HVAC_FanOperatingMode:1 Service Template

For UPnP™ Device Architecture V 1.0

Status: Standardized DCP
Date: May 13th, 2003

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1. Overview and Scope

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

This service definition enables the following functions:

- Changing and reading the user operating modes of a Forced Air HVAC system

1.1 Change Log for: HVAC_FanOperatingMode:1

7/24/00		Changes per 7/17 meeting of Home Automation and Security Working Group; Conversion to 0.996 template
8/24/00		Minor clarifications about implementing only a subset of the available mode values.
8/29/00		Added XML, removed ModeList
9/28/00		Corrected XML for GetFanStatus direction to OUT, added Name
11/28/00		Moved to Template Design Complete
2/14/01		Corrected per review TDC check list review. Corrected capitalization,
2/21/01		Moved to template 1.1
2/26/01		Proof read
3/11/01		Minor updates
4/2/01		Moved to 0.87
[31 May 2002]	v0.9	Revision marks removed; Argument direction for SetName corrected from "Out" to "In" Moved to 0.9; Test chapter added.
[13 May 2003]	v1.0	Converted to Approved Standard.

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:HVAC_FanOperatingMode:1

2.2. State Variables

Table 1 State Variables

Variable Name	Req. or Opt.[1]	Data Type	Allowed Value [2]	Default Value [2]	Eng. Units
Mode	R	string	see table	Auto	N/a
FanStatus	R	string	see table	none	none
Name	O	string		Zero length string	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.

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.

Table 2 AllowedValueList for Mode

Value	Req. or Opt. [1]
Auto	R
ContinuousOn	R
PeriodicOn	O
Vendor-defined	R
Vendor-defined	O

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

Table 3 AllowedValueList for FanStatus

Value	Req. or Opt. [1]
On	R
Off	R

Vendor-defined		R
Vendor-defined		O

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

2.2.1. Mode

Exposes the target operating mode of an HVAC fan or blower.

2.2.2. FanStatus

Exposes the current operating mode of an HVAC fan or blower.

2.2.3. Name

This optional variable may be used to capture a friendly name or location for this service.

2.2.4. Relationships Between State Variables

None

2.3. Eventing and Moderation

Table 4 Eventing & Moderation

Variable Name	Evented	Moderated Event	Max Event Rate[1]	Logical Combination	Min Delta per Event[2]
Name	Yes	No	none	none	On-change
Mode	Yes	No	none	none	On-change
FanStatus	Yes	No	none	none	On-change
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

Table 5 Event Model

Variable Name	UI requirements	Async Requirements	Func. Vs max rate tradeoffs	Est of Max rate	Reason not evented
Name	Needed for UI			On set-up only	N/a

Mode	Needed for UI			Very low	N/a
FanStatus	Needed for UI			Very low	N/a

2.4. Actions

Table 6 Action list

Name	Req. or Opt. [1]
SetMode	*R*
GetMode	*R*
GetFanStatus	*R*
GetName	O
SetName	O
Non-standard actions implemented by an UPnP vendor go here.	*X*

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

2.4.1. SetMode

Changes the operating mode of the HVAC fan or blower.

2.4.1.1. Arguments

Table 7 Arguments for SetMode

Argument	Direction	relatedStateVariable
NewMode	*IN*	Mode

2.4.1.2. Dependency on State (if any)

None

2.4.1.3. Effect on State (if any)

Sets the new value of Mode

2.4.1.4. Errors

errorCode	errorDescription	Description
700	Mode not available	The requested mode is not available

2.4.2. GetMode

Provides Mode information to control points or other devices

2.4.2.1. Arguments

Table 8 Arguments for GetMode

Argument	Direction	relatedStateVariable
CurrentMode	*Out*^{R}	Mode

R - Return Value

2.4.2.2. Dependency on State (if any)

Depends on the value of Mode

2.4.2.3. Effect on State (if any)

None

2.4.2.4. Errors

errorCode	errorDescription	Description
none		

2.4.3. GetFanStatus

GetFanStatus retrieves the current operational status of the Fan.

2.4.3.1. Arguments

Table 9 Arguments for GetFanStatus

Argument	Direction	relatedStateVariable
CurrentStatus	*Out*^{R}	FanStatus

R - Return Value

2.4.3.2. Dependency on State (if any)

Reflects the current fan status.

2.4.3.3. Effect on State

None

2.4.3.4. Errors

errorCode	errorDescription	Description
none		

2.4.4. GetName

Provides the Name value to a control point or other UPnP device

2.4.4.1. Arguments

Table 10 Arguments for GetName

Argument	Direction	relatedStateVariable
CurrentName	*Out*^{R}	Name

R Return Value

2.4.4.2. Dependency on State (if any)

Reflects the currents value of Name

2.4.4.3. Effect on State

None

2.4.4.4. Errors

errorCode	errorDescription	Description
none		

2.4.5. SetName

Provides a new Name value for the Name variable.

2.4.5.1. Arguments

Table 11 Arguments for SetName

Argument	Direction	relatedStateVariable
NewName	*In*	Name

2.4.5.2. Dependency on State (if any)

None.

2.4.5.3. Effect on State

Changes Name.

2.4.5.4. Errors

errorCode	errorDescription	Description
none		

2.4.6. 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).

2.4.7. Relationships Between Actions

None.

2.4.8. 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 6: 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

This service allows a Control Point to set and observe the operating mode of a HVAC fan or blower. Defined operating modes are:

- Auto or automatic – in this mode the fan cycles with the heating or cooling unit. The HVAC system may impose on and off delays. Delay times are not exposed by this service.
- ContinuousOn – in this mode the fan is on continuously
- PeriodicOn – in this mode the fan cycles with the heat or cooling unit AND will cycle periodically when the heating or cooling unit has not cycled for an extended time. The periodic time is not exposed by this servcie.

Different vendors employ different modes of operation. This service allows vendors to subset the defined operating modes per their particular implementation.

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>SetMode</name>
      <argumentList>
        <argument>
          <name>NewMode</name>
          <direction>in</direction>
     <relatedStateVariable>Mode</relatedStateVariable>
        </argument>
      </argumentList>
    </action>

<actionList>
    <action>
    <name>GetMode</name>
      <argumentList>
        <argument>
          <name>CurrentMode</name>
          <direction>out</direction>
          <retval/>
          <relatedStateVariable>Mode</relatedStateVariable>
        </argument>
      </argumentList>
    </action>

<actionList>
    <action>
    <name>GetFanStatus</name>
      <argumentList>
        <argument>
          <name>CurrentStatus</name>
          <direction>out</direction>
          <retval/>
          <relatedStateVariable>FanStatus</relatedStateVariable>
        </argument>
      </argumentList>
    </action>

<action>
    <name>GetName</name>
      <argumentList>
        <argument>
          <name>CurrentName</name>
          <direction>out</direction>
            <retval/>
          <relatedStateVariable>Name</relatedStateVariable>
        </argument>
      </argumentList>
    </action>

    <action>
    <name>SetName</name>
      <argumentList>
        <argument>
          <name>NewName</name>
          <direction>in</direction>
          <relatedStateVariable>Name</relatedStateVariable>
        </argument>
      </argumentList>
    </action>
    Declarations for other actions added by UPnP vendor (if any) go here
  </actionList>

  <serviceStateTable>
    <stateVariable sendEvents="yes">
      <name>Mode</name>
      <dataType>string</dataType>
      <defaultValue>Auto</defaultValue>
      <allowedValueList>
        <allowedValue>Auto</allowedValue>
        <allowedValue>ContinuousOn</allowedValue>
      The following allowed value is optional
      <allowedValue>PeriodicOn</allowedValue>
      Vendor defined allowed values go here
      </allowedValueList>
    </stateVariable>

   <serviceStateTable>
    <stateVariable sendEvents="yes">
      <name>FanStatus</name>
      <dataType>string</dataType>
      <allowedValueList>
        <allowedValue>Off</allowedValue>
        <allowedValue>On</allowedValue>
      Vendor defined allowed values go here
      </allowedValueList>
    </stateVariable>
      <stateVariable sendEvents="yes">
      <name>Name</name>
      <dataType>string</dataType>

    </stateVariable>


    Declarations for other state variables added by UPnP vendor (if any)
    go here
  </serviceStateTable>
</scpd>
```

4. Test

Testing of the UPnP functions Addressing, Discovery, Description, Control (Syntax) and Eventing are performed by the UPnP Test Tool v1.1 based on the following documents:

- UPnP Device Architecture v1.0
- The Service Definitions in chapter 2 of this document
- The XML Service Description in chapter 3 of this document
- The UPnP Test Tool service template test file: ***HVAC_FanOperatingMode1.xml***
- The UPnP Test Tool service template test file: ***HVAC_FanOperatingMode1.SyntaxTests.xml***

The test suite does not include tests for Control Semantics, since it is felt that such tests would not provide a higher level of interoperability.