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Definition of the Printer Abstract Service Type v2.0
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Abstract

This document is a product of the Service Location and Internet Printing Protocol Working Groups of the Internet Engineering Task Force (IETF). Comments should be sent to the srvloc@srvloc.org and ipp@pwg.org mailing lists.

This document defines the 'service:printer:' abstract type and the attributes associated with it. This 'service:printer:' template is designed to be used in conjunction with the Service Location Protocol, Version 2 (SLPV2) [[13](#)], but may be used with any directory service which supports attribute/value pair registration, such as the Lightweight Directory Access Protocol, Version 3 (LDAPv3 [[16](#)]).

The 'service:printer:' type is specified as an abstract service type. Printers advertised with the 'service:printer:' abstract type may be accessible by one or more print protocols, such as IPP [[3](#)] and LPR [[2](#)].

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1. Introduction

Service Type templates are used to describe in a standard way those services which use the 'service:' URL. The template described in this document is an abstract service type that includes concrete types such as the printing protocol defined in [RFC 1179](#) [2], "Line Printer Daemon Protocol". This template defines the 'service:printer:' abstract type.

The 'service:printer:' abstract type supports consistent registration of printer services. The attributes described within this document are derived from previous specifications developed by the IETF IPP WG and IETF Printer MIB WG.

The attributes specified are intended to facilitate both automatic and manual selection of services, not to provide service state, statistics, or notification. The target audience of service attributes consists of users, either software agents or end users.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [14].

3. Template url-path Definition

The 'service:printer:' type is an abstract type. Because an abstract service type may contain one of many concrete types, the 'url-path' associated with a 'service:printer:' URL may vary. IPP and LPR printers are presently supported by this 'service:printer:' template. Other printer protocols MAY be supported by extension templates or by future updates of this abstract 'service:printer:' template.

3.1. IPP

An IPP Printer object is defined in "IPP/1.1 Model and Semantics" [3]. An IPP printer concrete URL is defined in "IPP/1.1 Encoding and Transport" [9].

Examples of valid 'service:' URLs for IPP printers include:

```
service:printer:ipp://server.sun.com/cgi-bin/public-printer
service:printer:ipp://foo.sun.com/printers?public-printer
```

3.2. LPR

An LPR accessible printer MAY include a queue name as the last part of the URL. If the queue name is absent, the print server is assumed to use a default print queue. The definition of an LPR printer concrete URL is specified in this document, in the 'service:printer:' template.

Examples of valid 'service:' URLs for LPR printers include:

```
service:printer:lpr://server.sun.com
service:printer:lpr://server.sun.com/public-printer
```


4. Printer Service Template

The 'service:printer:' template defined below conforms to the grammar described in "Service Templates and service: Schemes". Please refer to [4] for detailed explanation of the syntax.

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Language of service template: en (English)

Security Considerations:

By advertising the security methods for each supported printer URL the printer may expose information useful to attackers. SLPv2 security or another security method SHOULD be used to authenticate any service advertisements.

Template Text:

```
----- template begins here -----
  template-type = printer

  template-version = 2.0

  template-description =
    The 'service:printer:' template describes the attributes
    supported by network printing devices. Devices may be
    either directly connected to a network or managed by a
    print server. The device or server understands one or
    more network print protocols such as IPP or LPR.

  template-url-syntax =
    url-path      = ippurl / lprurl
    ippurl        = IPP URL as defined in [9]
    lprurl        = "lpr://" hostport [ "/" qname ]
    hostport      = host [ ":" port ]
    host          = hostname / hostnumber
    hostname      = *( domainlabel "." ) toplabel
    domainlabel   = alphanum /
                    alphanum * [alphanum / "-"] alphanum
    toplabel      = alpha / alpha * [alphanum / "-"] alphanum
    hostnumber    = ipv4-number / ipv6-number
    ipv4-number   = 1*3digit 3*3("." 1*3digit)
    ipv6-number   = 32*hex
    3digit        = digit digit digit
    port          = 1*digit
    alphanum      = alpha / digit
    alpha         = "a" / "b" / "c" / "d" / "e" / "f" / "g" /
```

"h" / "i" / "j" / "k" / "l" / "m" / "n" /

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```

        "o" / "p" / "q" / "r" / "s" / "t" / "u" /
        "v" / "w" / "x" / "y" / "z" /
        "A" / "B" / "C" / "D" / "E" / "F" / "G" /
        "H" / "I" / "J" / "K" / "L" / "M" / "N" /
        "O" / "P" / "Q" / "R" / "S" / "T" / "U" /
        "V" / "W" / "X" / "Y" / "Z"
digit    = "0" / "1" / "2" / "3" / "4" / "5" / "6" /
          "7" / "8" / "9"

```

```

printer-xri-supported = STRING L
# REQUIRED for all registrations by conforming SLP SAs
# IPP 'printer-uri-supported'
# IPP 'uri-authentication-supported'
# IPP 'uri-authentication-supported'
# The unordered list of XRI (extended resource identifiers)
# supported by this printer.  Each member of the list
# consists of a URI (uniform resource identifier) followed
# by optional authentication and security metaparameters.
# The keywords for URI and their metaparameters are:
#   'uri' == IPP 'printer-uri-supported' value
#   'auth' == IPP 'uri-authentication-supported' value
#   'sec' == IPP 'uri-security-supported' value
# Legal values of the 'auth' metaparameter include
#   'none' (no authentication for this URI)
#   'requesting-user-name' (from operation request)
#   'basic' (HTTP/1.1 Basic, RFC 2617 [18])
#   'digest' (HTTP/1.1 Basic, RFC 2617 [18])
#   'certificate' (from certificate)
# per IPP Model [3] (extensions MAY also be used).
# A missing 'auth' metaparameter SHALL mean 'none'.
# Legal values of the 'sec' metaparameter include
#   'none' (no security for this URI)
#   'ssl3' (Netscape SSL3)
#   'tls' (IETF TLS/1.0, RFC 2246 [15])
# per IPP Model [3] (extensions MAY also be used).
# A missing 'sec' metaparameter SHALL mean 'none'.
# Each metaparameter of a list member is delimited by '<'.
# Each list member (including the last) is delimited by '>'.
# For example:
#   'uri=ipp://foo.com< auth=digest< sec=tls< >'
#   'uri=lpr://bar.com< auth=none< sec=none< >'
# Registrations MAY consolidate values for metaparameters,
# as in the following example:
#   'uri=ipp://foo.com< auth=basic,digest< sec=tls,ssl3< >'

printer-name = STRING
# REQUIRED for all registrations by conforming SLP SAs
# IPP 'printer-name'
# The site-specific administrative name of this printer.

```

This value of this attribute SHOULD be in the language
specified in 'printer-natural-language-configured'

```
# (although the printer's name may be in any language).
# This name MAY be the last part of the printer's URI or it
# MAY be completely unrelated.
# This name MAY contain characters that are not allowed in a
# conventional URI (which conforms to RFC 2396 [17]).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-natural-language-configured = STRING L 0
```

```
unknown
# RECOMMENDED for all registrations by conforming SLP SAs
# IPP 'natural-language-configured'
# The configured language in which error and status messages
# will be generated (by default) by this printer.
# Also, the (declared) language of the attributes
# 'printer-name', 'printer-location', 'printer-info',
# 'printer-make-and-model', 'printer-media-local-supported',
# 'printer-current-operator', 'printer-service-person'.
# For example:
#   'en-us' (US English) or 'fr-fr' (French in France)
# Legal values of language tags conform to RFC 1766
# 'Tags for the Identification of Languages' [5].
# For coherence with IPP Model [3], language tags in this
# attribute SHALL be lowercase normalized.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
# However, it is STRONGLY RECOMMENDED that this attribute
# be supported and that it be set to a meaningful value.
```

```
printer-location = STRING 0
```

```
unknown
# RECOMMENDED for all registrations by conforming SLP SAs
# IPP 'printer-location'
# The physical location of this printer.
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'.
# A free form description of this printer's physical
# location, for example:
#   'Orlando office, 2nd floor, near the fire escape'
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
# However, it is STRONGLY RECOMMENDED that this attribute
# be supported and that it be set to a meaningful value so
# that users can determine this printer's physical location
# for printer selection (before print job submission) and
# for output collection (after print job completion).
```

```
printer-info = STRING 0
```

```
unknown
```

```
# IPP 'printer-info'  
# Additional descriptive information on this printer.
```

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```
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'.
# A free form string that may contain any site-specific
# descriptive information about this printer.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-more-info = STRING L O
```

```
unknown
# IPP 'printer-more-info'
# A URI used to obtain more information about this specific
# printer. For example, this could be an 'http:' URI
# referencing an HTML page accessible to a Web Browser.
# The information obtained from this URI is intended for
# end user consumption.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-make-and-model = STRING O
```

```
unknown
# IPP 'printer-make-and-model'
# The manufacturer, make, and model of this printer,
# a simple text string defined by the manufacturer.
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-ipp-versions-supported = STRING L M O
```

```
none
# IPP 'ipp-versions-supported'
# The unordered list of 'major.minor' IPP versions
# supported by this printer or 'none'.
# For example:
#   '1.0, 1.1'
# Legal values include 'none', '1.0', and '1.1',
# per IPP Model \[3\] (extensions MAY also be used).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'none'.
```

```
printer-multiple-document-jobs-supported = STRING L O
```

```
unknown
# IPP 'multiple-document-jobs-supported'
# Indicates whether this printer supports more than one
# document per job.
# This template attribute is an extended boolean.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
unknown, true, false
```

printer-charset-configured = STRING L 0

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```
utf-8
# IPP 'charset-configured'
# The configured charset in which error and status messages
# will be generated (by default) by this printer.
# For example:
#   'utf-8' (ISO 10646/Unicode) or 'iso-8859-1' (Latin1)
# Legal values of charset tags (names/aliases) come from
# the IANA Registry of Coded Character Sets [6] and
# the '(preferred MIME name)' SHALL be used as the tag.
# For coherence with IPP Model [3], charset tags in this
# attribute SHALL be lowercase normalized.
```

```
printer-charset-supported = STRING L M O
```

```
utf-8
# IPP 'charset-supported'
# The possible charsets in which error and status messages
# may be generated (if requested) by this printer.
# Also, the possible charsets for printer string attributes
# set by operator, system administrator, or manufacturer.
# For example:
#   'utf-8' (ISO 10646/Unicode) or 'iso-8859-1' (Latin1)
# Legal values of charset tags (names/aliases) come from
# the IANA Registry of Coded Character Sets [6] and
# the '(preferred MIME name)' SHALL be used as the tag.
# This attribute SHALL include the value 'utf-8', per
# RFC 2277, 'IETF Policy on Charsets and Languages' [12].
# For coherence with IPP Model [3], charset tags in this
# attribute SHALL be lowercase normalized.
```

```
printer-generated-natural-language-supported = STRING L M O
```

```
unknown
# RECOMMENDED for all registrations by conforming SLP SAs
# IPP 'generated-natural-language-supported'
# The possible languages in which error and status messages
# may be generated (if requested) by this printer.
# Also, the possible languages for printer string attributes
# set by operator, system administrator, or manufacturer.
# For example:
#   'en-us' (US English) or 'fr-fr' (French in France)
# Legal values of language tags conform to RFC 1766
# 'Tags for the Identification of Languages' [5].
# For coherence with IPP Model [3], language tags in this
# attribute SHALL be lowercase normalized.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
# However, it is STRONGLY RECOMMENDED that this attribute
# be supported and that it be set to a meaningful value.
```

```
printer-document-format-supported = STRING L M O
```

unknown

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```
# IPP 'document-format-supported'
# The possible document formats in which data may be
# interpreted and printed by this printer.
# Legal values of document formats (MIME types) come from
# the IANA Registry of Internet Media Types [11].
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
# However, it is STRONGLY RECOMMENDED that this attribute
# be supported and that it be set to a meaningful value.
```

```
printer-color-supported = STRING L 0
```

```
unknown
# IPP 'color-supported'
# Indicates whether this printer is capable of any type of
# color printing at all, including highlight color.
# This template attribute is an extended boolean.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
unknown, true, false
```

```
printer-compression-supported = STRING L M 0
```

```
none
# RECOMMENDED for all registrations by conforming SLP SAs
# IPP 'compression-supported'
# The unordered list of compression algorithms supported
# by this printer.
# For example:
#   'deflate, gzip'
# Legal values include
#   'none'
#   'deflate' (public domain ZIP)
#   'gzip' (GNU ZIP)
#   'compress' (UNIX)
# per IPP Model [3] (extensions MAY also be used).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'none'.
# However, it is STRONGLY RECOMMENDED that this attribute
# be supported and that it be set to a meaningful value.
```

```
printer-pages-per-minute = INTEGER 0
```

```
-1
# IPP 'pages-per-minute'
# The nominal number of pages per minute which may be
# output by this printer (e.g., simplex, black-and-white).
# This attribute is informative, NOT a service guarantee.
# Typically, it is the value used in marketing literature
# to describe this printer.
# A value of '-1' indicates unknown.
# If this printer information is not known to the SLP SA,
```

then this attribute SHALL be set to '-1'.

```
printer-pages-per-minute-color = INTEGER 0
-1
# IPP 'pages-per-minute-color'
# The nominal number of color pages per minute which may be
# output by this printer (e.g., simplex, color).
# This attribute is informative, NOT a service guarantee.
# Typically, it is the value used in marketing literature
# to describe this printer.
# A value of '-1' indicates unknown.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to '-1'.

printer-finishings-supported = STRING L M 0
none
# IPP 'finishings-supported'
# The possible finishing operations supported by this
# printer.
# Legal values of finishings are defined in IPP Model [3].
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'none'.
none, staple, punch, cover, bind,
saddle-stitch, edge-stitch,
staple-top-left, staple-bottom-left,
staple-top-right, staple-bottom-right,
edge-stitch-left, edge-stitch-top,
edge-stitch-right, edge-stitch-bottom,
staple-dual-left, staple-dual-top,
staple-dual-right, staple-dual-bottom

printer-number-up-supported = INTEGER M 0
1
# IPP 'number-up-supported'
# The possible numbers of print-stream pages to impose
# upon a single side of an instance of a selected
# medium.
# Legal values of this attribute include 1, 2, and 4 [3].
# Implementations may support other values.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to '1'.

printer-sides-supported = STRING L M 0
one-sided
# IPP 'sides-supported'
# (Compare with Salutation 'duplex-mode')
# The number of impression sides (one or two) and the
# two-sided impression rotations supported by this printer.
# Salutation 'simplex' == IPP 'one-sided'
# Salutation 'duplex' == IPP 'two-sided-long-edge'
```

```
# Salutation 'tumble' == IPP 'two-sided-short-edge'  
# If this printer information is not known to the SLP SA,
```

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```
# then this attribute SHALL be set to 'one-sided'.
one-sided, two-sided-long-edge, two-sided-short-edge
```

```
printer-media-supported = STRING L M O
unknown
# IPP 'media-supported' - only the standard keyword values
# The standard names/types/sizes (and optional color
# suffixes) of the media supported by this printer.
# The values specified are NOT localized according to
# 'printer-natural-language-configured', but are in a
# fixed language of 'en-us' (US English). For example:
# 'iso-a4' or 'envelope' or 'na-letter-white'
# Legal values of this attribute conform to ISO 10175
# 'Document Printing Application (DPA)' [10] and
# any IANA registered extensions, per IPP Model [3].
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-media-local-supported = STRING M O
unknown
# IPP 'media-supported' - only site-specific name values
# Site-specific names of media supported by this printer.
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'
# (although the media names may be in any language).
# For example:
# 'purchasing-form' (site-specific name)
# as opposed to (in 'media-supported' above):
# 'na-letter' (standard keyword from ISO 10175 [10]).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

```
printer-resolution-supported = STRING L M O
unknown
# IPP 'printer-resolution-supported'
# (Compare with 'printer-xri-supported' in this template)
# The unordered list of resolutions supported for printing
# documents by this printer.
# Each resolution supported is a string with 3 fields:
# 1) Crossfeed direction resolution (positive integer)
# 2) Feed direction resolution (positive integer)
# 3) Resolution unit (enumerated value - see below)
# Each resolution field is delimited by '>', for example:
# '300> 300> dpi>, 600> 600> dpi>'
# Legal values of resolution unit are
# 'dpi' (dots per inch)
# 'dpcm' (dots per centimeter)
# per IPP Model [3] (extensions SHOULD NOT be used).
# This attribute is derived from the Printer MIB [7].
```

If this printer information is not known to the SLP SA,
then this attribute SHALL be set to 'unknown'.

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```
printer-print-quality-supported = STRING L M O
    unknown
    # IPP 'print-quality-supported'
    # The unordered list of print qualities supported for
    # printing documents on this printer.
    # For example:
    #   'draft, normal'
    # Legal values are defined in IPP Model [3].
    # If this printer information is not known to the SLP SA,
    # then this attribute SHALL be set to 'unknown'.
    unknown, draft, normal, high

printer-job-priority-supported = INTEGER 0
    1
    # IPP 'job-priority-supported'
    # (Compare with Salutation 'priority-levels-supported')
    # Indicates the number of job priority levels supported.
    # An IPP conformant printer which supports job priority
    # must always support a full range of priorities from
    # '1' to '100' (to ensure consistent behavior), therefore
    # this template attribute describes the 'granularity'.
    # Legal values of this attribute are from '1' to '100'.
    # If this printer information is not known to the SLP SA,
    # then this attribute SHALL be set to '1'.

printer-copies-supported = INTEGER 0
    -1
    # IPP 'copies-supported'
    # The maximum number of copies of a document
    # that may be printed as a single job.
    # A value of '0' indicates no maximum limit.
    # A value of '-1' indicates unknown.
    # If this printer information is not known to the SLP SA,
    # then this attribute SHALL be set to '-1'.

printer-job-k-octets-supported = INTEGER 0
    -1
    # IPP 'job-k-octets-supported'
    # The maximum size in kilobytes (1,024 octets actually)
    # incoming print job that this printer will accept.
    # A value of '0' indicates no maximum limit.
    # A value of '-1' indicates unknown.
    # If this printer information is not known to the SLP SA,
    # then this attribute SHALL be set to '-1'.

printer-current-operator = STRING M O
    unknown
    # Printer MIB 'prtGeneralCurrentOperator'
```

The name of the current human operator responsible for
operating this printer. It is suggested that this string

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```
# include information that would enable other humans to
# reach the operator, such as a telephone number.
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'
# (although the person's name may be in any language).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

printer-service-person = STRING M 0

```
unknown
# Printer MIB 'prtGeneralServicePerson'
# The name of the current service person responsible for
# servicing this printer. It is suggested that this string
# include information that would enable other humans to
# reach the service person, such as a telephone number.
# This value of this attribute SHOULD be in the language
# specified in 'printer-natural-language-configured'
# (although the person's name may be in any language).
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
```

printer-delivery-orientation-supported = STRING L M 0

```
unknown
# Printer MIB 'prtOutputPageDeliveryOrientation'
# The possible delivery orientations of pages as they are
# printed and ejected from this printer.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
unknown, face-up, face-down
```

printer-stacking-order-supported = STRING L M 0

```
unknown
# Printer MIB 'prtOutputStackingOrder'
# (Compare with Salutation 'paper-output')
# The possible stacking order of pages as they are printed
# and ejected from this printer.
# If this printer information is not known to the SLP SA,
# then this attribute SHALL be set to 'unknown'.
unknown, first-to-last, last-to-first
```

printer-output-features-supported = STRING L M 0

```
unknown
# Printer MIB 'prtOutputFeaturesGroup'
# (Compare with Salutation 'paper-output')
# The possible output features supported by this printer.
# 'bursting' == Printer MIB 'prtOutputBursting'
# 'decollating' == Printer MIB 'prtOutputDecollating'
# 'page-collating' == Printer MIB 'prtOutputPageCollated'
# 'offset-stacking' == Printer MIB 'prtOutputOffsetStacking'
```

If this printer information is not known to the SLP SA,
then this attribute SHALL be set to 'unknown'.

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unknown, bursting, decollating, page-collating,
offset-stacking

----- template ends here -----

5. Summary of Required Attributes

Attributes are associated with 'service:' URLs in order to provide a dynamic search capability to service location clients. SLP SAs SHOULD include OPTIONAL attributes in their service registrations.

Two (2) of the attributes defined in 'service:printer:' are REQUIRED in all compliant service registrations by SLP SAs:

SLP Required Attribute	IPP Generic Schem
-----	-----
printer-xri-supported	r
printer-name	r
r	RECOMMENDED - Appendix E 'Generic Directory Schema' IPP Model [3]
	REQUIRED - SLP 'service:printer:' template
m	Missing - Appendix E 'Generic Directory Schema' IPP Model [3]
	REQUIRED - SLP 'service:printer:' template

5.1. Rationale for Required Attributes

'printer-xri-supported'
- REQUIRED in SLP 'service:printer:' to consolidate values from the following three IPP attributes (without parallel ordered attributes): 'printer-uri-supported', 'uri-authentication-supported', and 'uri-security-supported'.

All other REQUIRED SLP 'service:printer:' template attributes are RECOMMENDED in [Appendix E](#) 'Generic Directory Schema' IPP Model [3].

6. Summary of Recommended Attributes

Attributes are associated with 'service:' URLs in order to provide a dynamic search capability to service location clients. SLP SAs SHOULD include RECOMMENDED attributes in their service registrations.

Some of the attributes defined in 'service:printer:' are RECOMMENDED in all compliant service registrations by SLP SAs:

SLP Recommended Attribute	IPP Generic Schem
-----	-----
printer-location	o
printer-natural-language-configured	m
printer-generated-natural-language-supported	o
printer-document-format-supported	r
printer-compression-supported	r
r	RECOMMENDED - Appendix E 'Generic Directory Schema' IPP Model [3]
	OPTIONAL - SLP 'service:printer:' template (with specified default)
o	OPTIONAL - Appendix E 'Generic Directory Schema' IPP Model [3]
	OPTIONAL - SLP 'service:printer:' template (with specified default)
m	Missing - Appendix E 'Generic Directory Schema' IPP Model [3]
	OPTIONAL - SLP 'service:printer:' template (with specified default)

6.1. Rationale for Recommended Attributes

'printer-location'

- RECOMMENDED in SLP 'service:printer:' template to aid users in selecting appropriate printers (by physical proximity);
- OPTIONAL in [Appendix E](#) 'Generic Directory Schema' of IPP Model [\[3\]](#).

'printer-natural-language-configured'

- RECOMMENDED in SLP 'service:printer:' template to specify language tags for 'printer-name', 'printer-location', 'printer-info', 'printer-make-and-model', 'printer-media-local-supported', 'printer-current-operator', and 'printer-service-person' attributes;
- missing in [Appendix E](#) 'Generic Directory Schema' of IPP Model [\[3\]](#), because the corresponding IPP attributes are language tagged in-band via the IPP 'textWithLanguage' syntax.

'printer-generated-natural-language-supported'

- RECOMMENDED in SLP 'service:printer:' template to aid users in selecting appropriate printers;
- OPTIONAL in [Appendix E](#) 'Generic Directory Schema' of IPP Model [\[3\]](#).

All other RECOMMENDED SLP 'service:printer:' template attributes are

RECOMMENDED in [Appendix E](#) 'Generic Directory Schema' IPP Model [\[3\]](#).

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7. Summary of Optional Attributes

Attributes are associated with 'service:' URLs in order to provide a dynamic search capability to service location clients. SLP SAs MAY include OPTIONAL attributes in their service registrations.

Most of the attributes defined in 'service:printer:' are OPTIONAL in all compliant service registrations by SLP SAs:

SLP Optional Attribute	IPP Generic Schem
-----	-----
printer-info	o
printer-more-info	o
printer-make-and-model	r
printer-ipp-versions-supported	r
printer-multiple-document-jobs-supported	o
printer-charset-configured	m (SLP enhancemen
printer-charset-supported	o
printer-color-supported	r
printer-finishings-supported	r
printer-number-up-supported	o
printer-sides-supported	r
printer-media-supported	r
printer-media-local-supported	r (site-specific)
printer-pages-per-minute	o
printer-pages-per-minute-color	o
printer-resolution-supported	o
printer-print-quality-supported	o
printer-job-priority-supported	m (SLP enhancemen
printer-copies-supported	m (SLP enhancemen
printer-job-k-octets-supported	m (SLP enhancemen
printer-current-operator	m (from Printer M
printer-service-person	m (from Printer M
printer-delivery-orientation-supported	m (from Printer M
printer-stacking-order-supported	m (from Printer M
printer-output-features-supported	m (from Printer M

- r RECOMMENDED - [Appendix E](#) 'Generic Directory Schema' IPP Model [3]
- o OPTIONAL - SLP 'service:printer:' template (with specified default)
- o OPTIONAL - [Appendix E](#) 'Generic Directory Schema' IPP Model [3]
- o OPTIONAL - SLP 'service:printer:' template (with specified default)
- m Missing - [Appendix E](#) 'Generic Directory Schema' IPP Model [3]
- o OPTIONAL - SLP 'service:printer:' template (with specified default)

7.1. Rationale for Optional Attributes

'printer-location', 'printer-make-and-model',
'printer-color-supported', 'printer-finishings-supported',
'printer-sides-supported', 'printer-media-supported', and
'printer-media-local-supported'

- OPTIONAL in SLP 'service:printer:' template because network print servers may not be able to determine this information;
- RECOMMENDED in [Appendix E](#) 'Generic Directory Schema' of IPP Model [3].

'printer-ipp-versions-supported'

- OPTIONAL in SLP 'service:printer:' template because network printers may not support IPP;
- RECOMMENDED in [Appendix E](#) 'Generic Directory Schema' of IPP Model [3].

'printer-charset-configured'

- OPTIONAL in SLP 'service:printer:' template to aid users in selecting appropriate printers;
- missing in [Appendix E](#) 'Generic Directory Schema' of IPP Model [3].

'printer-job-priority-supported', 'printer-copies-supported', and
'printer-job-k-octets-supported'

- OPTIONAL in SLP 'service:printer:' template to aid users in selecting appropriate printers;
- missing in [Appendix E](#) 'Generic Directory Schema' of IPP Model [3].

'printer-current-operator', 'printer-service-person',
'printer-delivery-orientation-supported',
'printer-stacking-order-supported', and
'printer-output-features-supported'

- OPTIONAL in SLP 'service:printer:' template to aid users in selecting appropriate printers;
- missing in [Appendix E](#) 'Generic Directory Schema' of IPP Model [3], because they are only specified in the Printer MIB [7], not in IPP.

All other OPTIONAL SLP 'service:printer:' template attributes are also OPTIONAL in [Appendix E](#) 'Generic Directory Schema' IPP Model [3].

8. Summary of Attribute Origins

The following table summarizes the origins of all of the attributes in the 'service:printer:' template (except 'template-xxx' generic attributes defined in "Service Templates and service: Schemes" [4] and required for all 'service:' templates). The two source documents are IPP Model [3] and Printer MIB [7].

Attribute Name	IPP	Printer MIB
-----	---	-----
printer-xri-supported	X	
printer-name	X	
printer-natural-language-configured	X	
printer-location	X	
printer-info	X	
printer-more-info	X	
printer-make-and-model	X	
printer-ipp-versions-supported	X	
printer-multiple-document-jobs-supported	X	
printer-charset-configured	X	
printer-charset-supported	X	
printer-generated-natural-language-supported	X	
printer-document-format-supported	X	
printer-color-supported	X	
printer-compression-supported	X	
printer-pages-per-minute	X	
printer-pages-per-minute-color	X	
printer-finishings-supported	X	
printer-number-up-supported	X	
printer-sides-supported	X	
printer-media-supported	X	
printer-media-local-supported	X	
printer-resolution-supported	X	
printer-print-quality-supported	X	
printer-job-priority-supported	X	
printer-copies-supported	X	
printer-job-k-octets-supported	X	
printer-current-operator		X
printer-service-person		X
delivery-orientation-supported		X
stacking-order-supported		X
output-features-supported		X

'printer-xri-supported'

- REQUIRED in SLP 'service:printer:' to consolidate values from the following three IPP attributes (without parallel ordered attributes):
'printer-uri-supported', 'uri-authentication-supported', and

'uri-security-supported'.

9. IANA Considerations

Registration of this 'service:printer:' template will follow the procedures defined in [section 4](#) 'A Procedure for Standardizing New Service Types' and [section 5](#) 'IANA Considerations' of "Service Templates and service: Schemes" [[4](#)].

10. Internationalization Considerations

All attribute values in registrations using the 'service:printer:' template MUST be encoded in UTF-8 characters, as required by "Service Location Protocol, Version 2" [[13](#)]. Also, a language tag for all of the textual attributes in the 'service:printer:' template SHOULD be supplied in the attribute 'printer-natural-language-configured'. Therefore, all registrations using the 'service:printer:' template conform to "IETF Policy on Character Sets and Languages" [[12](#)].

11. Security Considerations

When used with SLPv2, this 'service:printer:' template inherits all of the security issues described in [section 17](#) 'Security Considerations' of "Service Location Protocol, Version 2" [[13](#)].

By advertising the security methods for each supported printer URL the printer may expose information useful to attackers. SLPv2 security or another security method SHOULD be used to authenticate any service advertisements.

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[Appendix E](#) 'Generic Directory Schema' in IPP/1.1 Model [\[3\]](#) (recommended and optional attributes for registering IPP printers) was the primary input to this 'service:printer:' template.

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