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10 28 August 2001

11  
12 Internet Printing Protocol (IPP):  
13 LDAP Schema for Printer Services  
14

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33 Abstract  
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35 This document provides information for the Internet community. It  
36 does not specify an Internet standard of any kind. This document  
37 defines an LDAP schema, object classes and attributes, for printers  
38 and printer services, for use with directories that support  
39 Lightweight Directory Access Protocol (LDAPv3) [RFC2251]. This  
40 document is based on the printer attributes listed in Appendix E of  
41 Internet Printing Protocol (IPP/1.1) [RFC2911], the Service Location  
42 Protocol (SLPv2) [RFC2608] 'service:printer:' template defined in  
43 [SLPPRT], and the mapping between SLP service advertisements and LDAP  
44 descriptions of services defined in [RFC2926]. Send comments to the  
45 IPP WG <ipp@pwg.org> and the editor <flemingp@us.ibm.com>.  
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## 1. Introduction

This document provides information for the Internet community. It does not specify an Internet standard of any kind. This document defines an LDAP schema, object classes and attributes, for printers and printer services, for use with directories that support Lightweight Directory Access Protocol (LDAPv3) [RFC2251]. This document is based on the printer attributes listed in Appendix E of Internet Printing Protocol (IPP/1.1) [RFC2911], the Service Location Protocol (SLPv2) [RFC2608] 'service:printer:' template defined in [SLPPRT], and the mapping between SLP service advertisements and LDAP descriptions of services defined in [RFC2926]. Send comments to the IPP WG <ipp@pwg.org> and the editor <flemingp@us.ibm.com>.

Appendix E of IPP/1.1 [RFC2911] specifies a list of printer attributes which should be included in a general directory schema describing IPP print services. The syntax for each of these attributes is described in detail in [RFC2911] and [SLPPRT]. This document takes these attributes and maps them to LDAP attributes and object classes.

This document defines several object classes to provide LDAP applications with flexible options in defining printer information using LDAP schema. Classes are provided for defining directory entries with common printer information and for extending existing directory entries with SLPv2 [RFC2608], IPP/1.1 [RFC2911], and LPR [RFC1179] specific information.

## 2. Terminology

This document provides information for the Internet community. It does not specify an Internet standard of any kind.

For systems which choose to support this LDAP printer schema, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in sections 3 and 4 of this document are to be interpreted as described in [RFC2119].

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### 3. Definition of Object Classes

We define the following LDAP object classes for use with both generic printer related information and services specific to SLPv2 [RFC2608], IPP/1.1 [RFC2911], and LPR [RFC1179].

- slpServicePrinter - auxiliary class for SLP registered printers
- printerAbstract - abstract class for all printer classes
- printerService - structural class for printers
- printerServiceAuxClass - auxiliary class for printers
- printerIPP - auxiliary class for IPP printers
- printerLPR - auxiliary class for LPR printers

The following are some examples of how applications MAY choose to use these classes when creating directory entries:

- 1) Use printerService for directory entries containing common printer information.
- 2) Use both printerService and slpServicePrinter for directory entries containing common printer information for SLP registered printers.
- 3) Use printerService, printerLPR and printerIPP for directory entries containing common printer information for printers that support both LPR and IPP.
- 4) Use printerServiceAuxClass and object classes not defined by this document for directory entries containing common printer information. In this example, printerServiceAuxClass is used for extending other structural classes defining printer information with common printer information defined in this document.

Note that specifying the abstract object class printerAbstract is OPTIONAL when using printerService or printerServiceAuxClass to create directory entries per [RFC2251].

Refer to Section 4 for definition of attribute types referenced by these object classes. We use names instead of OIDs in MUST and MAY for clarity. Some attribute names described in [RFC2911] have been prefixed with 'printer-' as recommended in [SLPPRT] and [RFC2926].

For the object classes defined in this section, schema developers MAY add to the list of MAY OIDs, but MUST NOT modify the list of MUST OIDs and MUST NOT remove OIDs from the list of MAY OIDs. Schema developers MAY derive additional classes from the abstract and structural classes defined in this section. Note, an object class definition SHOULD NOT be changed without having a new name and OID assigned to it.

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### 3.1. slpServicePrinter

This auxiliary class defines Service Location Protocol (SLPv2) [RFC2608] specific information. It MUST be used with a structural class such as printerService. It MAY be used to create new or extend existing directory entries with SLP 'service:printer' abstract service type information as defined in [SLPPRT]. This object class is derived from 'slpService', the parent class for all SLP services, defined in [RFC2926].

```
( 1.3.18.0.2.6.254
NAME 'slpServicePrinter'
DESC 'Service Location Protocol (SLP) information.'
AUXILIARY
SUP slpService
)
```

### 3.2. printerAbstract

This abstract class defines printer information. It is a base class for deriving other printer related classes, such as, but not limited to, classes defined in this document. It defines a common set of printer attributes that are not specific to any one type of service, protocol or operating system.

```
( 1.3.18.0.2.6.258
NAME 'printerAbstract'
DESC 'Printer related information.'
ABSTRACT
SUP top
MAY ( printer-name $
      printer-natural-language-configured $
      printer-location $ printer-info $ printer-more-info $
      printer-make-and-model $
      printer-multiple-document-jobs-supported $
      printer-charset-configured $ printer-charset-supported $
      printer-generated-natural-language-supported $
      printer-document-format-supported $ printer-color-supported $
      printer-compression-supported $ printer-pages-per-minute $
      printer-pages-per-minute-color $
      printer-finishings-supported $ printer-number-up-supported $
      printer-sides-supported $ printer-media-supported $
      printer-media-local-supported $
      printer-resolution-supported $
      printer-print-quality-supported $
      printer-job-priority-supported $ printer-copies-supported $
      printer-job-k-octets-supported $ printer-current-operator $
    )
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printer-service-person $
printer-delivery-orientation-supported $
printer-stacking-order-supported $
printer-output-features-supported )
```

### 3.3. printerService

This structural class defines printer information. It is derived from class printerAbstract and thus inherits common printer attributes. This class can be used with or without auxiliary classes to define printer information. Auxiliary classes can be used to extend the common printer information with protocol, service or operating system specific information. Note that when extending other structural classes with auxiliary classes, printerService MUST NOT be used.

LDAP applications SHOULD use printer-uri as the naming attribute. That is, when using printerService, printer-uri SHOULD be used as the attribute type of the directory entry's relative distinguished name (RDN). printer-uri uniquely identifies each of the printer services for a given printer. Note that if the printer service changes domains, printer-uri MUST be updated with the new domain name.

```
( 1.3.18.0.2.6.255
NAME 'printerService'
DESC 'Printer information.'
STRUCTURAL
SUP printerAbstract
MAY ( printer-uri $ printer-xri-supported )
)
```

### 3.4. printerServiceAuxClass

This auxiliary class defines printer information. It is derived from class printerAbstract and thus inherits common printer attributes. This class MUST be used with a structural class.

LDAP applications SHOULD use printer-uri as the naming attribute. That is, when using printerServiceAuxClass, printer-uri SHOULD be used as the attribute type of the directory entry's relative distinguished name (RDN). printer-uri uniquely identifies each of the printer services for a given printer. Note that if the printer service changes domains, printer-uri MUST be updated with the new domain name.

```
( 1.3.18.0.2.6.257
NAME 'printerServiceAuxClass'
DESC 'Printer information.'
```

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```
AUXILIARY
SUP printerAbstract
MAY ( printer-uri $ printer-xri-supported )
)
```

### 3.5. printerIPP

This auxiliary class defines Internet Printing Protocol (IPP/1.1) [RFC2911] information. It MUST be used with a structural class such as printerService. It is used to extend structural classes with IPP specific printer information.

```
( 1.3.18.0.2.6.256
NAME 'printerIPP'
DESC 'Internet Printing Protocol (IPP) information.'
AUXILIARY
SUP top
MAY ( printer-ipp-versions-supported $
      printer-multiple-document-jobs-supported )
)
```

### 3.6. printerLPR

This auxiliary class defines LPR [RFC1179] information. It MUST be used with a structural class such as printerService. It is used to identify directory entries that support LPR.

```
( 1.3.18.0.2.6.253
NAME 'printerLPR'
DESC 'LPR information.'
AUXILIARY
SUP top
MUST ( printer-name )
MAY ( printer-aliases )
)
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#### 4. Definition of Attribute Types

The following attribute types are referenced by the object classes defined in Section 3.

The following attribute types reference syntax OIDs defined in Section 6 of [RFC2252] (see Section 5 'Definition of Syntaxes' below).

The following attribute types reference matching rule names (instead of OIDs) for clarity (see Section 6 below). Note that if the printer information is not known, the attribute value is not set (for optional attributes). In the following definitions, referenced matching rules are defined in Section 8 of [RFC2252] and/or Section 6 of [X.520]. (see Section 6 'Definition of Matching Rules' below).

Note: Some implementations of LDAP servers do not support some or all of the [X.520] matching rules in the EQUALITY, ORDERING, or SUBSTR clauses of attribute definitions. Administrators may wish to:

- 1) Omit the EQUALITY clause (or at least the 'booleanMatch', which is not defined in [RFC2252]);
- 2) Omit the ORDERING clause (or at least the 'integerOrderingMatch', which is not defined in [RFC2252]);
- 3) Omit the SUBSTR clause.

The following table is a summary of the attribute names defined by this document and their corresponding names from [RFC2911]. Some attribute names described in [RFC2911] have been prefixed with 'printer-' as recommended in [RFC2926], to address the flat namespace for LDAP identifiers.

LDAP & SLP Printer Schema	IPP Model [RFC2911]
-----	-----
printer-uri	
printer-xri-supported	
	[IPP printer-uri-supported]
	[IPP uri-authentication-supported]
	[IPP uri-security-supported]
printer-name	printer-name
printer-natural-language-configured	natural-language-configured
printer-location	printer-location
printer-info	printer-info
printer-more-info	printer-more-info
printer-make-and-model	printer-make-and-model
printer-ipp-versions-supported	ipp-versions-supported

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printer-multiple-document-jobs-supported
multiple-document-jobs-supported
printer-charset-configured            charset-configured
printer-charset-supported            charset-supported
printer-generated-natural-language-supported
generated-natural-language-supported
printer-document-format-supported
document-format-supported
printer-color-supported            color-supported
printer-compression-supported        compression-supported
printer-pages-per-minute            pages-per-minute
printer-pages-per-minute-color      pages-per-minute-color
printer-finishings-supported        finishings-supported
printer-number-up-supported        number-up-supported
printer-sides-supported            sides-supported
printer-media-supported            media-supported
printer-media-local-supported        [site names from IPP media-supported]
printer-resolution-supported        printer-resolution-supported
printer-print-quality-supported      print-quality-supported
printer-job-priority-supported       job-priority-supported
printer-copies-supported            copies-supported
printer-job-k-octets-supported      job-k-octets-supported
printer-current-operator
printer-service-person
printer-delivery-orientation-supported
printer-stacking-order-supported
printer-output-features-supported
printer-aliases
```

#### 4.1. printer-uri

Note, that for SLP registered printers, the LDAP printer-uri attribute MUST set to the value of the registered URL of the printer.

```
( 1.3.18.0.2.4.1140
NAME 'printer-uri'
DESC 'A URI supported by this printer.
This URI SHOULD be used as a relative distinguished name (RDN).
If printer-xri-supported is implemented, then this URI value
MUST be listed in a member value of printer-xri-supported.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
SINGLE-VALUE
)
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#### 4.2. printer-xri-supported

A list of XRI (extended resource identifiers) supported by this printer. Each value of this 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 [RFC2617])
- 'digest' (HTTP/1.1 Basic, [RFC2617])
- '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, [RFC2246])

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 '<'. 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<'

```
( 1.3.18.0.2.4.1107
NAME 'printer-xri-supported'
DESC '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.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
)
```

#### 4.3. 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

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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 [RFC2396]).

```
( 1.3.18.0.2.4.1135
NAME 'printer-name'
DESC 'The site-specific administrative name of this printer, more
     end-user friendly than a URI.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
SINGLE-VALUE
)
```

#### 4.4. printer-natural-language-configured

```
( 1.3.18.0.2.4.1119
NAME 'printer-natural-language-configured'
DESC 'The configured language in which error and status messages will
     be generated (by default) by this printer. Also, a possible
     language for printer string attributes set by operator, system
     administrator, or manufacturer. Also, the (declared) language
     of the "printer-name", "printer-location", "printer-info", and
     "printer-make-and-model" attributes of this printer. For
     example: "en-us" (US English) or "fr-fr" (French in France)
     Legal values of language tags conform to [RFC3066] "Tags for
     the Identification of Languages".'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
SINGLE-VALUE
)
```

#### 4.5. printer-location

```
( 1.3.18.0.2.4.1136
NAME 'printer-location'
DESC 'Identifies the location of the printer. This could include
     things like: "in Room 123A", "second floor of building XYZ".'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
SINGLE-VALUE
)
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4.6. printer-info

```
( 1.3.18.0.2.4.1139
NAME 'printer-info'
DESC 'Identifies the descriptive information about this printer.
This could include things like: "This printer can be used for
printing color transparencies for HR presentations", or "Out
of courtesy for others, please print only small (1-5 page) jobs
at this printer", or even "This printer is going away on July
1, 1997, please find a new printer".'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
SINGLE-VALUE
)
```

4.7. printer-more-info

```
( 1.3.18.0.2.4.1134
NAME 'printer-more-info'
DESC 'A URI used to obtain more information about this specific
printer. For example, this could be an HTTP type URI
referencing an HTML page accessible to a Web Browser. The
information obtained from this URI is intended for end user
consumption.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
SINGLE-VALUE
)
```

4.8. printer-make-and-model

```
( 1.3.18.0.2.4.1138
NAME 'printer-make-and-model'
DESC 'Identifies the make and model of the device. The device
manufacturer MAY initially populate this attribute.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
SINGLE-VALUE
)
```

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4.9. printer-ipp-versions-supported

```
( 1.3.18.0.2.4.1133
NAME 'printer-ipp-versions-supported'
DESC 'Identifies the IPP protocol version(s) that this printer
      supports, including major and minor versions, i.e., the version
      numbers for which this Printer implementation meets the
      conformance requirements.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
)
```

4.10. printer-multiple-document-jobs-supported

```
( 1.3.18.0.2.4.1132
NAME 'printer-multiple-document-jobs-supported'
DESC 'Indicates whether or not the printer supports more than one
      document per job, i.e., more than one Send-Document or
      Send-Data operation with document data.'
EQUALITY booleanMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.7
SINGLE-VALUE
)
```

4.11. printer-charset-configured

```
( 1.3.18.0.2.4.1109
NAME 'printer-charset-configured'
DESC 'The configured charset in which error and status messages will
      be generated (by default) by this printer. Also, a possible
      charset 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 are
      defined by the IANA Registry of Coded Character Sets and the
      "(preferred MIME name)" SHALL be used as the tag. For
      coherence with IPP Model, charset tags in this attribute SHALL
      be lowercase normalized. This attribute SHOULD be static (time
      of registration) and SHOULD NOT be dynamically refreshed
      (subsequently).'
EQUALITY caseIgnoreMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{63}
SINGLE-VALUE
)
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4.12. printer-charset-supported

```
( 1.3.18.0.2.4.1131
NAME 'printer-charset-supported'
DESC 'Identifies the set of charsets supported for attribute type
values of type Directory String for this directory entry. For
example: "utf-8" (ISO 10646/Unicode) or "iso-8859-1" (Latin1).
Legal values are defined by the IANA Registry of Coded
Character Sets and the preferred MIME name.'
EQUALITY caseIgnoreMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{63}
)
```

4.13. printer-generated-natural-language-supported

```
( 1.3.18.0.2.4.1137
NAME 'printer-generated-natural-language-supported'
DESC 'Identifies the natural language(s) supported for this directory
entry. For example: "en-us" (US English) or "fr-fr" (French in
France). Legal values conform to [RFC3066], Tags for the
Identification of Languages.'
EQUALITY caseIgnoreMatch
ORDERING caseIgnoreOrderingMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{63}
)
```

4.14. printer-document-format-supported

```
( 1.3.18.0.2.4.1130
NAME 'printer-document-format-supported'
DESC 'The possible document formats in which data may be interpreted
and printed by this printer. Legal values are MIME types come
from the IANA Registry of Internet Media Types.'
EQUALITY caseIgnoreMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
)
```

4.15. printer-color-supported

```
( 1.3.18.0.2.4.1129
NAME 'printer-color-supported'
DESC 'Indicates whether this printer is capable of any type of color
printing at all, including highlight color.'
EQUALITY booleanMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.7
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SINGLE-VALUE  
)

4.16. printer-compression-supported

( 1.3.18.0.2.4.1128  
NAME 'printer-compression-supported'  
DESC 'Compression algorithms supported by this printer. For example:  
"deflate, gzip". Legal values include; "none", "deflate"  
(public domain ZIP), "gzip" (GNU ZIP), "compress" (UNIX).'  
EQUALITY caseIgnoreMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{255}  
)

4.17. printer-pages-per-minute

( 1.3.18.0.2.4.1127  
NAME 'printer-pages-per-minute'  
DESC 'The nominal number of pages per minute which may be output by  
this printer (e.g., a simplex or black-and-white printer).  
This attribute is informative, NOT a service guarantee.  
Typically, it is the value used in marketing literature to  
describe this printer.'  
EQUALITY integerMatch  
ORDERING integerOrderingMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
SINGLE-VALUE  
)

4.18. printer-pages-per-minute-color

( 1.3.18.0.2.4.1126  
NAME 'printer-pages-per-minute-color'  
DESC 'The nominal number of color pages per minute which may be  
output by this printer (e.g., a simplex or color printer).  
This attribute is informative, NOT a service guarantee.  
Typically, it is the value used in marketing literature to  
describe this printer.'  
EQUALITY integerMatch  
ORDERING integerOrderingMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
SINGLE-VALUE  
)

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4.19. printer-finishings-supported

```
( 1.3.18.0.2.4.1125
  NAME 'printer-finishings-supported'
  DESC 'The possible finishing operations supported by this printer.
        Legal values include; "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".'
  EQUALITY caseIgnoreMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{255}
)
```

4.20. printer-number-up-supported

```
( 1.3.18.0.2.4.1124
  NAME 'printer-number-up-supported'
  DESC 'The possible numbers of print-stream pages to impose upon a
        single side of an instance of a selected medium. Legal values
        include; 1, 2, and 4. Implementations may support other
        values.'
  EQUALITY integerMatch
  ORDERING integerOrderingMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.27
)
```

4.21. printer-sides-supported

```
( 1.3.18.0.2.4.1123
  NAME 'printer-sides-supported'
  DESC 'The number of impression sides (one or two) and the two-sided
        impression rotations supported by this printer. Legal values
        include; "one-sided", "two-sided-long-edge",
        "two-sided-short-edge".'
  EQUALITY caseIgnoreMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
)
```

4.22. printer-media-supported

```
( 1.3.18.0.2.4.1122
  NAME 'printer-media-supported'
  DESC 'The standard names/types/sizes (and optional color suffixes) of
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the media supported by this printer. For example: "iso-a4",  
"envelope", or "na-letter-white". Legal values conform to ISO  
10175, Document Printing Application (DPA), and any IANA  
registered extensions.'

EQUALITY caseIgnoreMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{255}  
)

#### 4.23. printer-media-local-supported

( 1.3.18.0.2.4.1117  
NAME 'printer-media-local-supported'  
DESC 'Site-specific names of media supported by this printer, in the  
language in "printer-natural-language-configured".  
For example: "purchasing-form" (site-specific name) as opposed  
to (in "printer-media-supported"): "na-letter" (standard  
keyword from ISO 10175).'

EQUALITY caseIgnoreMatch  
SUBSTR caseIgnoreSubstringsMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{255}  
)

#### 4.24. printer-resolution-supported

( 1.3.18.0.2.4.1121  
NAME 'printer-resolution-supported'  
DESC 'List of resolutions supported for printing documents by this  
printer. Each resolution value is a string with 3 fields:  
1) Cross feed direction resolution (positive integer), 2) Feed  
direction resolution (positive integer), 3) Resolution unit.  
Legal values are "dpi" (dots per inch) and "dpcm" (dots per  
centimeter). Each resolution field is delimited by ">". For  
example: "300> 300> dpi>".'

EQUALITY caseIgnoreMatch  
SUBSTR caseIgnoreSubstringsMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{255}  
)

#### 4.25. printer-print-quality-supported

( 1.3.18.0.2.4.1120  
NAME 'printer-print-quality-supported'  
DESC 'List of print qualities supported for printing documents on  
this printer. For example: "draft, normal". Legal values  
include; "unknown", "draft", "normal", "high".'

EQUALITY caseIgnoreMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}  
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4.26. printer-job-priority-supported

```
( 1.3.18.0.2.4.1110
NAME 'printer-job-priority-supported'
DESC '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 attribute describes the
"granularity". Legal values of this attribute are from "1" to
"100".'
```

EQUALITY integerMatch  
ORDERING integerOrderingMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
SINGLE-VALUE  
)

4.27. printer-copies-supported

```
( 1.3.18.0.2.4.1118
NAME 'printer-copies-supported'
DESC '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.'
```

EQUALITY integerMatch  
ORDERING integerOrderingMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
SINGLE-VALUE  
)

4.28. printer-job-k-octets-supported

```
( 1.3.18.0.2.4.1111
NAME 'printer-job-k-octets-supported'
DESC '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.'
```

EQUALITY integerMatch  
ORDERING integerOrderingMatch  
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27  
SINGLE-VALUE  
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4.29. printer-current-operator

```
( 1.3.18.0.2.4.1112
  NAME 'printer-current-operator'
  DESC 'The name of the current human operator responsible for
        operating this printer. It is suggested that this string
        include information that would enable other humans to reach the
        operator, such as a phone number.'
  EQUALITY caseIgnoreMatch
  ORDERING caseIgnoreOrderingMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
  SINGLE-VALUE
)
```

4.30. printer-service-person

```
( 1.3.18.0.2.4.1113
  NAME 'printer-service-person'
  DESC 'The name of the current human 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 phone number.'
  EQUALITY caseIgnoreMatch
  ORDERING caseIgnoreOrderingMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
  SINGLE-VALUE
)
```

4.31. printer-delivery-orientation-supported

```
( 1.3.18.0.2.4.1114
  NAME 'printer-delivery-orientation-supported'
  DESC 'The possible delivery orientations of pages as they are printed
        and ejected from this printer. Legal values include;
        "unknown", "face-up", and "face-down".'
  EQUALITY caseIgnoreMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}
)
```

4.32. printer-stacking-order-supported

```
( 1.3.18.0.2.4.1115
  NAME 'printer-stacking-order-supported'
  DESC 'The possible stacking order of pages as they are printed and
```

1123           ejected from this printer. Legal values include; "unknown",  
1124           "first-to-last", "last-to-first".'

1125       EQUALITY caseIgnoreMatch  
1126       SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}  
1127       )

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1130 4.33. printer-output-features-supported

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1132       ( 1.3.18.0.2.4.1116  
1133       NAME 'printer-output-features-supported'  
1134       DESC 'The possible output features supported by this printer. Legal  
1135       values include; "unknown", "bursting", "decollating",  
1136       "page-collating", "offset-stacking".'  
1137       EQUALITY caseIgnoreMatch  
1138       SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}  
1139       )

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1142 4.34. printer-aliases

1143  
1144       ( 1.3.18.0.2.4.1108  
1145       NAME 'printer-aliases'  
1146       DESC 'Site-specific administrative names of this printer in addition  
1147       the printer name specified for printer-name.'  
1148       EQUALITY caseIgnoreMatch  
1149       ORDERING caseIgnoreOrderingMatch  
1150       SUBSTR caseIgnoreSubstringsMatch  
1151       SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{127}  
1152       )

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1181 5. Definition of Syntaxes  
1182

1183 No new attribute syntaxes are defined by this document.  
1184

1185 The attribute types defined in Section 4 above reference syntax OIDs  
1186 defined in Section 6 of [RFC2252], which are summarized below:  
1187

Syntax OID	Syntax Description
1.3.6.1.4.1.1466.115.121.1.7	Boolean
1.3.6.1.4.1.1466.115.121.1.15	Directory String (UTF-8 [RFC2279])
1.3.6.1.4.1.1466.115.121.1.27	Integer

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1195 6. Definition of Matching Rules  
1196

1197 No new matching rules are defined by this document.  
1198

1199 The attribute types defined in Section 4 above reference matching  
1200 rules defined in Section 8 of [RFC2252] and/or Section 6 of [X.520],  
1201 which are summarized below:  
1202

Matching Rule OID	Matching Rule Name	Usage
2.5.13.13*	booleanMatch	EQUALITY
2.5.13.2	caseIgnoreMatch	EQUALITY
2.5.13.14	integerMatch	EQUALITY
2.5.13.3	caseIgnoreOrderingMatch	ORDERING
2.5.13.15*	integerOrderingMatch	ORDERING
2.5.13.4	caseIgnoreSubstringsMatch	SUBSTR

1211  
1212 \* - Defined in ITU-T X.520:1996 [X.520] but not listed in [RFC2252]  
1213

1214 Note: Some implementations of LDAP servers do not support some or  
1215 all of the [X.520] matching rules in the EQUALITY, ORDERING, or  
1216 SUBSTR clauses of attribute definitions. Administrators may wish to:  
1217

- 1218 1) Omit the EQUALITY clause (or at least the 'booleanMatch', which is  
1219 not defined in [RFC2252]);  
1220
- 1221 2) Omit the ORDERING clause (or at least the 'integerOrderingMatch',  
1222 which is not defined in [RFC2252]);  
1223
- 1224 3) Omit the SUBSTR clause.  
1225

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7. IANA Considerations

There are no IANA registration considerations defined by this document.

8. Internationalization Considerations

All text string attribute values in objects of the printerService class MUST be encoded in UTF-8 [RFC2279] characters, as required by the syntax 'Directory String' [RFC2252]. Also, a language tag [RFC3066] for all of the text string attributes in objects of the printerService class SHOULD be supplied in 'printer-natural-language-configured'. Therefore, all objects of the printerService class conform to the "IETF Policy on Character Sets and Languages" [RFC2277].

9. Security Considerations

As with any LDAP schema, it is important to protect specific entries and attributes with the appropriate access control. It is particularly important that only administrators can modify entries defined in this LDAP printer schema. For additional considerations of deploying printers in an IPP environment, the reader is referred to Section 8 of [RFC2911].

Obtaining a reference to an object and storing it in the directory may make a handle to the object available to a wider audience. This may have security implications.

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