DigitalSecurityCameraStillImage:1 Service Template Version 1.01

For UPnP™ Version 1.0
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1. Overview and Scope

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

The service enables delivery and control of live snapshot images from a digital security camera.

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2. Service Modeling Definitions

2.1. ServiceType

A service that is compliant with this template is identified with the following service type: **urn:schemas-upnp-org:service:** *DigitalSecurityCameraStillImage:1*.

2.2. State Variables

Table 1: State Variables

Variable Name	Req. or Opt. [1]	Data Type	Allowed Value	Default Value	Eng. Units
AvailableEncodings	*R*	*string*			
DefaultEncoding	*R*	*string*			
AvailableCompressionLevels	*R*	*string*			
DeafultCompressionLevel	*R*	*string*			
AvailableResolutions	*R*	*string*			
DefaultResolutions	*R*	*string*			
ImageURL	*R*	*string*			
ImagePresentationURL	*R*	*string*			
Non-standard state variables implemented by an UPnP vendor go here.	X	*TBD*	*TBD*	*TBD*	*TBD*

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

2.2.1. AvailableEncodings

The value of this string should be a list of all by the vendor specific service supported MIME-type still image types. The types in the list should be separated by a ",".

Example: image/jpeg, image/gif, image/bmp

This is a read only property.

2.2.2. DefaultEncoding

The value of this string must be a MIME-type still image type. Any MIME still image type listed in AvailableEncodings may be used as an allowed value.

2.2.3. AvailableCompressionLevels

Compression level describes how much an image should be compressed. Since a wide variety of compression methods and algorithms are available compression levels become subjective values that are hard to quantify. The value of this string should be a list of all supported compression levels separated by a ",". The list order should be the lowest compression level first.

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Example1: 0, 1, 2, 3, 4, 5

Example2: Lowest, Highest

This is a read only property.

2.2.4. DeafultCompressionLevel

The value of this string must be one of the supported compression levels specified in AvailableCompressionLevels.

AvailableEncodings may be used as an allowed value.

2.2.5. AvailableResolutions

Resolution is the actual number of horizontal and vertical pixels an image contains. It does not tell anything of the image quality apart from the size in pixels. There must be at least one resolution available. Presented in ascending order based on first the value of X multiplied by Y and as second order the value of X. Always formatted as "XxY". Where X is the horizontal number of pixels and Y the vertical number of pixels.

Example: 320x240, 640x480

This is a read only property.

Resolution is always based on Rotation = 0.

(See: Security Camera Settings Service for more information)

2.2.6. DefaultResolutions

The value of this string must be one of the supported resolutions specified in AvailableResolutions.

2.2.7. ImageURL

The ImageURL is the URL for the image itself.

This is a read only property.

2.2.8. ImagePresentationURL

This is the URL for an html presentation page of the current image. The typical implementation would be an html page that includes the ImageURL. This field must exist but may contain the empty string.

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2.3. Eventing and Moderation

Table 2: Event Moderation

Variable Name	Evented	Moderated Event	Max Event Rate [1]	Logical Combination	Min Delta per Event [2]
AvailableEncodings	*No*	*No*	*N/A*		*N/A*
DefaultEncoding	*Yes*	*No*	*N/A*		*N/A*
AvailableCompressionLevels	*No*	*No*	*N/A*		*N/A*
DeafultCompression Level	*Yes*	*No*	*N/A*		*N/A*
AvailableResolutions	*No*	*No*	*N/A*		*N/A*
DefaultResolution	*Yes*	*No*	*N/A*		*N/A*
ImageURL	*No*	*No*	*N/A*		*N/A*
ImagePresentationURL	*No*	*No*	*N/A*		*N/A*
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).

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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 3: Actions

Name	Req. or Opt. [1]
GetAvailableEncodings	*R*
SetDefaultEncoding	*R*
GetDefaultEncoding	*R*
GetAvailableCompressionLevels	*R*
SetDefaultCompressionLevel	*R*
GetDefaultCompressionLevel	*R*
GetAvailableResolutions	*R*
SetDefaultResolution	*R*
GetDefaultResolution	*R*
GetImageURL	*R*
GetDefaultImageURL	*R*
GetImagePresentationURL	*R*
GetDefaultImagePresentationURL	*R*
Non-standard actions implemented by an UPnP vendor go here.	X

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

2.4.1. GetAvailableEncodings

Get the list of supported MIME-type still image types.

2.4.1.1. Arguments

Table 4: Arguments for *GetAvailableEncodings*

Argument	Direction	relatedStateVariable
RetAvailableEncodings	*OUT*	*AvailableEncodings*

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2.4.2. SetDefaultEncoding

Set the DefaultEncoding.

2.4.2.1. Arguments

Table 5: Arguments for *SetDefaultEncoding*

Argument	Direction	relatedStateVariable
ReqEncoding	*IN*	*DefaultEncoding*

2.4.2.2. Effect on State

Changes the value of DefaultEncoding to ReqEncoding.

2.4.2.3. Errors

errorCode	errorDescription	Description
700	*ReqEncoding not supported*	ReqEncoding is not one of the supported encodings specified in AvailableEncodings.

2.4.3. GetDefaultEncoding

Get the DefaultEncoding.

2.4.3.1. Arguments

Table 6: Arguments for *GetDefaultEncoding*

Argument	Direction	relatedStateVariable
RetEncoding	*OUT*	*DefaultEncoding*

2.4.4. GetAvailableCompressionLevels

Get the list of supported compression levels.

2.4.4.1. Arguments

Table 7: Arguments for *GetAvailableCompressionLevels*

Argument	Direction	relatedStateVariable
RetAvailableCompressionLevels	*OUT*	*AvailableCompressionLevels*

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2.4.5. SetDefaultCompressionLevel

Set the DefaultCompressionLevel.

2.4.5.1. Arguments

Table 8: Arguments for *SetDefaultCompressionLevel*

Argument	Direction	relatedStateVariable
ReqCompressionLevel	*IN*	*DefaultCompressionLevel*

2.4.5.2. Effect on State

Changes the value of DefaultCompressionLevel to ReqCompressionLevel.

2.4.5.3. Errors

errorCode	errorDescription	Description
701	*ReqCompressionLevel not supported*	ReqCompressionLevel is not one of the supported compression levels specified in AvailableCompressionLevels.

2.4.6. GetDefaultCompressionLevel

Get the DefaultCompressionLevel.

2.4.6.1. Arguments

Table 9: Arguments for *GetDefaultCompressionLevel*

Argument	Direction	relatedStateVariable
RetCompressionLevel	*OUT*	*DefaultCompressionLevel*

2.4.7. GetAvailableResolutions

Get the list of supported resolutions.

2.4.7.1. Arguments

Table 10: Arguments for *GetAvailableResolutions*

Argument	Direction	relatedStateVariable
RetAvailableResolutions	*OUT*	*AvailableResolutions*

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2.4.8. SetDefaultResolution

Set the DefaultResolution.

2.4.8.1. Arguments

Table 11: Arguments for *SetDefaultResolution*

Argument	Direction	relatedStateVariable
ReqResolution	*IN*	*DefaultResolution*

2.4.8.2. Effect on State

Changes the value of DefaultResolution to ReqResolution.

2.4.8.3. Errors

errorCode	errorDescription	Description
702	*ReqResolution not supported*	ReqResolution is not one of the supported resolutions specified in AvailableResolutions.

2.4.9. GetDefaultResolution

Get the DefaultResolution.

2.4.9.1. Arguments

Table 12: Arguments for *GetDefaultResolution*

Argument	Direction	relatedStateVariable
RetResolution	*OUT*	*DefaultResolution*

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2.4.10.GetImageURL

Get a URL to the image itself. The RetImageURL is being built depending on how the different parameters has been set.

ReqEncoding should be one of the supported encodings.
ReqCompression should be one of the supported compressions.
ReqResolution should be one of the supported resolutions.

2.4.10.1.Arguments

Table 13: Arguments for *GetImageURL*

Argument	Direction	relatedStateVariable
ReqEncoding	*IN*	*DefaultEncoding*
ReqCompression	*IN*	*DefaultCompression*
ReqResolution	*IN*	*DefaultResolution*
RetImageURL	*OUT*	*ImageURL*

2.4.10.2.Errors

errorCode	errorDescription	Description
700	*ReqEncoding not supported*	ReqEncoding is not one of the supported encodings specified in AvailableEncodings.
701	*ReqCompressionLevel not supported*	ReqCompressionLevel is not one of the supported compression levels specified in AvailableCompressionLevels.
702	*ReqResolution not supported*	ReqResolution is not one of the supported resolutions specified in AvailableResolutions.

2.4.11.GetDefaultImageURL

Get a URL to the image itself. The RetImageURL is being built depending on how the different default parameters DefaultEncoding, DefaultCompressionLevel and DefaultResolution has been set.

2.4.11.1.Arguments

Table 13: Arguments for *GetDefaultImageURL*

Argument	Direction	relatedStateVariable
RetImageURL	*OUT*	*ImageURL*

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2.4.12.GetImagePresentationURL

Get a URL to an html presentation page of the current image.
The ReqImagePresentationURL is being built depending on how the different parameters has been set.

ReqEncoding should be one of the supported encodings.
ReqCompression should be one of the supported compressions.
ReqResolution should be one of the supported resolutions.

2.4.12.1.Arguments

Table 14: Arguments for *GetImagePresentationURL*

Argument	Direction	relatedStateVariable
ReqEncoding	*IN*	*DefaultEncoding*
ReqCompression	*IN*	*DefaultCompression*
ReqResolution	*IN*	*DefaultResolution*
RetImagePresentationURL	*OUT*	*ImagePresentationURL*

2.4.12.2.Errors

errorCode	errorDescription	Description
700	*ReqEncoding not supported*	ReqEncoding is not one of the supported encodings specified in AvailableEncodings.
701	*ReqCompressionLevel not supported*	ReqCompressionLevel is not one of the supported compression levels specified in AvailableCompressionLevels.
702	*ReqResolution not supported*	ReqResolution is not one of the supported resolutions specified in AvailableResolutions.

2.4.13.GetDefaultImagePresentationURL

Get a URL to an html presentation page of the current image. The RetImagePresentationURL is being built depending on how the different default parameters DefaultEncoding, DefaultCompressionLevel and DefaultResolution has been set.

2.4.13.1.Arguments

Table 15: Arguments for *GetDefaultImagePresentationURL*

Argument	Direction	relatedStateVariable
RetImagePresentationURL	*OUT*	*ImagePresentationURL*

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2.4.14.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).

2.4.15.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 16: 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.
700	*ReqEncoding not supported*	ReqEncoding is not one of the supported encodings specified in AvailableEncodings.
701	*ReqCompressionLevel not supported*	ReqCompressionLevel is not one of the supported compression levels specified in AvailableCompressionLevels.
702	*ReqResolution not supported*	ReqResolution is not one of the supported resolutions specified in AvailableResolutions.
800-899	*TBD*	*(Specified by UPnP vendor.)*

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2.5. Theory of Operation

An instance of Digital Security Camera Still Image Service may be embedded into a Digital Security Camera Device or other devices requiring this service.

This service will enable access to live snapshot still images by providing the retrieval address of the desired image. The retrieval address will be in the form of a complete URL.

Method of image data transfer is in no way restricted by this specification, implementers are free to use any available transport protocols that can be described in the form of a URL.

The operation of this service is “stateless”. The action of fetching an ImageURL or ImagePresentationURL does not affect the properties of previous, simultaneous or later fetched Image and ImagePresentation URLs. This allows for multiple User Control Points to receive images with different properties without potential interference.

The properties AvailableResolutions, AvailableCompressionLevels and AvailableEncodings are vendor specific descriptions of the complete set of available options of the matching property.

The ImageURL property is the URL where the image (file) itself can be fetched.

The ImagePresentationURL is a container document needed for *display* of the image by a user control point. This does for instance allow for display of images that require special image viewers such as ActiveX components or Java applets.

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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>GetAvailableEncodings</name>
      <argumentList>
        <argument>
          <name>RetAvailableEncodings</name>
          <relatedStateVariable>AvailableEncodings
          </relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
    <name>GetDefaultEncoding</name>
      <argumentList>
        <argument>
          <name>RetEncoding</name>
          <relatedStateVariable>DefaultEncoding</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
    <name>SetDefaultEncoding</name>
      <argumentList>
        <argument>
          <name>ReqEncoding</name>
         <relatedStateVariable>DefaultEncoding</relatedStateVariable>
          <direction>in</direction>
        </argument>
      </argumentList>
    </action>
    <action>
    <name>GetAvailableCompressionLevels</name>
      <argumentList>
        <argument>
          <name>RetAvailableCompressionLevels</name>
         <relatedStateVariable>AvailableCompressionLevels
         </relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
    <name>GetDefaultCompressionLevel</name>
      <argumentList>
        <argument>
```

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```
        <name>RetCompressionLevel</name>
       <relatedStateVariable>DefaultCompressionLevel
       </relatedStateVariable>
        <direction>out</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>SetDefaultCompressionLevel</name>
    <argumentList>
      <argument>
        <name>ReqCompressionLevel</name>
       <relatedStateVariable>DefaultCompressionLevel
       </relatedStateVariable>
        <direction>in</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>GetAvailableResolutions</name>
    <argumentList>
      <argument>
        <name>RetAvailableResolutions</name>
       <relatedStateVariable>AvailableResolutions
       </relatedStateVariable>
        <direction>out</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>GetDefaultResolution</name>
    <argumentList>
      <argument>
        <name>RetResolution</name>
       <relatedStateVariable>DefaultResolution
       </relatedStateVariable>
        <direction>out</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>SetDefaultResolution</name>
    <argumentList>
      <argument>
        <name>ReqResolution</name>
        <relatedStateVariable>DefaultResolution
        </relatedStateVariable>
       <direction>in</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>GetImageURL</name>
    <argumentList>
      <argument>
        <name>ReqEncoding</name>
```

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```
        <relatedStateVariable>DefaultEncoding</relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>ReqCompression</name>
        <relatedStateVariable>DefaultCompressionLevel
        </relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>ReqResolution</name>
        <relatedStateVariable>DefaultResolution
        </relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>RetImageURL</name>
        <relatedStateVariable>ImageURL
        </relatedStateVariable>
        <direction>out</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>GetDefaultImageURL</name>
    <argumentList>
      <argument>
        <name>RetImageURL</name>
        <relatedStateVariable>ImageURL
        </relatedStateVariable>
        <direction>out</direction>
      </argument>
    </argumentList>
  </action>
  <action>
  <name>GetImagePresentationURL</name>
    <argumentList>
      <argument>
        <name>ReqEncoding</name>
        <relatedStateVariable>DefaultEncoding</relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>ReqCompression</name>
        <relatedStateVariable>DefaultCompressionLevel
        </relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>ReqResolution</name>
        <relatedStateVariable>DefaultResolution
        </relatedStateVariable>
        <direction>in</direction>
      </argument>
      <argument>
        <name>RetImagePresentationURL</name>
```

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```
          <relatedStateVariable>ImagePresentationURL
          </relatedStateVariable>
           <direction>out</direction>
         </argument>
       </argumentList>
     </action>
     <action>
     <name>GetDefaultImagePresentationURL</name>
       <argumentList>
         <argument>
           <name>RetImagePresentationURL</name>
          <relatedStateVariable>ImagePresentationURL
          </relatedStateVariable>
           <direction>out</direction>
         </argument>
       </argumentList>
     </action>
   </actionList>
   <serviceStateTable>
     <stateVariable sendEvents="no">
       <name>AvailableEncodings</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="yes">
       <name>DefaultEncoding</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="no">
       <name>AvailableCompressionLevels</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="yes">
       <name>DefaultCompressionLevel</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="no">
       <name>AvailableResolutions</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="yes">
       <name>DefaultResolution</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="no">
       <name>ImageURL</name>
       <dataType>string</dataType>
     </stateVariable>
     <stateVariable sendEvents="no">
       <name>ImagePresentationURL</name>
       <dataType>string</dataType>
     </stateVariable>
   </serviceStateTable>
</scpd>
```

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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: ***DigitalSecurityCameraStillImage1.xml***
- The UPnP Test Tool service template test file: ***DigitalSecurityCameraStillImage1.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.

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