

For V1.01 Standard Service Template

Naming conventions and versioning (Service Template Title Page)

- ___ 1. The Service name is compliant with UPnP naming and versioning conventions
- Service name is descriptive of function, < 64 characters.
 - Capitalizes first letter of each word used in the name.
 - Draft version number 0.8 - 0.9 is appended to the service name reflecting TDC.
 - Template file name reflects the ServiceType and version replacing ":" with a space. For example, ServiceType 0.8.

Overview and Scope (Service Template Section 1)

- ___ 2. The Overview provides a synopsis of the service's function and intended application.
- Provides a clear, 3-5 sentence summary of service functionality from an application perspective.
 - Should list primary functions at a higher level than the action-set (ie; groups of Actions may be described)
 - Identifies functionality not addressed by this service.
 - Includes a change log outlining evolution of the design at a high level.

State Variables (Service Template Section 2.2)

- ___ 3. State Variable names are compliant with UPnP naming conventions
- Are descriptive of the state variable's function, < 32 Characters
 - Capitalize the first letter of each word used in the name
 - Do not use reserved prefixes (X_ or A_) except as intended
- ___ 4. State Variable specifications are complete.
- Each variable is specified as Required or Optional.
 - Data types are specified for each variable.
 - Variables of type A_ARG_TYPE_StateVariable are correctly specified:
 - Same as any other variable except: List n/a (not applicable) for DefaultValue and n/a for Engineering Units.
 - Engineering units based on SI standard units are specified where they apply. See <http://www.ex.ac.uk.cimt/dictunit/dictunit.htm>
- ___ 5. AllowedValues (Recommended) are correctly specified.
- AllowedValue's are specified for Number (allowedValueRange) and String (allowedValueList) data types only.
 - AllowedValues (if specified) are consistent with the bounds set by the variable's data type. For example, a variable of type "i1" must not list an allowedValue exceeding 127.
 - AllowedValues (if specified) are clearly defined including:
 - Required or Optional values
 - Standard Value or "vendor-defined" placeholders - in the proper word style
 - Footnotes (where necessary) to identify standard requirements.
 - AllowedValueRange (if specified) includes values or "vendor-defined" placeholders for a range specification including: min, max and step.

- ___ 6. DefaultValues (Optional) are correctly specified.
- a) DefaultValues (Optional) are specified where necessary to define the initial or reset state of the service.
 - b) Default values (if specified) are clearly defined including:
 - Required or Optional
 - Standard Value or "vendor-defined" placeholders - in the proper word style
 - Footnotes (where necessary) to identify standard requirements.
 - c) Default values (if specified) are consistent with the boundaries set by allowedValues and the variable's data type.

- ___ 7. State Variable descriptions (recommended) adequately define function and usage.
- a) Variable Description specifies each variable's run-time persistence (static or dynamic) and functional significance.
 - b) Relationships between state variables including any functional groupings, or modeling dependencies (e.g. Array modeling) etc. are specified following the state variable descriptions.

Eventing and Moderation (Service Template section 2.3)

- ___ 8. All state variables are specified in the event moderation table.
- a) Exception: Specification of A_ARG_TYPE_StateVariables in this table is optional since variables of this type do not have any Eventing functionality.
 - b) Variables with evented = "No" list n/a (not applicable) for moderation specifications.
 - c) Variables with evented = "No" affect a static property in the XML service description, and require changing the XML service schema from the default <stateVariable sendEvents = "Yes"> to "No" for each state variable that is not evented.

- ___ 9. Moderation specifications are complete
- d) Variables with evented = "Yes" may include moderation specifications (optional). Note, in the absence of moderation, events are triggered on each change in the variable's value.
 - e) All variables that are moderated must specify a moderation effect:
 - Max Rate
 - Min Delta
 - Some combination of the two: Max Rate And/OR Min Delta

- ___ 10. The Description of the Event Model (recommended) should summarize basic design assumptions and requirements for eventing and moderation for use by an application developer including:
- a) User interface requirement (if any)
 - b) Asynchronous action requirement (if any)
 - c) Functional versus Max Rate tradeoffs for moderation (if any)
 - d) If a relatively high event frequency is required, an estimate for the maximum event rate associated with the service?
 - e) Reason not evented (if not obvious)

Actions (Service Template section 2.4)

- ___ 11. Action names are compliant with UPnP naming conventions
 - a) All actions are listed in Table 3 as either Required or Optional.
 - b) Action names are descriptive of the function, and are < 32 characters.
 - c) Action names are in "Verb-Noun" form (recommended) For example, ActionObject = SetTargetLevel).
 - d) The first letter of each word used in each action name is capitalized.
 - e) Actions do not use reserved prefixes (e.g. X_, A_ etc.) except as intended. (X_ is for non standard actions, state variables, allowed Values etc.; A_ is reserved by the UPnP architecture – for example, A_ARG_TYPE_StateVariables).

- ___ 12. Action specifications are complete as necessary to facilitate implementation and test.
 - a) A complete Action Specification is provided for each action supported by the service in section 2.4.x.
 - b) For each action, a description (recommended) of the action follows the section header, "2.4.x ActionName" as needed to supplement detailed action specifications.
 - c) Action descriptions describe the functional behavior of the action, for example, what the action does; the need for "Atomic Read or Write access to variable sets" etc.
 - d) A Description of the Relationship Between Actions (following the last Action Specification in section 2.4) is provided as necessary to describe dependencies or interactions between actions in a service including shared state variables, atomic action sequences etc.

- ___ 13. Actions are defined for synchronous operation
 - a) Actions are guaranteed to complete by returning response codes and any "Out" arguments in < 30 seconds.

- ___ 14. Action argument specifications are complete
 - a) Argument names follow the same naming conventions as state variables – see 3. above. Note; all action arguments specified must be implemented by the service.
 - b) Action argument names are unique from StateVariable names. (ie; Action arguments are different from state variables). For example, arguments cannot be queried via a Get() action, do not persist state etc.
 - c) A direction (In, Out) with respect to the service has been specified for each argument. For example, In-arguments are passed to a service when an action is invoked, while out arguments return values as a result of the action.
 - d) "IN" arguments are listed first before "OUT" arguments in the Action Specification.
 - e) The first and only the first "OUT" argument for each action may include a footnote^R to declare a "retval" for the action. This declaration is optional and is provided for platform APIs that expose a return value related to this action.

- ___15. A RelatedStateVariable is specified for each argument.
- a) A RelatedStateVariable of the same data type is specified for each of the action's arguments as necessary to type the argument.
 - b) If a RelatedStateVariable of the appropriate DataType did not exist, one has been declared with prefix A_ARG_TYPE where Type may be any of UPnP supported data types.
 - c) All relatedStateVariables of type A_ARG_TYPE must be specified in "Table 1 State Variables" in accordance with 4. c) above.
- ___16. The action's behavior in the context of service state has been specified as necessary to support definition of semantic test cases.
- a) An action's dependency on state (if any) has been specified including:
 - State preconditions (if any) affecting the actions behavior where such behavior must be consistent for all UPnP services of this type.
 - Description of how state preconditions affect the action's behavior.
 - Alternately, this section may reference section 2.5, Theory of Operation to provide a service wide view of action-state dependencies.
 - b) The Action's Effect on Service State (if any) has been specified including:
 - Changes in service state resulting from action invocation.
- ___17. All Error Codes that apply have been specified for each action
- a) All common error codes that apply are listed for each action including 401-403, 501, and 600-699 (common action errors) – See the service template, Common Error codes for a complete listing for this service..
 - b) All action-specific errors (700-799) that apply to standard service actions are listed in the errorCode specifications for each action with a description of the error. (Note; action-specific 7xx errors may also be listed for reference in the Common Error Codes table of the Service Standard.)
 - c) Action errors that are dependent on service state (if any) include a description of state dependencies.
 - d) Each Error Description is provided in the context of the end user and should be less than 256 characters.

Theory of operation (Service Template section 2.5)

- ___18. The Theory of operation (optional) provides a description of service functionality as necessary to facilitate implementation and application of this service.
- a) Includes definition of terms where necessary.
 - b) Provides a pseudo code description of action sequences that demonstrate how a control point is intended to interact with this service.
 - c) Provides a description of the internal function of the service for example, it's state model (if applicable).

XML Service Template (Service Template section 3.0)

- ___ 19. The XML Service Template is complete
- Information identified by Red italics has been specified by the working committee.
 - The XML template is consistent with all table specifications for State Variables, Evented Variables, Actions and Arguments defined in section 2 of the draft standard.
 - All optional state variables and actions have been specified in the XML service template.
 - Placeholders for “vendor-defined” allowedValues are specified in the XML template.
- ___ 20. The XML syntax is well formed. Use the following procedure to verify syntax:
- Procedure to be provided.
- ___ 21. The XML schema is valid in accordance with the UPnP template language. Use the following procedure to validate the schema:
- Procedure to be provided.

Test (Service Template section 4.0)

- ___ 22. TBD

Template Design Complete (TDC) - to be formally declared by the Working Committee

- ___ 23. This Service template meets Version .8 TDC criteria suitable for implementation and test.
- This service standard supports targeted device application scenarios.
 - There are no unresolved design issues that would prevent sample implementations.
 - The design has been reviewed by at least 3 sample implementers.
 - The service model is well defined in accordance with this checklist.
 - This service standard effectively balances tradeoffs between:
 - Baseline functional requirements to be exposed in V1 services
 - Implementation complexity (no. of state variables and actions)
 - Re-usability (modular, generic building blocks where feasible)
 - Extensibility (Is extensible for Version 2 of the service – if applicable).
 - Service options (actions and state variables) are limited to the core set committed by sample implementers for standardization.
 - The XML service description is complete.
 - Optional and recommended modeling specifications have been completed to the satisfaction of the working committee including:
 - AllowedValues
 - DefaultValues
 - Variable descriptions including relationship between state variables
 - Event moderation
 - Action descriptions, dependency on state, and effect on state
 - Action error codes
 - Theory of operation