th>
<th>errorDescription</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Invalid Action</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>402</td>
<td>Invalid Args</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>403</td>
<td>Out of Synch</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>501</td>
<td>Action Failed</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
</tbody>
</table>

2.4.2. GetTarget

Provided for testing and debugging purposes.

2.4.2.1. Arguments

Table 2-6: Arguments for GetTarget

<table>
<thead>
<tr>
<th>Argument</th>
<th>Direction</th>
<th>relatedStateVariable</th>
</tr>
</thead>
<tbody>
<tr>
<td>RetTargetValue</td>
<td>OUT</td>
<td>Target</td>
</tr>
</tbody>
</table>

2.4.2.2. Effect on State (if any)

None.

Requests the Power Switch Service instance to return the value of Target.

2.4.2.3. Errors

Table 2-7: Error Codes for GetTarget

<table>
<thead>
<tr>
<th>ErrorCode</th>
<th>errorDescription</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Invalid Action</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>402</td>
<td>Invalid Args</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>403</td>
<td>Out of Synch</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>501</td>
<td>Action Failed</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
</tbody>
</table>

2.4.3. GetStatus

2.4.3.1. Arguments

Table 2-8: Arguments for GetStatus
2.4.3.2. *Effect on State*

None.

Requests the Power Switch Service instance to return the value of Status.

2.4.3.3. *Errors*

**Table 2-9: Error Codes for GetStatus**

<table>
<thead>
<tr>
<th>ErrorCode</th>
<th>ErrorDescription</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Invalid Action</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>402</td>
<td>Invalid Args</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>403</td>
<td>Out of Synch</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
<tr>
<td>501</td>
<td>Action Failed</td>
<td>See UPnP Device Architecture Section on Control.</td>
</tr>
</tbody>
</table>

2.4.4. *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).

2.4.5. *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 must be returned.

**Table 2-10: Common Error Codes**

<table>
<thead>
<tr>
<th>errorCode</th>
<th>errorDescription</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Invalid Action</td>
<td>See UPnP Device Architecture section on Control.</td>
</tr>
<tr>
<td>402</td>
<td>Invalid Args</td>
<td>See UPnP Device Architecture section on Control.</td>
</tr>
<tr>
<td>404</td>
<td>Invalid Var</td>
<td>See UPnP Device Architecture section on Control.</td>
</tr>
<tr>
<td>501</td>
<td>Action Failed</td>
<td>See UPnP Device Architecture section on Control.</td>
</tr>
<tr>
<td>701-799</td>
<td></td>
<td>Common action errors defined by the UPnP Forum working committees.</td>
</tr>
</tbody>
</table>
### 2.5. Theory of Operation

Instances of Power Switch Services are embedded into devices to provide a standard means of programmatic control over these embedding devices’ powered-on (enabled/disabled) state, this being either on (1) or off (0).

This service model provides for situations where requested state changes may not result in actual one-for-one output state changes, reflected via the `Status` variable, for any number of reasons. For example if there are time delays involved or maybe the requested state can’t be achieved because of a hardware failure.

In the simplest of cases the output state (`Status`) will always follow the requested state changes submitted via `SetTarget`.

There is also the situation where the `Status` variable could change state without any programmatic action against this model at all. For example, this could happen if there was a front-panel power control that was changed by a user.

<table>
<thead>
<tr>
<th>errorCode</th>
<th>errorDescription</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>800-899</td>
<td>TBD</td>
<td>(Specified by UPnP vendor.)</td>
</tr>
</tbody>
</table>
3. XML Service Description

```xml
<?xml version="1.0"?>
<scpd xmlns="urn:schemas-upnp-org:service-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <actionList>
    <action>
      <name>SetTarget</name>
      <argumentList>
        <argument>
          <name>newTargetValue</name>
          <relatedStateVariable>Target</relatedStateVariable>
          <direction>in</direction>
        </argument>
      </argumentList>
    </action>
    <action>
      <name>GetTarget</name>
      <argumentList>
        <argument>
          <name>RetTargetValue</name>
          <relatedStateVariable>Target</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
      <name>GetStatus</name>
      <argumentList>
        <argument>
          <name>ResultStatus</name>
          <relatedStateVariable>Status</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
  </actionList>
  <serviceStateTable>
    <stateVariable sendEvents="no">
      <name>Target</name>
      <dataType>boolean</dataType>
      <defaultValue>0</defaultValue>
    </stateVariable>
    <stateVariable sendEvents="yes">
      <name>Status</name>
      <dataType>boolean</dataType>
      <defaultValue>0</defaultValue>
    </stateVariable>
  </serviceStateTable>
</scpd>
```

Declarations for other actions added by UPnP vendor (if any) go here

Declarations for other state variables added by UPnP vendor (if any) go here

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</scpd>
4. Test

Syntactical testing is performed by the UPnP test tool based on the XML description as provided in Section 3.

The working committee and the implementers have come to the conclusion that further test descriptions e.g. for semantical testing do not provide a higher level of interoperability.

Thus the XML description is deemed to be sufficient for testing of devices that implement this template and further test descriptions are not provided by this template.