

1 INTERNET-DRAFT

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11 **Mapping between LPD and IPP Protocols**

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27 **Abstract**

28 This Internet-Draft specifies the mapping between (1) the commands and operands
29 of the "Line Printer Daemon (LPD) Protocol" specified in RFC 1179 and (2) the
30 operations and parameters of the Internet Printing Protocol (IPP). One of the
31 purposes of this document is to compare the functionality of the two protocols.
32 Another purpose is to facilitate implementation of gateways between LPD and
33 IPP.

34 **WARNING:** RFC 1179 was not on standards track. While RFC 1179 was
35 intended to record existing practice, in some areas it fell short. However, this
36 specification maps between (1) the actual current practice of RFC 1179 and (2)
37 IPP. This document does not attempt to map the numerous divergent extensions
38 to the LPD protocol that have been made by many implementors.

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57 **Mapping between the LPD and IPP Protocols**58 **1. Introduction**

59 The reader of this specification is expected to be familiar with the IPP Model and
60 Semantics specification [1], the IPP Protocol specification [2], and the Line Printer
61 Daemon (LPD) protocol specification [3] as described in RFC 1179.

62 RFC 1179 was written in 1990 in an attempt to document existing LPD protocol
63 implementations. Since then, a number of undocumented extensions have been made by
64 vendors to support functionality specific to their printing solutions. All of these extensions
65 consist of additional control file directives. This document does not address any of these
66 vendor extensions. Rather it addresses existing practice within the context of the features
67 described by RFC 1179. Deviations of existing practice from RFC 1179 are so indicated.

68 In the area of document formats, also known as page description languages (PDL), RFC
69 1179 defines a fixed set with no capability for extension. Consequently, some new PDL's
70 are not supported, and some of those that are supported are sufficiently unimportant now
71 that they have not been registered for use with the Printer MIB[4] and IPP[1] [2], though
72 they could be registered if desired. See the Printer MIB specification [4] and/or the IPP
73 Model specification [1] for instructions for registration of document-formats with IANA.
74 IANA lists the registered document-formats as "printer languages".

75 Other LPD commands are intended to work on "text" only formats and so are
76 inappropriate for many contemporary document formats that completely specify each
77 page.

78 This document addresses the protocol mapping for both directions: mapping of the LPD
79 protocol to the IPP protocol and mapping of the IPP protocol to the LPD protocol.

80 **2. Terminology**

81 The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
82 "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in
83 this document are to be interpreted as described in RFC 2119 [6].

84 The syntax of the LPD commands is given using ABNF [6].

85 The following tokens are used in order to make the syntax more readable:

86 LF stands for %x0A (linefeed)

87 SP stands for %x20. (space)

88 3. Mapping between LPD Commands and IPP Operations

89 This section describes the mapping between LPD on-the wire and IPP operations. Each
90 of the following sub-sections appear as sub-sections of section 5 of RFC 1179.

91 3.1 Print any waiting jobs

92 Command syntax: %x01 Printer-queue-name LF

93 In LPD, this command starts the daemon, if it isn't already running. Such an equivalent
94 operation is not provided in IPP, since the IPP Printer is assumed to always be running,
95 where as in LPD, the client makes sure that the daemon is running using this command.

96 If an LPD-to-IPP mapper receives this LPD command, it SHALL ignore it and send no
97 IPP operation.

98 An IPP-to-LPD mapper SHALL send this LPD command after it has finished sending all
99 pending 'Receive a printer job' commands.

100 3.2 Receive a printer job

101 Command syntax: %x02 Printer-queue-name LF

102 An LPD-to-IPP mapper SHALL map the 'Receive a printer job' command to either:

- 103 • the Print-Job operation with a single data file or
- 104 • the Create-Job operation followed by a Send-Document operation for each
105 data file.

106 If a job consists of a single data file, the PrintJob operation is RECOMMENDED.

107 If a job consists of more than one data file, Create Job followed by Send-Document for
108 each data file is REQUIRED. If the IPP Printer doesn't support the Create-Job and Send-
109 Document operations, the LPD-to-IPP mapper SHALL submit each data file as a separate
110 Print-Job operation (thereby converting a single LPD job into multiple IPP jobs).

111 ISSUE: Ok that I changed so that the mapper shall break a multi-document job into
112 separate jobs, one IPP job for each LPD data file, instead of error return?

113 NOTE: if Create-Job is used, it MUST precede the Send-Document operation even if the
114 LPD control file, which supplies attributes for Create-Job, arrives after all documents.

115 An IPP-to-LPD mapper SHALL map the following IPP operations to this LPD command:

- 116 • Print-Job
- 117 • Print-uri
- 118 • Create-Job followed by Send-Document or Send-URI for each document

119 The mechanism for mapping between an LPD Printer-queue-name operand and the IPP
120 "printer-uri" parameter is not defined in this document.

121 ISSUE: error code conversion.

122 See the next section for the mapping of the LPD "second level commands" to IPP input-
123 parameters.

124 3.2 Send queue state (short)

125 Command syntax: %x03 Printer-queue-name *(SP (User-Name / job-number))

126 If the LPD command contains only the Printer-queue-name operand, the LPD-to-IPP
127 mapper SHALL use the Get-Attributes operation of the corresponding IPP Printer to get
128 printer-state information and the Get-Jobs operation of the Printer to get information
129 about all of the jobs. With Get-Attributes, it SHALL request the "printer-state" and
130 "printer-state-reasons" attributes. With Get-Jobs, it SHALL request the "number-of-
131 intervening-jobs", "job-originating-user", "job-name", "document-name" (or "document-
132 uri"), and "job-k-octets".

133 NOTE: RFC 1179 does not specify what attributes are returned in response to a 'Send
134 queue state' (short) command, but leaves it up to implementation. The IPP attributes
135 specified in this specification reflect existing practice.

136 NOTE: This specification does *not* specify how the LPD-to-IPP mapper maps: (1) the
137 LPD Printer-queue-name operand to the IPP "printer-uri" parameter or (2) the LPD job-
138 number operand to the IPP "job-uri" parameter, since the format of these URIs is opaque
139 in the IPP protocol and is implementation-dependent.

140 If the LPD command contains one or more User-name operands, the LPD-to-IPP mapper
141 SHALL get all the jobs as above using the Get-Jobs operation on the Printer and then do
142 its own filtering on the returned value of the "job-originating-user" attribute for each job.

143 If the LPD command contains only job-number operands, the LPD-to-IPP mapper
144 SHALL either (1) get all the jobs as above using the Get-Jobs operation on the Printer and
145 then do its own filtering or (2) get each specified job individually using separate Get-
146 Attributes operations (multiple jobs may be requested in a single IPP connection with
147 multiple Get-Attribute operations, one for each job).

148 The IPP-to-LPD mapper shall use the long version of this command. See that command.

149 3.2 Send queue state (long)

150 Command syntax: %x04 printer-name *(SP (user-name / job-number))

151 Same mapping as the 'Send queue state' (short) command. The IPP client supplies a
152 longer list of requested attributes to the Get-Jobs or Get-Attributes operations.

153 The LPD-to-IPP mapper should specify additional attributes than the ones listed for the
154 'Send queue state' (short) command.

155 NOTE: RFC 1179 does not specify what attributes are returned in response to a 'Send
156 queue state' (short) command, but leaves it up to implementation.

157 The IPP-to-LPD mapper shall use this command to get what attributes it can from the
158 LPD server.

159 **3.2 05 - Remove jobs**

160 Command syntax: %x05 Printer-queue-name SP agent *(SP (User-name / job-number))

161 The agent operand is the user-name of the user initiating the 'Remove jobs' command.

162 The special user-name 'root' indicates a privileged user.

163 The LPD-to-IPP mapper shall map this command to the Cancel-Job operation.

164 This command with the Printer-queue-name operand and one job-number operand is the
165 same as the IPP Cancel-Job operation when the client supplies just the job URI. Multiple
166 jobs may be canceled in IPP in a single connection with multiple Cancel-Job operations.

167 In IPP only a privileged operator may cancel jobs belonging to another user.

168 NOTE: This specification does *not* specify how the LPD-to-IPP mapper maps: (1) the
169 LPD Printer-queue-name to the IPP "printer-uri" or (2) the LPD job-number to the IPP
170 "job-uri", since the format of these URIs is opaque in the IPP protocol and is
171 implementation-dependent.

172 There is no IPP equivalent for the LPD 'Remove jobs' command with just the Printer-
173 queue-name operand supplied, since IPP provides no way to cancel the current job.

174 There is no IPP equivalent for the LPD 'Remove jobs' command with a User-name
175 operand supplied, since IPP provides no way to cancel a job specified by user name.

176 The LPD-to-IPP mapper shall map a Cancel-Job operation to this command.

177 There are some major issues about setting the agent.

178 **4. Mapping between LPD Sub-Commands and IPP Operations**

179 This section describes the mapping between LPD sub-commands and IPP operations.

180 Each of the following sub-sections appear as sub-sections of section 6 of RFC 1179. The
181 operands of the sub-commands appear in parens in the sub-headings

182 **4.1 01 - Abort job ()**

183 Sub-command syntax: %x01

184 This sub-command is intended to abort any job transfer in process. If an IPP Create-Job
185 operation and/or a Send-Document operation were performed on behalf of the receive job
186 command that is being aborted, an IPP Cancel-Job operation should be issued for the job
187 URI that was returned by the Printer on which the Create-Job operation was performed.
188 Also, any temporary files created while processing the 'Receive job request' should be
189 cleaned up, and the connection to the client should be closed. Finally, this sub-command
190 is implied if at any time the connection between the LPD client and server is terminated
191 before an entire print job has been transferred via an LPD 'Receive job request'.

192 ISSUE: is IPP defined at this point to abort a job whose connection is closed before the
193 job has been fully received. If so, that is an alternate and simpler way to abort the job.

194 4.2 02 - Receive control file

195 Sub-command syntax: %x02 Number-of-bytes-in-control-file, Name-of-control-file

196 This sub-command is roughly equivalent to the IPP Create-Job operation. Once the
197 control file has been received, it's contents should be translated, and an
198 appropriate IPP Create-Job operation performed.

199 However, some information, such as Document-Name go in the Send-Document
200 operation.

201 4.3 03 - Receive data file

202 Sub-command syntax: %x03 Number-of-bytes-in-data-file Name-of-data-file

203 This sub-command is roughly equivalent to the IPP Send-Document operation. If the
204 control file has been previously received, and it's corresponding IPP Create-Job operation
205 performed, an IPP Send-Document operation can be performed using the job URI
206 returned by the IPP Create-Job operation.

207 When performing the Send-Document operation, the size of the document data MUST be
208 specified. Unfortunately RFC-1179 alludes to a method for passing an arbitrary length
209 data file. This is described as being done by using an octet-count of zero, however the
210 description isn't complete, and in practice, no implementations allow sending or receiving
211 arbitrary length data files.

212 5. Mapping of LPD control file lines to IPP Operation Input Parameters

213 This section describes the mapping from LPD control file lines to IPP operation input
214 parameters for the Print-Job, Create-Job, and Send-Document operations. Each of the
215 following sub-sections appear as sub-sections of section 7 of RFC 1179.

216 ISSUE: somewhere, we need to map the LPD query format to IPP attributes.

217 In LPD text operands have a maximum length of 31 or 99 while IPP input parameters
 218 have a maximum of 255 characters. Therefore, no data is lost when mapping from LPD to
 219 IPP. However, when mapping from IPP to LPD, there may be some data loss if the IPP
 220 parameters exceed the maximum length of the LPD equivalent operands.

221 In the following table, IPP input parameter names are indicated in double quotes (") and
 222 input parameter values are indicated in single quotes ('). Values of the IPP "document-
 223 format" attribute that could be registered, but are not currently, are indicated with "***".

224 Where there is a one-to-one mapping, both directions are specified. Where IPP has none,
 225 the LPD-to-IPP the attribute is ignored, and in the IPP-to-LPD the LPD feature is left
 226 unspecified.

LPD command	Equivalent IPP input parameter(s)
C Class for banner page	None.
H Originating Host	"job-originating-host"
I Indent Printing	None.
J Job name for banner page	"job-name"
L Print banner page	"job-sheets" = any but 'none' Absence of an 'L' directive indicates that "job-sheets=none" is set.
M Mail When Printed	"notification-events" = 'job-completion' and "notification-method" = 'mailto://Job-originating-user@job-originating-host'
N Name of source file	"document-name" This is on a per data file basis
P User identification	"job-originating-user"
S Symbolic link data	None.
T Title for pr	None.
U Unlink data file	None.
W Width of output	None.
1 troff R font	None.
2 troff I font	None.
3 troff B font	None.
4 troff S font	None.
c Plot CIF file	"document-format" = 'CIF' **
d Print DVI file	"document-format" = 'TeX DVI' **

f	Print formatted file	<p>"document-format" = 'Automatic'</p> <p>In practice, this value is often overloaded. It is often used with any format of document data including PostScript and PCL data.</p>
g	Plot file	<p>"document-format" = 'BSDPlotLibrary' **</p>
k	reserved for Kerberized clients and servers	<p>None.</p> <p>This is unimplemented in LPD implementations. It was a place holder for future work that never occurred.</p>
l	Print file leaving control characters	<p>"document-format" = 'Automatic'</p> <p>In practice, this is often used as a rough equivalent to the 'f' directive. Again it may mean one of many document formats.</p>
n	Print ditroff output file	<p>"document-format" = 'ditroff' **</p>
o	Print Postscript output file	<p>"document-format" = 'ps'</p> <p>"document-format" = 'PS'(7)</p> <p>o is recognized by LPD-to-IPP, but never generated in IPP-to-LPD. Rather 'f' is used.</p> <p>This was not implemented in any RFC-1179 implementations until very recently in WinNT.</p>
p	Print file with 'pr' format	<p>None.</p> <p>It therefore is equivalent to 'f' or 'l'</p>
r	File to print with FORTRAN carriage control	<p>"document-format" = 'FORTRAN' **</p>
t	Print troff output file	<p>"document-format" = 'troff' **</p>
v	Print raster file	<p>"document-format" = 'RasterFormat' **</p>
z	reserved for future use with the Palladium print system	<p>None.</p> <p>This was reserved for the MIT Palladium print system, but was never used by that system.</p>

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