

Summary of Changes between UPnP Device Architecture V1.0 (June 2000) and V1.0.1 (May 2003)

Change Type:

- E = Editorial only
- C = Technical, but backwardly compatible
- X = Technical, and may raise backward compatibility concerns for devices implementing only the original v1.0 spec while ignoring other referenced documents, the Implementation Guide, Technical Committee issue writeups, etc.

Change Type	Location	Description
E	Throughout	Applied UIC usage rules for "UPnP" and "Universal Plug and Play" including trademark footnotes.
E	Throughout	Applied grammar, spelling, punctuation, formatting, and terminology corrections.
E	Throughout	Updated URLs to referenced standards.
E	Table of Contents	Added table of contents with page numbers.
E	Introduction	Relocated language related to DHCP and DNS servers being optional.
E	Introduction / UPnP Forum	Added description of UIC.
E	Introduction / In this document	Added description of type style and color usage to convey where protocol elements are defined.
E	Introduction / In this document, 1.0	Changed references to SSDP and GENA to indicate they are defined within the document as opposed to separate drafts.
C	Introduction / In this document	Defined "controlled devices" and "control points".
C	Introduction / Required vs. recommended	Defined "shall", "must not", "shall not", "should not".
E	Introduction / Acronyms	Defined "CP", "DCP", "HTTPMU", "HTTPU", "SOAP", "UDA"; delete definitions of "FXPP", "ICANN", and "UPnP".
E	0	Incorporated relevant portions of Auto-IP draft into this document instead of referencing an external document.
X	0, A	Incorporated IPv6 Annex. Declare that devices can support IPv4, IPv6, or both (IPv4 is optional if IPv6 is supported).
X	0	Devices which incorporate a DHCP server need not obtain their IP address from a separate DHCP server but may allocate one to themselves.
C	0.2	Recommendation that devices allocate Auto-IP addresses using a pseudo-random algorithm across the address range to minimize collisions.
C	0.3	Recommendation that ARP probe to determine availability of Auto-IP address be sent four times at two-second intervals.
C	0.3	Recommendation that after selecting Auto-IP address, send two ARPs filling in Sender address to flush caches of other devices.
C	0.3	Allow, but do not require, devices to cache their selected Auto-IP address and try it first after a reboot.
X	0.3	Devices must listen for ARPs sent by other with their IP address as the Sender address, and resolve the collision using a prescribed mechanism. Devices must not ignore ARPs indicating an address conflict.
C	0.3	Devices should broadcast ARPs to facilitate timely detection of collisions.
X	0.3	Devices must not send packets with source or destination Auto-IP addresses to a router for forwarding.
X	0.3	Devices with multiple interfaces must use different Auto-IP addresses on each interface to avoid ambiguity.
C	0.4	Devices which had been operating using an Auto-IP address that receive a DHCP-assigned address may continue to also use the Auto-IP address indefinitely.
X	0.4	Devices that use multiple IPv4 address may use the NLS header to allow control

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		points to identify them as single devices.
C	0.4, 1.0	When devices switch from one IP address to another, they should (rather than <i>must</i>) cancel outstanding advertisements on the old address.
X	0.5	Devices that provide a host name to a DHCP server and register with a DNS server must provide a mechanism to insure the host name is unique.
E	0.7	Deleted reference to obsolete IETF draft on interaction between DHCP and DNS.
C	1.0	Clarify that multihomed devices should send UPnP advertisements on all interfaces on which UPnP is enabled, and that the LOCATION header of each must be reachable on the network on which it is sent.
X	1.0	UPnP advertisements and searches must not be sent on external Internet interfaces.
X	1.0, 1.1.2, 1.1.3, 1.2.2	TTL on multicast packets are recommended, but not required, to default to 4.
X	1.0	When a TTL is used that is greater than 1 and a DHCP-assigned address is being used, an IGMP Join message must be sent to the router.
C	1.0, 2.0	Clarify that both <i>major</i> and <i>minor</i> components of the architecture version are separate integers, rather than being a single decimal number.
E	1.1.2	Clarify definition of "NT" and "USN".
E	1.1.2	Clarify which portions of NT and USN in SSDP messages are literals as opposed to values inserted by the implementation.
C	1.1.2	Clarify that if a device contains multiple instances of the same service, it is only necessary to advertise the service type once.
X	1.1.2	Device must advertise only the highest supported version of a device or service type, not all supported versions.
X	1.1.2	Advertisements in a set must have comparable durations and be refreshed as a group.
X	1.1.2	Devices must wait a random interval between 300 and 3000 msec after connection to the network, obtaining a new address, or activating a new interface, before sending the initial set of advertisements.
X	1.1.2	Devices which cannot detect when they are connected to the network must refresh their advertisements more quickly until they receive packets or other evidence of being connected to the network, then back off to the normal advertisement duration.
C	1.1.2	Devices which frequently enter and leave the network (such as handheld or mobile devices) may use a shorter advertisement duration than the recommended 30 minutes.
C	1.1.2	Recommend that advertisements be refreshed at a random interval between one-fourth and one-half of the duration in order to have an opportunity for multiple refresh cycles within the duration, and to avoid advertisement refresh storms.
X	1.1.2, 1.1.3, 1.2.2	If the port number 1900 is omitted from the HOST header, the recipient should assume it is 1900.
C	1.1.2	Vendor-defined device and service types may be advertised.
X	1.2	Control points may search for a prefix substring of a type; enables version-independent searches.
X	1.2	Devices must match a prefix substring of a supported type in an SSDP search and respond with all matching types; enables version-independent searches.
E	1.2.2	Clarify what the "M-" prefix means in "M-SEARCH".
X	1.2.2	M-SEARCH may be unicast to a device if its IP address is already known (such as an IGD whose address is known through DHCP).
E	1.2.2	Clarify that "MAN" header is defined in HTTP extension framework.
E	1.2.2	Clarify that MX is enumerated in seconds.
X	1.2.2	MX value must be between 1 and 120 inclusive. (Was in HTTPMU spec)
C	1.2.2	Allows searches for vendor-defined device and service types.
X	1.2.2	Control points must allow at least the time they specified in the MX header, plus some additional time, for responses to arrive from devices (was in HTTPMU spec).

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X	1.2.2	Control points must not search for prefixes of "ssdp:all", "upnp:rootdevice", or "uuid:".
X	1.2.3	Control points must not respond to partial prefix matches of UUIDs, only device or service types.
X	1.2.3	Devices must wait a random interval between 0 seconds and the MX header value before responding to a search, in order to spread out the responses over time (was in HTTPMU spec).
C	1.2.3	If a device must send multiple responses to a search, the responses should be spread out over the interval from 0 to the MX header value.
X	1.2.3	If a search request does not contain an MX header, devices must silently discard the search request and not respond.
C	1.2.3	If a search request contains an MX value greater than 120, devices should assume that the value is 120.
C	1.2.3	Devices should not stop responding to other search requests while waiting for the MX value interval.
X	1.2.3	Multi-homed devices must respond to search requests on the same interface and address on which the request was received.
E	1.2.3	Clarify where EXT header is defined.
C	1.2.3	Allow responses to searches for vendor-defined device and service types.
E	1.2.3	Clarify values returned in USN header.
X	1.2.3	Devices must NOT send a 412 Precondition Failed error or any other error for malformed search requests.
X	1.2.3	Responses to M-SEARCH requests are sent only once, not multiple times. (this may have been over-zealousness by the editor removing language that duplicated the advertisement language).
C	2.0	Control points must assume a device is no longer available if its advertisements expire.
C	2.0	Clarify rules regarding backward compatibility of device and service versions, preliminary draft version numbers, relationship between architecture version and device/service version.
X	2.1	Some implementations may strictly enforce length limits noted on various description elements, so working committees and vendors should abide by those limits.
X	2.1	URLBase is deprecated in favor of using the URL from which the description document was downloaded.
X	2.1	When combining URLs, the rules in RFC 2396 must be followed rather than simply appending values.
X	2.1	Domain name portions of URNs must have the dots replaced by hyphens in accordance with RFC 2141.
C	2.1	Icon sizes are vendor specific; no particular icon sizes are recommended or required.
C	2.1	Recommended that if icons are specified, at least one be in PNG format.
X	2.1, 2.6	The serviceList element in the device description is <i>optional</i> . Devices may exist that define no services. Also, the serviceList element may be present but contain no service elements.
X	2.1, 2.3	Control points must ignore XML comments and processing instructions embedded in device and service descriptions.
X	2.1, 2.3	Devices must not send XML comments or processing instructions in device or service descriptions.
X	2.1, 2.3	Device and service descriptions must be encoded in UTF-8.
C	2.1	Control points need not be capable of decoding UTF-16 in device and service descriptions.
X	2.1	PNG icons must not be progressively encoded.

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X	2.3	Clarified the allowed character set for names of actions, arguments, and state variables.
E	2.3	Clarified that "relatedStateVariable" defines only the type of an argument and does not imply any semantic relationship between the argument and the state variable.
X	2.3	Boolean data types must contain only "0" or "1". Values of "true", "false", "yes", or "no" are not permitted.
X	2.3	AllowedValue strings <i>must</i> be less than 32 characters long (rather than <i>should</i>)
X	2.3, 2.4	allowedValueList and allowedValueRange may specify optional device capabilities. Working committees must specify whether the entire list or range must be supported, require a minimum subset with other values optional, allow vendors to define additional values or range, etc. Unsupported values must be omitted from the service description by the device.
X	2.3, 3.2.1, 3.2.2	Clarified that unrecognized XML elements and attributes should be ignored (there's no concept of "mustUnderstand"). This used to be in the FXPP referenced document.
E	2.6, 2.7	Define "textOnly" and "eltOnly" in schema definition.
E	2.7	Deleted the "Augmenting the UPnP Template Language" section in its entirety, since nobody ever used it.
C	2.8	Multi-homed devices must respond to requests to retrieve device and service descriptions on the same address and interface from which the request was received.
X	3.0, 3.3, 4.0, 4.4	QueryStateVariable is deprecated and removed. Working committees or vendors must define actions to retrieve specific values.
X	3.0	UPnP control messages must be encoded using UTF-8.
C	3.0	UPnP devices need not support decoding of UTF-16.
C	3.0	Advise that if large amounts of data need to be transferred that it be done by passing a URL or some other out-of-band mechanism rather than within a SOAP argument.
X	3.2.1	Every "in" argument defined for the action must be included in the SOAP request, in the order defined.
X	3.2.1	Devices must return a 415 Unsupported Media Type error if the CONTENT-TYPE header does not specify "text/xml".
X	3.2.1	Control points shall not send XML comments or processing instructions embedded in SOAP messages.
X	3.2.1	Devices shall ignore XML comments and processing instructions embedded in SOAP messages.
X	3.2.1, 3.2.2	XML namespace identifiers need not be the same as specified in the examples ("s" or "u"), but can be any value legally used.
X	3.2.1	When invoking an action that has no arguments, a combined element (e.g., "<actionname/>") may be used instead of separate start and end tags.
C	3.2.2	Clarified the point from which the response timer should be measured.
C	3.2.2	Clarified that actionNameResponse and argumentName are case sensitive.
X	3.2.2	Clarified that every "out" argument defined for the action must be included in the SOAP response in the order specified in the service description.
X	3.2.2	Devices shall not send XML comments or processing instructions in SOAP responses.
X	3.2.2	Control points shall ignore XML comments and processing instructions in SOAP responses.
X	3.2.2	When responding to an action that has no "out" arguments, a combined element (e.g., "<actionnameResponse/>") may be used instead of separate start and end tags.
C	3.2.2	Clarified (from the HTTP spec) rules for closing the socket after responding in HTTP 1.0.

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C	3.2.2	Multi-homed devices must send SOAP responses using the same address and interface from which the request was received.
X	3.2.2	Deprecated UPnP error value 403.
X	3.2.2	Added several 600-series UPnP error values.
C	4.0	Clarified that eventing is not necessarily designed to keep all control points informed of the entire state of a service (unless it is designed that way by a working committee or vendor).
X	4.1, 4.2	The event key is a 32-bit unsigned integer that wraps from 4294967295 to 1. When represented on the wire, it is an ascii integer, not zero-filled to be exactly eight digits long.
X	4.1, 4.2	The initial event message (event key 0) is always sent even if the control point unsubscribes immediately.
X	4.1	The device must insure that the control point has received the subscription response before sending the initial event message.
X	4.1.1	CALLBACK URLs must be HTTP URLs.
X	4.1.1	Each callback URL must be enclosed in angle brackets.
X	4.1.1	Device must not truncate callback URLs in any way, and must reject the subscription if insufficient memory is available.
C	4.1.1	Clarified the formatting of the TIMEOUT header.
C	4.1.1, 4.1.2, 4.1.3	Multi-homed devices must respond to subscription, renewal, and unsubscribe requests using the same address and interface from which the request was received.
C	4.1.1	Clarified (from the HTTP spec) rules for closing the socket after responding in HTTP 1.0.
C	4.1.2	Clarified that the initial event message is not sent again on a subscription renewal.
X	4.2	Event message are encoded using UTF-8; devices and control points need not be capable of decoding UTF-16.
X	4.2	Multiple updates to a single evented state variable must be sent in separate messages.
X	4.2	The <i>variableName</i> element in the <i>propertyset</i> element must not be qualified by any namespace.
X	4.2	Devices shall not embedded XML comments or processing instructions in event notifications, and control points shall ignore any they receive.
C	4.2	Multi-homed devices shall send event notifications using the same address and interface from which the subscription request was received.
C	4.2	Devices should abandon sending an event message if unable to connect to any of the callback URLs, but should trying to send future event messages until the subscriptions expires or is cancelled.
C	4.2	Clarify that a control point using HTTP 1.0 without the KeepAlive token must close the socket after responding to an event notification. (from HTTP spec)