ISO/IEC 29341-6-13

Edition 1.0 2008-11

INTERNATIONAL STANDARD

Information technology – UPnP Device Architecture – Part 6-13: Heating, Ventilation and Air Conditioning Device Control Protocol – House Status Service



ISO/IEC 29341-6-13:2008(E)

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 ISO/IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ISO/IEC 29341-6-13

Edition 1.0 2008-11

INTERNATIONAL STANDARD

Information technology – UPnP Device Architecture – Part 6-13: Heating, Ventilation and Air Conditioning Device Control Protocol – House Status Service

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE G

ICS 35.200

ISBN 2-8318-1007-9

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

CONTENTS

FOREWORD 4
ORIGINAL UPNP DOCUMENTS (informative) 6
1. Overview and Scope 8
2. Service Modeling Definitions 9
2.1. Service Type 9
2.2. State Variables 9
2.2.1. OccupancyState 9
2.2.2. ActivityLevel 9
2.2.3. DormancyLevel 10
2.2.4. Relationships Between State Variables 10
2.3. Eventing and Moderation 11
2.3.1. Event Model 11
2.4. Actions 12
2.4.1. GetOccupancyState 12
2.4.2. GetActivityLevel 12
2.4.3. GetDormancyLevel 13
2.4.4. SetOccupancyState 13
2.4.5. SetActivityLevel 14
2.4.6. SetDormancyLevel 14
2.4.7. Non-Standard Actions Implemented by a UPnP Vendor 15
2.4.8. Common Error Codes 15
2.5. Theory of Operation 16
2.6. Synchronization of Multiple Instances 16
3. XML Service Description 18
4. Test 20

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

LIST OF TABLES

Table 1: State Variables 9
Table 2: AllowedValueList for ActivityLevel 10
Table 3: DefaultValue for ActivityLevel 10
Table 4: AllowedValueList for DormancyLevel 10
Table 5: DefaultValue for DormancyLevel 10
Table 6: Event Moderation 11
Table 7: Actions 12
Table 8: Arguments for GetOccupancyState 12
Table 9: Arguments for GetActivityLevel 12
Table 10: Arguments for GetDormancyLevel 13
Table 11: Arguments for SetOccupancyState 13
Table 12: Arguments for SetActivityLevel 14
Table 13: Arguments for SetDormancyLevel 14
Table 14: Common Error Codes 15

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 6-13: Heating, Ventilation and Air Conditioning Device Control Protocol – House Status Service

FOREWORD

1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.

2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.

4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.

6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC publication.

7) All users should ensure that they have the latest edition of this publication.

8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.

9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

IEC and ISO draw attention to the fact that it is claimed that compliance with this document may involve the use of patents as indicated below.

ISO and IEC take no position concerning the evidence, validity and scope of the putative patent rights. The holders of the putative patent rights have assured IEC and ISO that they are willing to negotiate free licences or licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of the putative patent rights are registered with IEC and ISO.

Intel Corporation has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Intel Corporation
Standards Licensing Department
5200 NE Elam Young Parkway
MS: JFS-98
USA – Hillsboro, Oregon 97124

Microsoft Corporation has informed IEC and ISO that it has patent applications or granted patents as listed below:

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

6101499 / US; 6687755 / US; 6910068 / US; 7130895 / US; 6725281 / US; 7089307 / US; 7069312 / US; 10/783 524 /US

Information may be obtained from:

Microsoft Corporation
One Microsoft Way
USA – Redmond WA 98052

Philips International B.V. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Philips International B.V. – IP&S
High Tech campus, building 44 3A21
NL – 5656 Eindhoven

NXP B.V. (NL) has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

NXP B.V. (NL)
High Tech campus 60
NL – 5656 AG Eindhoven

Matsushita Electric Industrial Co. Ltd. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Matsushita Electric Industrial Co. Ltd.
1-3-7 Shiromi, Chuoh-ku
JP – Osaka 540-6139

Hewlett Packard Company has informed IEC and ISO that it has patent applications or granted patents as listed below:

5 956 487 / US; 6 170 007 / US; 6 139 177 / US; 6 529 936 / US; 6 470 339 / US; 6 571 388 / US; 6 205 466 / US

Information may be obtained from:

Hewlett Packard Company
1501 Page Mill Road
USA – Palo Alto, CA 94304

Samsung Electronics Co. Ltd. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Digital Media Business, Samsung Electronics Co. Ltd.
416 Maetan-3 Dong, Yeongtang-Gu,
KR – Suwon City 443-742

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29341-6-13 was prepared by UPnP Implementers Corporation and adopted, under the PAS procedure, by joint technical committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

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.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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
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

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

1. Overview and Scope

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

This service-type provides an indication about house occupancy status and operational mode. It is commonly used as a mechanism for influencing the state of Devices and/or Control Points depending upon whether people are in the house. Typical applications are: e.g. switching on or off lights, air-conditioning etc.

Occupancy status can be derived i) directly from an occupant via a user interface, or ii) indirectly by algorithms such as a calendar program, or iii) indirectly by heuristics that determine the status from subsystem or device activity. That is to say: this service type would be implemented in two types of occupancy "detector" devices:

- A physical switch (e.g. a home/away push button on a device).
- A "virtual" switch that uses some kind of algorithm or heuristics to work out if the house is occupied (e.g. a calendar or a predictive algorithm).

In case a) the physical detection device would incorporate this occupancy service, but in case b) the MMI of the device that contains the algorithm would incorporate this occupancy service.

This service is a “source” of UPnP event messages. Control Points that are interested to be updated about the occupancy state of the house should subscribe to receive events from this service type. (However, Control Points are also permitted to “poll” the service from time to time in order to enquire about the current occupancy state).

This service template does not address:

- Presence detection for security alarm purposes.
- Actual number of persons in the building (or building part) e.g. for demand controlled ventilation in (say) a conference room.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2. Service Modeling Definitions

2.1. Service Type

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

urn:schemas-upnp-org:service:*HouseStatus: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
OccupancyState	R	string	Occupied, Unoccupied, Indeterminate	Occupied	none
ActivityLevel	O	string	See table 2	See table 3	none
DormancyLevel	O	string	See table 4	See table 5	none
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.

2.2.1. OccupancyState

This is a read only variable that represents the occupancy status of the house, whereby:

- **Occupied** = People in the house
- **Unoccupied** = No people in the house
- **Indeterminate** = The service is unable to determine if the house is occupied or not.

2.2.2. ActivityLevel

This is an optional read only variable that acts as a qualifier to provide an extra level of detail concerning the occupancy status of the house. It indicates the level of activity of the occupants. Whereby:

- **Regular** = Indicates that the house is in a neutral/normal state of occupancy. Note: ActivityLevel is optional, so in case of a service where ActivityLevel is NOT implemented, a Control Point should assume that the activity level is regular.
- **Asleep** = Means that although the house is occupied, the occupants are asleep – meaning that the degree of activity is lower than "Regular". (example: this could be used to adjust the temperature or switch off lights).
- **HighActivity** = Means that the house is occupied with a degree of activity that is higher than "Regular" – e.g. for a party. (example: this could be used to increase the speed of a ventilation fan).

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

Table 2: AllowedValueList for ActivityLevel

Value	Req. or Opt.
Regular	R
Asleep	R
HighActivity	R
Vendor-defined	O

[1] R = Required, O = Optional

Table 3: DefaultValue for ActivityLevel

Value	Req. or Opt.
Regular	R

[1] R = Required, O = Optional

2.2.3. DormancyLevel

This is an optional read only variable that acts as a qualifier to provide an extra level of detail concerning the un-occupied status of the house. It indicates the expected duration of the absence. Whereby:

- **Vacation** = Means that the duration of the unoccupied period is expected to be, (but not guaranteed to be), longer than 1 day.
- **Regular =** Indicates that the house is in a neutral/normal state of un-occupancy. Note: DormancyLevel is optional, so in case of a service where DormancyLevel is NOT implemented, a Control Point should assume that the level is regular.
- **PetsAtHome** = The house is not occupied by humans, but there may be pets moving around inside the house. (i.e. the security motion detectors inside the house should not be armed).

Table 4: AllowedValueList for DormancyLevel

Value	Req. or Opt.
Vacation	R
Regular	R
PetsAtHome	R
Vendor-defined	O

[1] R = Required, O = Optional

Table 5: DefaultValue for DormancyLevel

Value	Req. or Opt.
Regular	R

[1] R = Required, O = Optional

2.2.4. Relationships Between State Variables

None.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.3. Eventing and Moderation

For the HouseStatus service, an example event subscription would be as follows:

a) A thermostat (say) implements the HouseStatus service in the physical form of a home / away button on the front.

b) The Lights, Answering machine, Oven, Lawn Sprinkler (or whatever) do an M-SEARCH for an HouseStatus service, and when they find one, they subscribe to receive events from that service using SUBSCRIBE. (In principle, the thermostat could also use a subscription to its own HouseStatus service too, but in practice since it is in the same device, it would probably use an internal signal instead).

c) When the homeowner presses the home / away button on the thermostat, the service publishes (sources) the corresponding OccupancyState change event NOTIFY message.

d) The Lights, Answering machine, Oven, Lawn Sprinkler (or whatever) and thermostat all receive (sink) this notification and switch over into their "Occupied" respectively "Unoccupied" mode accordingly.

Table 6: Event Moderation

Variable Name	Evented	Moderated Event?	Max Event Rate [1]	Logical Combination	Min Delta per Event [2]
OccupancyState	Yes	Yes	30	no	See note 3
ActivityLevel	Yes	Yes	30	no	See note 3
DormancyLevel	Yes	Yes	30	no	See note 3
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).

Note 3: Never send events if the value of the state variable has not changed! This is important for avoiding race conditions. See section 2.6

2.3.1. Event Model

2.3.1.1. Delayed Response

Depending on the physical implementation of the containing device, a state change of HouseStatus may be triggered in a number of ways: e.g. “going out” button on the front of a security panel, “standby” button on a room thermostat etc. Especially, in the case of human operated buttons, etc. it is obvious that the person will still remain in the building for a certain period even AFTER the button has been set to Unoccupied mode. Therefore any Control Point that subscribes to HouseStatus events must make allowances for this.

Example: After receiving an OccupancyState=Unoccupied event, a lighting circuit should perhaps wait for a certain period of time before turning off the lights. However, in the case of receiving an OccupancyState=Occupied event, it should probably turn on the lights immediately.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4. Actions

Table 7: Actions

Name	Req. or Opt. [1]
GetOccupancyState	R
GetActivityLevel	O
GetDormancyLevel	O
SetOccupancyState	R
SetActivityLevel	O
SetDormancyLevel	O
Non-standard actions implemented by an UPnP vendor go here.	X

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

2.4.1. GetOccupancyState

Reads the current value of OccupancyState

2.4.1.1. Arguments

Table 8: Arguments for GetOccupancyState

Argument	Direction	relatedStateVariable
CurrentOccupancyState	OUT [R]	OccupancyState

[R] = Return Value (RETVAL)

2.4.1.2. Effect on State

None.

2.4.1.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.2. GetActivityLevel

Reads the current value of ActivityLevel

2.4.2.1. Arguments

Table 9: Arguments for GetActivityLevel

Argument	Direction	relatedStateVariable
CurrentActivityLevel	OUT [R]	ActivityLevel

[R] = Return Value (RETVAL)

2.4.2.2. Effect on State

None.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4.2.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.3. GetDormancyLevel

Reads the current value of DormancyLevel

2.4.3.1. Arguments

Table 10: Arguments for GetDormancyLevel

Argument	Direction	relatedStateVariable
CurrentDormancyLevel	OUT [R]	DormancyLevel

[R] = Return Value (RETVAL)

2.4.3.2. Effect on State

None.

2.4.3.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.4. SetOccupancyState

Changes the value of OccupancyState.

2.4.4.1. Arguments

Table 11: Arguments for SetOccupancyState

Argument	Direction	relatedStateVariable
NewOccupancyState	IN	OccupancyState

[R] = Return Value (RETVAL)

2.4.4.2. Effect on State

Changes the value of OccupancyState.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4.4.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.5. SetActivityLevel

Changes the value of ActivityLevel

2.4.5.1. Arguments

Table 12: Arguments for SetActivityLevel

Argument	Direction	relatedStateVariable
NewActivityLevel	IN	ActivityLevel

[R] = Return Value (RETVAL)

2.4.5.2. Effect on State

Changes the value of ActivityLevel

2.4.5.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.6. SetDormancyLevel

Changes the value of DormancyLevel.

2.4.6.1. Arguments

Table 13: Arguments for SetDormancyLevel

Argument	Direction	relatedStateVariable
NewDormancyLevel	IN	DormancyLevel

[R] = Return Value (RETVAL)

2.4.6.2. Effect on State

Changes the value of DormancyLevel.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4.6.3. Errors

errorCode	errorDescription	Description
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
800-899	*TBD*	*(Specified by UPnP vendor.)*

2.4.7. 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).

2.4.8. 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 14: 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.)*

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.5. Theory of Operation

This service-type provides an indication about house occupancy status and operational mode. It is commonly used as a mechanism for influencing the state of Control Points depending upon whether people are in the house. For example, when the house is unoccupied, the environmental system may use a different heating or cooling goal, or the lighting system may turn unneeded lights off.

Typically such a Control Point may SUBSCRIBE to receive occupied / unoccupied events from the OccupancyState variable; whenever it receives the respective event notifications, it will adjust it's state accordingly. Alternatively a Control Point may poll this service using the GetOccupancyState function.

It is the responsibility of each device vendor to select a behavior --a strategy-- that is appropriate for best supporting the user's desire for a given state reported by the HouseStatus service. This mechanism should provide a simple, coordinated way for users to operate their homes.

Occupancy State	Activity Level	Dormancy Level	Remarks
Occupied	Regular		There are people in the house. There is a "normal" (i.e. regular) amount of occupant activity.
	Asleep		There are people in the house. There is a ***below*** "normal" amount of occupant activity – e.g. the occupants are sleeping.
	HighActivity		There are people in the house. There is an ***above*** "normal" amount of occupant activity – e.g. the occupants are partying.
Unoccupied		Regular	There are no people in the house (i.e. the house is "dormant"). The level of dormancy is "normal" – e.g. the occupants are out at work, and they are expected to return in the evening.
		Vacation	There are no people in the house. The level of dormancy is ***above*** "normal" – e.g. the occupants are away on vacation (say > 48 hours absence).
		PetsAtHome	There are no people in the house. The level of dormancy is ***below*** "normal" – e.g. the occupants are out at work, but they left their pet animal(s) at home; the pet(s) may be moving about the home.
Indeterminate			The service is currently unable to ascertain the state of the house,

2.6. Synchronization of Multiple Instances

It is conceivable that a home might contain more than one instance of the HouseStatus service (e.g. a home / away button on the thermostat, and another one on the security panel). This could lead to potentially confusing situations where one device might indicate an occupied status and another might indicate an unoccupied status. In order to resolve this issue, vendors MUST to do the following:

i) Each device that implements the HouseStatus service, MUST also implement a Control Point.

ii) On initialization, (and from time to time thereafter), this Control Point must search for all other instances of HouseStatus.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

iii) This Control Point must subscribe to receive event notifications from all such other instances of HouseStatus that it finds.

iv) Whenever this Control Point receives an occupancy state change notification from another instance of the HouseStatus service, the service must update the value of its OccupancyState, ActivityLevel or DormancyLevel variables to the same value(s) as that received in the notification message.

v) If (and only if) the value of its own OccupancyState, ActivityLevel or DormancyLevel variables change, the service shall in turn notify all other Control points that have subscribed to it. NB the HouseStatus service should NEVER send state change notifications if the value of its OccupancyState, ActivityLevel or DormancyLevel variables have not changed – since otherwise race conditions could develop with two or more instances of the HouseStatus service notifying each other in a circular fashion.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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>GetOccupancyState</name>
      <argumentList>
        <argument>
          <name>CurrentOccupancyState</name>
          <direction>out</direction>
          <retval />
          <relatedStateVariable>OccupancyState</relatedStateVariable>
        </argument>
      </argumentList>
   </action>
   <action>
    <name>GetActivityLevel</name>
      <argumentList>
        <argument>
          <name>CurrentActivityLevel</name>
          <direction>out</direction>
          <retval />
          <relatedStateVariable>ActivityLevel</relatedStateVariable>
        </argument>
      </argumentList>
   </action>
   <action>
    <name>GetDormancyLevel</name>
      <argumentList>
        <argument>
          <name>CurrentDormancyLevel</name>
          <direction>out</direction>
          <retval />
          <relatedStateVariable>DormancyLevel</relatedStateVariable>
        </argument>
      </argumentList>
   </action>
   <action>
    <name>SetOccupancyState</name>
      <argumentList>
        <argument>
          <name>NewOccupancyState</name>
          <direction>in</direction>
          <relatedStateVariable>OccupancyState</relatedStateVariable>
        </argument>
      </argumentList>
   </action>
   <action>
    <name>SetActivityLevel</name>
      <argumentList>
        <argument>
          <name>NewActivityLevel</name>
          <direction>in</direction>
          <relatedStateVariable>ActivityLevel</relatedStateVariable>
        </argument>
      </argumentList>
```

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

```
    </action>
    <action>
     <name>SetDormancyLevel</name>
       <argumentList>
         <argument>
           <name>NewDormancyLevel</name>
           <direction>in</direction>
           <relatedStateVariable>DormancyLevel</relatedStateVariable>
         </argument>
       </argumentList>
    </action>
Declarations for other actions added by UPnP vendor (if any) go here
  </actionList>
  <serviceStateTable>
    <stateVariable sendEvents="yes">
      <name>OccupancyState</name>
      <dataType>string</dataType>
      <defaultValue>Occupied</defaultValue>
      <allowedValueList>
        <allowedValue>Occupied</allowedValue>
        <allowedValue>Unoccupied</allowedValue>
        <allowedValue>Indeterminate</allowedValue>
      </allowedValueList>
    </stateVariable>
    <stateVariable sendEvents="yes">
      <name>ActivityLevel</name>
      <dataType>string</dataType>
      <defaultValue>Regular</defaultValue>
      <allowedValueList>
        <allowedValue>Regular</allowedValue>
        <allowedValue>Asleep</allowedValue>
        <allowedValue>HighActivity</allowedValue>
      </allowedValueList>
    </stateVariable>
    <stateVariable sendEvents="yes">
      <name>DormancyLevel</name>
      <dataType>string</dataType>
      <defaultValue>Regular</defaultValue>
      <allowedValueList>
        <allowedValue>Regular</allowedValue>
        <allowedValue>Vacation</allowedValue>
        <allowedValue>PetsAtHome</allowedValue>
      </allowedValueList>
    </stateVariable>
Declarations for other state variables added by UPnP vendor (if any)
    go here
  </serviceStateTable>
</scpd>
```

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

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: ***HouseStatus1.xml***
- The UPnP Test Tool service template test file: ***HouseStatus1.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.

--`,,```,,,,````-`-`,,`,,`,`,,`---
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
Fax: + 41 22 919 03 00
info@iec.ch
www.iec.ch

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale