

**Information technology -
Document Printing Application (DPA) -
Part 3: Management abstract service definition and procedures**

Draft Final Text

International Standard 10175-3

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1 Information technology

2 Document Printing Application (DPA)

3 Part 3:

4 Management abstract service definitions and procedures

5 Section 1 - General

6 1 Scope

7 The Document Printing Application is one component of a coordinated set of facilities and standards needed to
8 satisfy the printing requirements of the modern distributed office. Together, the capabilities provided can enable
9 users to create and produce high-quality office documents in a consistent and unambiguous manner within a
10 distributed open systems environment.

11 The Document Printing Application Standard (ISO/IEC 10175) consists of three parts:

- 12 Part 1: Abstract service definitions and procedures
- 13 Part 2: Protocol specification
- 14 Part 3: Management abstract service definition and procedures

15 This part of ISO/IEC 10175 extends the facilities specified in ISO/IEC 10175-1 by adding the capability for
16 administrators and operators to manage and control printers, print servers and all other print objects; in addition, this
17 part specifies additional capabilities for a print client to control a print job. The text and specifications contained in
18 this part of ISO/IEC 10175 are derived from IEEE 1387.4 (POSIX) - System Administration Part 4 - Printing
19 Interfaces. In particular, this part of ISO/IEC 10175:

- 20 - specifies additional administrative functions and services that may be provided by Document Printing
21 Application servers;
- 22 - specifies the Document Printing Application abstract service for the additional administrative functions
23 using the principles established by the Abstract Service Definition Conventions (ISO/IEC 10021-3);
- 24 - specifies the requirements for conformance with the Document Printing Application for these additional
25 administrative functions.

26 See clause 1 of ISO/IEC 10175-1 for a more extensive description of the Document Printing Application.

27 2 Normative references

28 [The following standards contain provisions which, through reference in this text, constitute provisions of this part of](#)
29 [ISO/IEC 10175. At the time of publication, the editions indicated were valid. All standards are subject to revision,](#)
30 [and parties to agreements based on this part of ISO/IEC 10175 are encouraged to investigate the possibility of](#)
31 [applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of](#)
32 [currently valid International Standards.](#)

- 33 ISO/IEC 7498-1: 1994, *Information technology - Open Systems Interconnection -*
34 *Basic Reference Model: The Basic Model.*
- 35 ISO/IEC 7498-2: 1989, *Information processing systems - Open Systems Interconnection -*
36 *Basic Reference Model - Part 2: Security Architecture.*
- 37 ISO/IEC 8824: 1990, *Information technology - Open Systems Interconnection - Specification of Abstract*
38 *Syntax Notation One (ASN.1).*
- 39 ISO/IEC 8825: 1990, *Information technology - Open Systems Interconnection - Specification of Basic*
40 *Encoding Rules for Abstract Syntax Notation One (ASN.1).*
- 41 ISO/IEC 10021-3: 1990, *Information technology - Text Communication - Message-Oriented Text Interchange*
42 *Systems (MOTIS)*
43 *- Part 3: Abstract Service Definition Conventions.*
- 44 IEEE 1387.4 / D~~9~~⁸, *Draft Standard for Information Technology - POSIX System Administration - Part 4:-*
45 *Printing Interfaces, IEEE, ~~March 1998~~^{October 1994}.*

46 **3 Definitions**

47 For the purposes of this part of ISO/IEC 10175, the definitions given in ISO/IEC 10175-1 apply.

48 **4 Abbreviations**

49 For the purposes of this part of ISO/IEC 10175, the abbreviations given in ISO/IEC 10175-1 apply.

50 **5 Conventions**

51 For the purposes of this part of ISO/IEC 10175, the conventions given in ISO/IEC 10175-1 apply.

52 Section 2 - DP management abstract service definition

53 6 DP abstract model

54 For the purposes of this part of ISO/IEC 10175, the DP abstract model given in ISO/IEC 10175-1, clause 6, applies.
55 The abstract operations defined in this part of ISO/IEC 10175 are all accessed through the DP-Administration port.

56 7 Abstract association information

57 For the purposes of this part of ISO/IEC 10175, the abstract association information given in ISO/IEC 10175-1,
58 clause 7, applies; no additional requirements exist for this part of ISO/IEC 10175.

59 8 Abstract operations

60 This clause defines the following abstract-operations:

- 61 a) Clean
- 62 b) Control
- 63 c) Create
- 64 d) Delete
- 65 e) Disable
- 66 f) Enable
- 67 g) Pause
- 68 h) ResubmitJob
- 69 i) Resume
- 70 j) Set
- 71 k) Shutdown

72 Normally only an appropriately authorized administrator may use the above operations. However, this is a site
73 and/or enterprise-specific policy decision, not mandated by this International Standard. [Also, see the text of 8.3.8,](#)
74 [ResubmitJob, for a possible exception.](#)

75 The table below lists each of the above abstract-operations and all of the abstract-operations of ISO-IEC 10175-1,
76 and [indicates](#) the object classes on which they operate.

abstract-operation	DPA Part	job	document	server	printer		all others
					logical	physical	
CancelJob	1	yes*					
Clean	3			yes		yes	
Control	3			yes		yes	
Create	3			unspecified	yes	yes	yes
Delete	3	yes	yes	unspecified	yes	yes	yes
Disable	3			yes	yes	yes	
Enable	3			yes	yes	yes	
InterruptJob	1	yes*					
ListObjectAttributes	1	yes	yes	yes	yes	yes	yes

ModifyJob	1	yes*					
Pause	3			yes		yes	
PauseJob	1	yes*					
Print	1	yes*					
PromoteJob	1	yes*					
ResubmitJob	3	yes		yes	yes	impl. option	
Resume	3			yes		yes	
ResumeJob	1	yes*					
Set	3	yes	yes	yes	yes	yes	yes
Shutdown	3			yes		impl. option	

77 NOTES

78 1 * Most abstract-operations utilize an **object-class** argument element to specify the class of the **object-**
 79 **instance** (or **object-identification**). However, many of the operations of ISO/IEC 10175-1 do not since they only
 80 operate on a single class, the job. Operations that do not utilize an **object-class** argument element are marked with an
 81 asterisk (*) in the above table.

82 2 In POSIX, multiple object instances may be specified, either as an explicit list of individual object instances, as an
 83 object instance that may contain wildcard characters, e.g. an asterisk (*), or as a combination of both methods.
 84 However, DPA abstract-operations may only be applied to a single specific object-instance at a time. Thus the print
 85 client must invoke a separate DPA operation for each **object-instance**. But if the use of wildcard characters is
 86 supported by the print client and print server, the print client may invoke the specified abstract-operation on all
 87 objects of the specified **object-class** whose name matches the wildcard expansion. Support for wildcards is an
 88 implementation option.

89 3 ~~The Clean, Shutdown and Print operations and the Delete operation may operate asynchronously; i.e., these~~
 90 ~~operations need not complete immediately before returning to the client, based on the state of the relevant~~
 91 ~~object-printer. All other DPA abstract-operations operate synchronously. However, although the Create operation may~~
 92 ~~cause objects to be removed when force-creation is TRUE, the Create operation shall immediately create the new~~
 93 ~~object. If the printer is not able to immediately complete the deletion of the existing object due to the state of the~~
 94 ~~printer, the server shall rename the existing object so that the creation of the new object can complete.~~

95 **8.1 Common datatypes and values used in DP management abstract operations**

96 **8.1.1 Imported datatypes**

97 This part of ISO/IEC 10175 imports and uses the following datatypes defined in ISO/IEC 10175-1:

98 From ISO/IEC 10175-1 Annex B:

- 99 Attribute,
- 100 AttributeId,
- 101 CommonArguments,
- 102 JobAttrModification,
- 103 ModifyOperator
- 104 ObjectIdentification,

- 105 AccessError,
- 106 AttributeError,
- 107 PrinterError,
- 108 SecurityError,
- 109 SelectionError,
- 110 ServiceError,
- 111 UpdateError

112 From ISO/IEC 10175-1 Annex C:

113 DistinguishedNameString,
 114 JobIdentifier,
 115 Message

116 In addition, the abstract-operations defined in this part of ISO/IEC 10175 employ the abstract service macros
 117 ABSTRACT-ERROR and ABSTRACT-OPERATION, defined in ISO/IEC 10021-3.

118 8.1.2 Datatypes common for most DPA abstract operations

119 8.1.2.1 Common-arguments

120 The argument of each of the abstract-operations defined in this part of ISO/IEC 10175 includes an optional element
 121 of type **CommonArguments**, imported from ISO/IEC 10175-1 Annex C, as indicated in 8.1.1, above. See [8.1.2 in](#)
 122 ISO/IEC 10175-1 ~~clause 8.1.2~~ for specifications of the attributes that may be included in an instance of the
 123 **CommonArguments** type.

124 8.1.2.2 Message

125 The argument of each of the abstract-operations defined in this part of ISO/IEC 10175 includes an optional element
 126 of type **Message**, imported from ISO/IEC 10175-1 Annex C, as indicated in 8.1.1, above. When a client specifies a
 127 **Message** element in one of the abstract-operations defined in this part of ISO/IEC 10175, the server shall treat it in
 128 the manner specified in this subclause.

129 The server shall attach the specified message to the **object-instance** identified in the operation. The message string
 130 shall be a human-readable message which can be retrieved later by using the **ListObjectAttributes** operation.

131 If messages are specified in one locale and retrieved in another, a variety of results may occur depending on the
 132 message specification from the client locale and at the server locale. See the table below for different possible results
 133 to **message** at the server. See [clause 8.1.2.3 in ISO/IEC 10175-1](#) for a description of **operation-locale**.

		if message at the server locale is:		
		unspecified	non-NULL string	NULL string
if message from the client locale is:				
unspecified	message at server remains unspecified	message at server remains the non-NULL string	message at server remains the NULL string	
non-NULL string	message at server becomes the client non-NULL string	message at server changes to the client non-NULL string	message at server changes to the client non-NULL string	
NULL string	message at server becomes the NULL string	message at server changes to the NULL string	message at server remains the NULL string	

134 8.2 DP-User Port Abstract Operation Definitions

135 There are no DP-User Port abstract-operations defined in this part of ISO/IEC 10175.

136 8.3 DP-Administration Port Abstract-Operation Definitions

137 Clients may use the abstract-operations described in the following [sub](#)clauses to administer and control the flow of
 138 print-jobs through printers, and to administer and control print objects. Specific print server implementations may
 139 limit usage of one or more of these abstract-operations to administrators with sufficient access rights, and/or may
 140 vary the facilities provided by a given abstract-operation depending upon the access rights assigned to the individual
 141 administrators served by the print server.

142 *Temporary NOTE—The abstract operations defined in this part of ISO/IEC 10175 are extensions to the list of DP-*
 143 *Administration port abstract operations defined in ISO/IEC 10175-1; future addenda to ISO/IEC 10175-1 will specify*
 144 *the relationships in detail.*

145 **8.3.1 Clean**

146 This abstract-operation allows an administrator to remove all jobs from the specified print server or printer.
 147 (Removal of jobs from logical printers is an implementation option.) When the Clean operation is invoked by an
 148 administrator with appropriate privileges, the server shall:

- 149 a) If ~~if~~ disable the object ~~if it~~ is enabled, reject the abstract-operation and report an inappropriate-object-
 150 state AccessError; otherwise,
- 151 b) If the object is a physical printer, pause the printer to stop the printer from producing output (see **Pause**
 152 operation),
- 153 c) Remove all jobs contained in or scheduled for that object,
- 154 d) Restore the state of the object to what it was when the execution of the **Clean** operation began.

155 The server shall remove jobs that are being printed on the physical printer at the time the **Clean** operation is invoked
 156 in a manner that is consistent with the behavior of the **Delete** operation.

157 This operation may operate asynchronously; i.e., this operation need not complete immediately before returning,
 158 based on the state of the object ~~printer~~.

159 This abstract-operation is formally defined as follows:

```
160 Clean ::= ABSTRACT-OPERATION
161     ARGUMENT      CleanArgument
162     RESULT        CleanResult
163     ERRORS       { AccessError,
164                     SecurityError,
165                     ServiceError }
```

166 NOTE - Normally only an appropriately authorized administrator may clean a printer or server object. However, this is
 167 a site and/or enterprise-specific policy decision, not mandated by this International Standard.

168 **8.3.1.1 Clean-argument**

169 The argument of this abstract-operation is formally defined as follows:

```
170 CleanArgument ::= SEQUENCE {
171     object-class      [0] OBJECT IDENTIFIER,
172                       -- id-oc-server, id-oc-printer
173     object-instance [1] ObjectIdentification,
174                       -- choice depends on object class
175     message          [2] Message OPTIONAL,
176     common-arguments [3] CommonArguments OPTIONAL }
```

177 The following argument elements shall be supported by the server:

178 **object-class**

179 This argument element shall specify the object class of the **object-instance**. The **object-class** argument element
 180 shall be one of the following values: **id-oc-printer** or **id-oc-server**.

181 **object-instance**

182 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element.
 183 The administrator shall specify one **object-instance** value associated with the **object-class**.

184 For each supported **object-class**, the server shall remove all jobs from the object specified by the **object-instance**
 185 identified by the **ObjectIdentification** element.

186 A print server shall either accept or reject a request to clean an **object-instance**. The print server shall return any
187 attribute warnings or abstract-errors to the print client.

188 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-printer	simple-name	<p>Printer name representing a physical printer. The behavior of the Clean operation on a job that is currently printing shall be consistent with the behavior of the Delete operation on currently printing jobs. See clause-8.3.4 for a description of the Delete operation. Use of the Clean operation for a logical printer is not supported.</p> <p>NOTE 1 - As an example, if the printer is a physical printer, a server implementation shall delete all jobs that are currently printing on the specified physical printer, i.e. jobs that have their printers-assigned attribute set to the physical printer. If the printer is a logical printer, the server implementation shall reject the operation and return a clean-logical-printer-unsupported ServiceError.</p>
id-oc-server	simple-name	<p>Server name. Cleaning a print server shall cause all jobs to be removed (deleted) that have been submitted to it (to any of its supported printers). Therefore, all print jobs on all printers supported by the specified server shall be removed. The behavior of the Clean operation on a job that is currently printing shall be consistent with the behavior of the Delete operation on currently printing jobs. See clause-8.3.4 for a description of the Delete operation.</p> <p>NOTE 2 - As an example, a server implementation shall delete all jobs that it contains, including jobs that are currently being printed on a physical printer.</p>

189 **message**

190 See 8.1.2.

191 **common-arguments**

192 See [clause-8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

193 8.3.1.2 Clean-result

194 The result of this abstract-operation is formally defined as follows:

```
195 CleanResult ::= SEQUENCE {
196     object-status [0] SET OF Attribute OPTIONAL }
```

197 The server may return object-status attributes of the cleaned object.

198 **8.3.1.3 Clean Abstract-errors**

199 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
 200 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

201 **8.3.2 Control**

202 This abstract-operation allows an administrator to perform a variety of operations on the specified print server or
 203 printer. The **operations** argument element contains an attribute for each operation to be performed by the **Control**
 204 operation. The operations that are currently supported by the **Control** operation are reset and tracing.

205 This abstract-operation is formally defined as follows:

```

206 Control ::= ABSTRACT-OPERATION
207     ARGUMENT      ControlArgument
208     RESULT        ControlResult
209     ERRORS        { AccessError,
210                   SecurityError,
211                   ServiceError }
    
```

212 NOTE - Normally only an appropriately authorized administrator may invoke the **Control** operation. However, this is
 213 a site and/or enterprise-specific policy decision, not mandated by this International Standard.

214 **8.3.2.1 Control-argument**

215 The argument of this abstract-operation is formally defined as follows:

```

216 ControlArgument ::= SEQUENCE {
217     object-class      [0] OBJECT IDENTIFIER,
218                     -- id-oc-server, id-oc-printer
219     object-instance  [1] ObjectIdentification,
220                     -- choice depends on object class
221     message          [2] Message OPTIONAL,
222     operations       [3] SEQUENCE OF Attribute,
223                     -- operands and parameters
224                     -- Current operations: reset and trace
225     common-arguments [4] CommonArguments OPTIONAL }
    
```

226 The following argument elements shall be supported by the server:

227 **object-class**

228 This argument element shall specify the object class of the **object-instance**. The **object-class** argument element
 229 shall be one of the following values: **id-oc-printer** or **id-oc-server**.

230 **object-instance**

231 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element.
 232 The administrator shall specify one **object-instance** value associated with the **object-class**.

233 For each supported **object-class**, the server shall perform the **Control** operation defined by the **operations** argument
 234 element on the object specified by the **object-instance** identified by the **ObjectIdentification** element.

235 A print server shall either accept or reject a **Control** operation request on the **object-instance**. The print server shall
 236 return any attribute warnings or abstract-errors to the print client.

237 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
-----------------------------------	-------------------------------------	-------------------------------

id-oc-printer	simple-name	<p>Printer name representing a physical printer.</p> <p>The behavior of the Control operation depends on the operations argument element, which may be one or more of the following attributes:</p> <ul style="list-style-type: none"> • reset: The server shall reset the physical printer according to the value of the reset attribute. The server may perform either a cold start (id-val-reset--power-cycle), a warm start (id-val-reset-to-nvram), or a reset to factory default conditions (id-val-reset-to-factory-default). Support for id-val-reset-to-factory-default is an implementation option. • trace-enable: The server shall enable tracing for the physical printer if the trace-enable attribute is TRUE, and shall disable tracing if the or trace-enable attribute is FALSE. <p>Use of the Control operation for a logical printer is not supported.</p>
id-oc-server	simple-name	<p>Server name.</p> <p>The behavior of the Control operation depends on the operations argument element, which may be one or more of the following attributes:</p> <ul style="list-style-type: none"> • reset: The server shall reset itself according to the value of the reset attribute. The server may perform either a cold start (id-val-reset--power-cycle), a warm start (id-val-reset-to-nvram), or a reset to factory default conditions (id-val-reset-to-factory-default). Support for id-val-reset-to-factory-default is an implementation option. • trace-enable: The server shall enable tracing for itself if the trace-enable attribute is TRUE, and shall disable tracing if the or trace-enable attribute is FALSE.

238 **message**

239 See 8.1.2.

240 **operations**

241 This argument element shall specify the attributes and values that describe the specific **Control** operation to be applied to the **object-instance**. The operations that are currently supported by the **Control** operation are described by the following attributes:

- 244 • **reset:** This operation resets the printer or print server at one of the following levels:
 245 **id-val-reset--power-cycle** for a cold start, **id-val-reset-to-nvram** for a warm start, or
 246 **id-val-reset-to-factory-default** for a reset to factory default conditions.

247 NOTE - For jobs that are being printed on the physical printer at the time the **Control** operation is invoked
 248 with the **reset** attribute, the results are unspecified.

- 249 • **trace-enable:** This operation enables tracing when the value of **trace-enable** is **TRUE** and
 250 disables tracing when the value of **trace-enable** is **FALSE**. When tracing is
 251 enabled, the printer or print server logs its execution activity to a file.

252 **common-arguments**253 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.254 **8.3.2.2 Control-result**

255 The result of this abstract-operation is formally defined as follows:

```
256     ControlResult ::= SEQUENCE {
257         object-status [0] SET OF Attribute OPTIONAL }
```

258 The server may return object-status attributes of the cleaned object.

259 **8.3.2.3 Control Abstract-errors**260 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.262 **8.3.3 Create**

263 This abstract-operation allows an administrator to create a printing object and set its attributes to the values specified within the argument elements. The **object-class** argument element shall indicate the class of the object. The server shall create the specified object instance as an object of the specified **object-class**. When the Create operation is invoked by an administrator with appropriate privileges, the server shall perform the following actions:

- 267 a) The server shall initialize the newly created object with the attributes specified by the **object-attributes** argument element. This has the same effect as issuing an equivalent **Set** operation. Note however, that some attributes may be settable with the **Create** operation, but may be restricted from further modification with the **Set** operation. See the **Set** operation description and the restrictions on attribute modification in [clause 8.3.10](#). If the **copy-from** argument element is specified, the server creates a copy of the object specified by the ~~by-the~~ **copy-from** argument element, and the attributes specified by the **object-attributes** argument element are applied subsequently.
- 274 b) If the [specified print](#) object already exists and the **force-creation** argument element is set to **FALSE**, the print server shall return the **object-already-exists SelectionError** for this operation. If the **force-creation** argument element is set to **TRUE**, the print server shall immediately delete the existing object and shall create the new object. If the printer is not able to immediately complete the deletion of the existing object due to the state of the printer, the server shall rename the existing object so that the creation of the new object can complete.
- 280 c) An **object-instance** created by the **Create** operation shall be permanent; the object is persistent, lasting across re-initialization of the print system, or any of its components.
- 282 d) When an **object-instance** of class **id-oc-printer** is created, the server shall place it in the **idle** state with the **enabled** attribute set to **FALSE** so print jobs cannot be accepted by the new printer. The administrator may then invoke the **Enable** operation to place the printer object in the **idle** state with the **enabled** attribute set to **TRUE**.
- 286 e) The server shall create an entry for the newly created **object-instance** in the name service, if such an entry is required by the server implementation.

288 This argument element shall cause the newly created **object-instance** to be a copy of the object specified by the **copy-from** argument element. The **Create** operation shall not operate on jobs or documents. It is implementation-defined whether the **Create** operation can cause the server to create print servers and how this is accomplished. Print servers may also be created by methods outside the scope of this International Standard. The **Create** operation shall operate on all other supported object classes.

293 ~~This operation may operate asynchronously, i.e. this operation need not complete immediately before returning, based on the state of the printer.~~

295 This abstract-operation is formally defined as follows:

```

296 Create ::= ABSTRACT-OPERATION
297     ARGUMENT      CreateArgument
298     RESULT        CreateResult
299     ERRORS        { AccessError,
300                   SecurityError,
301                   SelectionError,
302                   ServiceError }

```

303 NOTE - Normally only an appropriately authorized administrator may create an object. However, this is a site and/or
304 enterprise-specific policy decision, not mandated by this International Standard.

305 8.3.3.1 Create-argument

306 The argument of this abstract-operation is formally defined as follows:

```

307 CreateArgument ::= SEQUENCE {
308     object-class      [0] OBJECT IDENTIFIER, -- id-oc-xxx
309                   -- any id-oc-xxx, excluding job and document
310     object-instance   [1] ObjectIdentification,
311                   -- instance identifier depends on class
312     message           [2] Message OPTIONAL,
313     copy-from         [3] ObjectIdentification OPTIONAL,
314                   -- initial value object (IVO)
315     force-creation    [4] BOOLEAN DEFAULT FALSE,
316                   -- recreate if necessary
317     object-attributes [5] SET OF Attribute OPTIONAL,
318                   -- attributes of new object instance
319     common-arguments [6] CommonArguments OPTIONAL }

```

320 The following argument elements shall be supported by the server:

321 **object-class**

322 This argument element shall specify the object class of the **object-instance** to be created. The server implementation
323 shall support a specific conformance level, as described in Annex E of ISO/IEC 10175-1, and that conformance level
324 will determine the object classes and the ~~ir~~ attributes that the server supports, as a minimum. ~~The following are the~~
325 ~~object classes defined in part 1 ISO/IEC 10175: id-oc-auxiliary-sheet, id-oc-auxiliary-sheet-package, id-oc-~~
326 ~~delivery-method, id-oc-finishing, id-oc-font, id-oc-initial-value-document, id-oc-initial-value-job, id-oc-~~
327 ~~imposition, id-oc-medium, id-oc-output, id-oc-printer, id-oc-resource, id-oc-resource-context, id-oc-scheduler,~~
328 ~~id-oc-server, or id-oc-transfer-method.~~

329 **object-instance**

330 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element.
331 The administrator shall specify one **object-instance** value associated with the **object-class**.

332 If the specified~~For each supported~~ **object-class is supported**, the server shall create the object specified by the **object-**
333 **instance** identified by the **ObjectIdentification** element.

334 A print server shall either accept or reject a request to create an **object-instance**. The print server shall return any
335 attribute warnings or abstract-errors to the print client.

336 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-printer	simple-name	Printer name representing a logical or physical printer. If a printer object is created with the same name as a previously existing printer object which had jobs submitted to it, the new printer object shall also have those jobs submitted to it. Since the printer is created in the idle state with the enabled attribute set to FALSE , when the user issues a Enable operation on the newly (re)created printer, that printer shall begin printing the jobs that were submitted to it.
id-oc-server	simple-name	Server name. The server shall create a new server object in an unspecified manner. The ability to create a server object is implementation-defined.
id-oc-initial-value-document	name-or-oid	Initial-value-document name. Contains the attributes of the document class that the server may default when constructing a document object.
id-oc-initial-value-job	name-or-oid	Initial-value-job name. Contains the attributes of the job class that the server may default when constructing a job object.
id-oc-auxiliary-sheet	name-or-oid	Start sheet, end sheet, separator sheet name.
id-oc-auxiliary-sheet-package	name-or-oid	Predefined package of start sheets, end sheets, and separator sheets referenced by a single name.
id-oc-delivery-method	object-identifier	Delivery method identifier; such as for print job output.
id-oc-finishing	name-or-oid	Finishing method name; such as stapling, folding, or binding.
id-oc-font	font-reference	Font name.
id-oc-imposition	name-or-oid	Imposition method name; such as 2-up or 4-up.
id-oc-medium	name-or-oid	Media name; such as iso-a4-white or north-american-letter.
id-oc-output	object-identifier	Output method identifier; such as sorting or collating.
id-oc-resource	name-or-oid	Resource identifier; such as overlay or logo.
id-oc-resource-context	name-or-oid	Resource context name; encapsulate details about the server's environment that, when used with a resource name, uniquely identifies a resource in the environment of that server.
id-oc-scheduler	object-identifier	Scheduler name; determines the order in which jobs are sent to physical printer.
id-oc-transfer-method	object-identifier	Transfer method identifier; such as ftam , with-request , or push-by-client .

337 **message**

338 See 8.1.2.

339 **copy-from**

340 This argument element shall cause the newly created **object-instance** to be a copy of the object specified by the **copy-**
 341 **from** argument element. Attributes contained in that object shall be copied into the newly created object. The object
 342 may be located on any accessible print server.

343 The syntax and interpretation of the specified value is dependent on the **object-class** argument element in the same
 344 manner as **object-instance**.

345 If the optional server-name component of the name is omitted, the server shall interpret the value of the **copy-from**
 346 argument element as the name of an object on the same server as the object being created. If the optional server-
 347 name component of the name is included, the server shall request a list of the attributes of the *copy-from-object-*
 348 *instance* from the specified server and initialize the newly created object with those attributes. The ability of a server
 349 to copy an object from another server is an implementation option. A conforming server implementation not
 350 supporting this feature shall return an **unsupported-parameter-value ServiceError** when the administrator
 351 specifies a **server-name** that is not identical to the name of the server on which the object is being created.

352 **force-creation**

353 This argument element specifies whether or not the server shall be allowed to create a new print object when an
 354 object with the specified name already exists.

355 The **force-creation** argument element shall be one of the following values: **TRUE** or **FALSE**.

356 When an administrator with appropriate privileges specifies the **force-creation** argument element with value **TRUE**,
 357 the server shall create the specified print object, whether or not an object with the specified name already exists. If a
 358 print object with the specified name already exists, the server shall delete the existing print object before it creates the
 359 new print object. The server shall return no abstract-error or warning in this case. If the specified object does not
 360 exist, this argument element shall have no effect.

361 When an administrator with appropriate privileges specifies the **force-creation** argument element with value
 362 **FALSE**, the server shall create the specified print object only if an object with the specified name does not already
 363 exist. If a print object with the specified name does not already exist, the server shall create the new print. If a print
 364 object with the specified name does already exist, the server shall not create the new print object, but shall return the
 365 **object-already-exists SelectionError**.

366 **object-attributes**

367 This argument element shall specify the attributes and values with which the new **object-instance** shall be
 368 initialized. If the **copy-from** argument element is specified, the attributes specified by the **object-attributes**
 369 argument element are applied subsequently.

370 **common-arguments**

371 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

372 **8.3.3.2 Create-result**

373 The result of this abstract-operation is formally defined as follows:

```
374 CreateResult ::= SEQUENCE {
375     object-status [0] SET OF Attribute }
```

376 The server shall return the supported subset of the following **object-status** attributes of the created object depending
 377 on the **object-class**:

Object	object-class Specification	Attributes
Printer	id-oc-printer	id-att-printer-name id-att-printer-realization id-att-printer-state id-att-availability id-att-associated-server

		id-att-printer-locations id-att-printer-associated-printers id-att-scheduler-ready
Server	id-oc-server	id-att-server-name id-att-server-state id-att-availability id-att-logical-printers-supported id-att-physical-printers-supported
Medium	id-oc-medium	id-att-medium-identifier id-att-associated-server id-att-medium-realization id-att-medium-type id-att-medium-associated-media id-att-medium-size id-att-medium-dimensions id-att-medium-sides id-att-medium-color
Imposition	id-oc-imposition	id-att-imposition-identifier id-att-associated-server id-att-imposition-specification id-att-number-up
Initial-value-job	id-oc-initial-value-job	id-att-initial-value-job-identifier id-att-associated-server id-att-logical-printers-ready id-att-physical-printers-ready id-att-printer-locations-requested id-att-printer-models-requested id-att-job-retention-period
Initial-value-document	id-oc-initial-value-document	id-att-initial-value-document-identifier id-att-associated-server id-att-logical-printers-ready id-att-physical-printers-ready id-att-copy-count id-att-sides id-att-document-format
Font	id-oc-font	id-att-font-identifier id-att-associated-server id-att-file-reference
Auxiliary-sheet	id-oc-auxiliary-sheet	id-att-auxiliary-sheet-identifier id-att-auxiliary-sheet-medium id-att-associated-server
Auxiliary-sheet-package	id-oc-auxiliary-sheet-package	id-att-auxiliary-sheet-package-identifier id-att-associated-server
Transfer-method	id-oc-transfer-method	id-att-transfer-method-identifier id-att-transfer-method-type id-att-document-reference-type id-att-associated-server
Resource	id-oc-resource	id-att-resource-name id-att-resource-type id-att-associated-server id-att-file-reference
Resource-context	id-oc-resource-context	id-att-resource-context-identifier

		id-att-context-address id-att-associated-server
Delivery-method	id-oc-delivery-method	id-att-delivery-method-identifier id-att-associated-server
Finishing	id-oc-finishing	id-att-finishing-identification id-att-finishing-realization id-att-associated-server id-att-finishing-specification id-att-finishing-associated-finishings
Output	id-oc-output	id-att-output-identifier id-att-associated-server
Scheduler	id-oc-scheduler	id-att-scheduler-identifier id-att-associated-server

378 8.3.3.3 Create Abstract-errors

379 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
380 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

381 8.3.4 Delete

382 This abstract-operation allows an administrator to delete printing objects. The **object-class** argument element shall
383 indicate the class of the object. When the Delete operation is invoked by an administrator with appropriate
384 privileges, the server shall perform the following actions:

- 385 a) [If the specified object is a printer](#) the server shall [first determine whether the printer has been disabled](#)
386 [and is without jobs: if the printer is not in this required state, the server shall reject the abstract-](#)
387 [operation and report an **inappropriate-object-state** AccessError; otherwise: ~~printers before deleting~~](#)
388 [them.](#)
- 389 b) The server shall delete the specified print object(s) from the print system;~~;~~
- 390 c) The server shall delete the print object entry in the name service, if an entry exists and is required by
391 the server implementation;~~;~~
- 392 d) The server shall delete a currently printing job, as soon as the printer technology allows it to be deleted,
393 in an implementation-defined manner.

394 It is implementation-defined whether the **Delete** operation can delete print servers and how this is accomplished.

395 ~~This operation may operate asynchronously, i.e. this operation need not complete immediately before returning based~~
396 ~~on the state of the printer.~~

397 This abstract-operation is formally defined as follows:

```

398 Delete ::= ABSTRACT-OPERATION
399 ARGUMENT DeleteArgument
400 RESULT DeleteResult
401 ERRORS { AccessError,
402 SecurityError,
403 ServiceError,
404 UpdateError }
```

405 NOTE - Normally only an appropriately authorized administrator may delete an object. However, this is a site and/or
406 enterprise-specific policy decision, not mandated by this International Standard.

407 8.3.4.1 Delete-argument

408 The argument of this abstract-operation is formally defined as follows:

```

409 DeleteArgument ::= SEQUENCE {
410     object-class      [0] OBJECT IDENTIFIER,
411                     -- any id-oc, including job and server
412     object-instance  [1] ObjectIdentification,
413                     -- choice depends on class
414     message          [2] Message OPTIONAL,
415     common-arguments [3] CommonArguments OPTIONAL }
    
```

416 The following argument elements shall be supported by the server:

417 **object-class**

418 This argument element shall specify the object class of the **object-instance** to be deleted. The **object-class** argument element shall be one of the following values: **id-oc-auxiliary-sheet**, **id-oc-auxiliary-sheet-package**, **id-oc-delivery-method**, **id-oc-document**, **id-oc-finishing**, **id-oc-font**, **id-oc-initial-value-document**, **id-oc-initial-value-job**, **id-oc-imposition**, **id-oc-job**, **id-oc-medium**, **id-oc-output**, **id-oc-printer**, **id-oc-resource**, **id-oc-resource-context**, **id-oc-scheduler**, or **id-oc-transfer-method**.

423 **object-instance**

424 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element. The administrator shall specify one **object-instance** value associated with the **object-class**.

426 For each supported **object-class**, the server shall immediately delete the object specified by the **object-instance** identified by the **ObjectIdentification** element.

428 A print server shall either accept or reject a request to delete an **object-instance**. The print server shall return any attribute warnings or abstract-errors to the print client.

430 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-job	job-identifier	Global job identifier. If the job is not printing, the server shall immediately delete the job object, and all of its contained documents. The server shall delete a currently printing job as soon as the printer technology allows it to be deleted.
id-oc-document	document-identifier	Document identifier. The document sequence numbers of subsequent documents shall remain unchanged. If the last (or only) document in a multi-document print job is removed, the server shall delete the entire print job. The server shall delete a currently printing document as soon as the printer technology allows it to be deleted.
id-oc-printer	simple-name	Printer name representing a logical or physical printer. The server shall disable a printer before deleting it. See the Disable operation description in clause 8.3.5 . The server shall stop printing any currently printing job on the printer, as soon as the printer technology allows it to be stopped, in an unspecified manner. Any print job submitted to print on a deleted printer shall remain in its current state, submitted to that printer, until such time as the printer object is recreated or the

		<p>job is resubmitted to another printer.</p> <p>NOTE 1 - As an example, if the printer is a physical printer, a server implementation may wait for the jobs to complete or may require that the administrator first clean the printer of all of its jobs. See the Clean operation description in clause 8.3.1. Thus, if the physical printer contains jobs, then the server may reject the operation and return the deletion-not-possible UpdateError to the print client. If the physical printer does not contain jobs, then the server may proceed with the Delete operation and remove the physical printer. If the deleted physical printer was the only one specified in the physical-printers-requested job attribute, and the physical-printers-requested attribute was compulsory, i.e. not listed in the non-compulsory-attributes attribute, then the server shall put the job in the held state with the on-request-resources-required attribute containing the physical-printers-requested attribute. Alternatively, if the deleted physical printer was again the only one specified in the physical-printers-requested job attribute, but the physical-printers-requested attribute was listed in the non-compulsory-attributes attribute, then the physical-printers-requested job attribute shall be added to the ignored-attributes attribute and the job shall remain in the print system and shall be reassigned to another physical printer. If the printer is a logical printer, the server implementation shall delete the logical printer. Once the logical printer has been deleted, the following server and printer attributes shall be updated to reflect this change: logical-printers-supported, logical-printers-ready, and printer-associated-printers.</p>
id-oc-server	simple-name	<p>Server name.</p> <p>The server shall immediately delete the server object in an unspecified manner. The ability to delete a server object is implementation-defined.</p> <p>NOTE 2 - As an example, a server implementation may require that the administrator first clean the server of all of its jobs. See the Clean operation description in clause 8.3.1. Thus, if the server contains jobs, then the server may reject the operation and return the deletion-not-possible UpdateError to the print client. If the server does not contain jobs, then it may proceed with the Delete operation.</p>
id-oc-initial-value-document	name-or-oid	<p>Initial-value-document name. Contains the attributes of the document class that the server may default when constructing a document object.</p>

id-oc-initial-value-job	name-or-oid	Initial-value-job name. Contains the attributes of the job class that the server may default when constructing a job object.
id-oc-auxiliary-sheet	name-or-oid	Start sheet, end sheet, separator sheet name.
id-oc-auxiliary-sheet-package	name-or-oid	Predefined package of start sheets, end sheets, and separator sheets referenced by a single name.
id-oc-delivery-method	object-identifier	Delivery method identifier; such as for print job output.
id-oc-finishing	name-or-oid	Finishing method name; such as stapling, folding, or binding.
id-oc-font	font-reference	Font name.
id-oc-imposition	name-or-oid	Imposition method name; such as 2-up or 4-up.
id-oc-medium	name-or-oid	Media name; such as iso-a4-white or north-american-letter.
id-oc-output	object-identifier	Output method identifier; such as sorting or collating.
id-oc-resource	name-or-oid	Resource identifier; such as overlay or logo.
id-oc-resource-context	name-or-oid	Resource context name; encapsulate details about the server's environment that, when used with a resource name, uniquely identifies a resource in the environment of that server.
id-oc-scheduler	object-identifier	Scheduler name; determines the order in which jobs are sent to physical printer.
id-oc-transfer-method	object-identifier	Transfer method identifier; such as ftam , with-request , or push-by-client .

431 **message**

432 See 8.1.2.

433 **common-arguments**

434 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

435 8.3.4.2 Delete-result

436 The result of this abstract-operation is formally defined as follows:

```
437     DeleteResult ::= SEQUENCE {
438         object-status    [0] SET OF Attribute OPTIONAL }
```

439 No specific set of attributes are required to be returned.

440 8.3.4.3 Delete Abstract-errors

441 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

443 8.3.5 Disable

444 This abstract-operation allows an administrator to disable the acceptance of new print jobs (**Print**, **ResubmitJob**, or **InterruptJob** operations) on the specified print server or printer. A disabled print server or printer shall continue to accept other operations defined in this International Standard.

447 Any print job that had previously been submitted to a printer that is now disabled shall be unaffected. Any currently printing job on a printer that is disabled shall continue printing to completion.

449 An administrator with appropriate privileges shall use the **Enable** operation to enable acceptance of print jobs on a specified server or printer.

451 This abstract-operation is formally defined as follows:

```

452     Disable ::= ABSTRACT-OPERATION
453         ARGUMENT      DisableArgument
454         RESULT        DisableResult
455         ERRORS        { AccessError,
456                         SecurityError,
457                         ServiceError }

```

458 NOTE - Normally only an appropriately authorized administrator may disable an object. However, this is a site and/or
459 enterprise-specific policy decision, not mandated by this International Standard.

460 8.3.5.1 Disable-argument

461 The argument of this abstract-operation is formally defined as follows:

```

462     DisableArgument ::= SEQUENCE {
463         object-class      [0] OBJECT IDENTIFIER,
464                             -- id-oc-server, -id-oc-printer
465         object-instance  [1] ObjectIdentification,
466                             -- choice depends on class
467         message          [2] Message OPTIONAL,
468                             -- value of id-att-server-message,
469                             -- id-att-printer-message
470         common-arguments [3] CommonArguments OPTIONAL }

```

471 The following argument elements shall be supported by the server:

472 **object-class**

473 This argument element shall specify the object class of the **object-instance**. The **object-class** argument shall be one
474 of the following values: **id-oc printer** or **id-oc-server**.

475 **object-instance**

476 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element.
477 The administrator shall specify one **object-instance** value associated with the **object-class**.

478 For each supported **object-class**, the server shall disable the object specified by the **object-instance** identified by the
479 **ObjectIdentification** element.

480 A print server shall either accept or reject a request to disable a printer or server. The print server shall return any
481 attribute warnings or abstract-errors to the print client.

482 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-printer	simple-name	Printer name representing a logical or physical printer. For both logical and physical printers, the print server shall stop accepting new print job requests (from the Print , ResubmitJob , and InterruptJob operations) on the specified printer. If the printer is a physical printer, it shall finish printing any jobs that are currently printing on that physical printer.
id-oc-server	simple-name	Server name. After a Disable operation is issued, the print server shall reject all new print requests, i.e. shall reject the Print , ResubmitJob , or InterruptJob operations.

		The print server shall continue to accept requests from other operations defined in this International Standard, such as ListObjectAttributes , CancelJob , or ModifyJob .
--	--	---

483 **message**

484 See 8.1.2.

485 **common-arguments**

486 See [clause](#) 8.1.2 in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

487 8.3.5.2 Disable-result

488 The result of this abstract-operation is formally defined as follows:

```
489     DisableResult ::= SEQUENCE {
490         object-status    [0] SET OF Attribute OPTIONAL }
```

491 The server may return object-status attributes of the disabled object.

492 8.3.5.3 Disable Abstract-errors

493 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server will return a particular abstract-error are defined in [clause](#) 8.4 of ISO/IEC 10175-1.

495 8.3.6 Enable

496 This abstract-operation allows an administrator to enable the acceptance of new print jobs (**Print**, **ResubmitJob**, or **InterruptJob** operations) on the specified print server or printer. Any jobs that had previously been submitted to the print server or printer shall continue unaffected.

499 An administrator with appropriate privileges shall use the **Disable** operation to disable acceptance of new print jobs on a specified server or printer.

501 This abstract-operation is formally defined as follows:

```
502     Enable ::= ABSTRACT-OPERATION
503         ARGUMENT      EnableArgument
504         RESULT        EnableResult
505         ERRORS        { AccessError,
506                         SecurityError,
507                         ServiceError }
```

508 NOTE - Normally only an appropriately authorized administrator may enable an object. However, this is a site and/or enterprise-specific policy decision, not mandated by this International Standard.

510 8.3.6.1 Enable-argument

511 The argument of this abstract-operation is formally defined as follows:

```
512     EnableArgument ::= SEQUENCE {
513         object-class    [0] OBJECT IDENTIFIER,
514                         -- id-oc-server, -id-oc-printer
515         object-instance [1] ObjectIdentification,
516                         -- choice depends on class
517         message         [2] Message OPTIONAL,
518                         -- value of id-att-server-message,
519                         -- id-att-printer-message
520         common-arguments [3] CommonArguments OPTIONAL }
```


521 The following argument elements shall be supported by the server:

522 **object-class**

523 This argument element shall specify the object class of the **object-instance**. The **object-class** argument shall be one
524 of the following values: **id-oc-printer** or **id-oc-server**.

525 **object-instance**

526 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element.
527 The administrator shall specify one **object-instance** value associated with the **object-class**.

528 For each supported **object-class**, the server shall enable the object specified by the **object-instance** identified by the
529 **ObjectIdentification** element.

530 A print server shall either accept or reject a request to enable a printer or server. The print server shall return any
531 attribute warnings or abstract-errors to the print client.

532 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-printer	simple-name	Printer name representing a logical or physical printer. If the printer is a logical printer, the print server shall resume accepting new print job requests for that logical printer. If the printer is a physical printer, the print server shall resume accepting new print jobs and submitting jobs to that physical printer.
id-oc-server	simple-name	Server name. After an Enable operation is issued, the print server shall accept valid new print requests from the Print , ResubmitJob , or InterruptJob operations.

533 **message**

534 See 8.1.2.

535 **common-arguments**

536 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

537 **8.3.6.2 Enable-result**

538 The result of this abstract-operation is formally defined as follows:

```
539     EnableResult ::= SEQUENCE {
540         object-status    [0] SET OF Attribute OPTIONAL }
```

541 The server may return object-status attributes of the enabled object.

542 **8.3.6.3 Enable Abstract-errors**

543 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
544 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

545 **8.3.7 Pause**

546 This abstract-operation allows an administrator to pause a print server or a printer. An administrator with
547 appropriate privileges shall use the **Resume** operation to resume the paused printer or server.

548 This abstract-operation is formally defined as follows:

```

549 Pause ::= ABSTRACT-OPERATION
550     ARGUMENT      PauseArgument
551     RESULT        PauseResult
552     ERRORS        { AccessError,
553                   AttributeError,
554                   SecurityError,
555                   SelectionError,
556                   ServiceError }
    
```

557 NOTE - Normally only an appropriately authorized administrator may pause an object. However, this is a site and/or
 558 enterprise-specific policy decision, not mandated by this International Standard.

559 **8.3.7.1 Pause-argument**

560 The argument of this abstract-operation is formally defined as follows:

```

561 PauseArgument ::= SEQUENCE {
562     object-class      [0] OBJECT IDENTIFIER,
563                       -- id-oc-printer, id-oc-server
564     object-identification [1] ObjectIdentification,
565     message           [2] Message OPTIONAL,
566                       -- value of id-att-printer-message,
567                       -- id-att-server-message, id-att-message
568     common-arguments  [3] CommonArguments OPTIONAL }
    
```

569 The following argument elements shall be supported by the server:

570 **object-class**

571 This argument element shall specify the object class of the **object-identification**. The **object-class** argument shall be
 572 one of the following values: **id-oc-printer** or **id-oc-server**.

573 **object-identification**

574 This argument element shall specify the **object-identification** based on the value of the **object-class** argument
 575 element. The administrator shall specify one **object-identification** value associated with the **object-class**.

576 For each supported **object-class**, the server shall pause the object specified by the **object-identification** identified by
 577 the **ObjectIdentification** element.

578 A print server shall either accept or reject a request to pause an **object-identification**. The print server shall return
 579 any attribute warnings or abstract-errors to the print client.

580 Each **object-identification** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-identification Values
id-oc-printer	simple-name	Printer name representing a physical printer. If a job is currently processing or printing the server shall: a) stop printing the job at an unspecified pausable point, b) change the printer's printer-state to paused . c) change the job's job-state-of-printers-assigned to paused . Any job that was currently printing is left with a job-state of processing or printing , and still assigned to that printer.

		<p>Use of the Pause and Resume operations for a logical printer is not supported.</p> <p>NOTE - A server implementation may treat the paused state as a stronger pause than the job-start-wait, job-end-wait, and job-password-wait states, since for the other pause states operator actions instead of the Resume operation may cause the printer to resume printing. Thus an administrator may invoke the Pause operation when the printer is already paused for a different reason, thus requiring the administrator to invoke the Resume operation only once to resume printing. Administrators may prefer this at a time when they do not want the printer to resume printing automatically. Regardless of the reason for the printer to be paused, the administrator need only issue one Resume operation to resume printing.</p>
id-oc-server	simple-name	<p>Server name.</p> <p>When pausing a server, the server shall:</p> <ol style="list-style-type: none"> stop distributing print jobs to physical printers (this means print jobs that are currently in the pending job state shall be left in that state), and change the server-state to on-request, <p>All other server operations shall be unaffected.</p>

581 **message**

582 See 8.1.2.

583 **common-arguments**

584 See [clause](#) 8.1.2 in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

585 8.3.7.2 Pause-result

586 The result of this abstract-operation is formally defined as follows:

```

587     PauseResult ::= SEQUENCE {
588         affected-job-identifier [0] JobIdentifier OPTIONAL,
589                               --_returned if a job was printing on the
590                               --_printer being paused
591         paused-object-status   [1] SET OF Attribute OPTIONAL }

```

592 The server may return object-status attributes of the paused object.

593 8.3.7.3 Pause Abstract-errors

594 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
595 will return a particular abstract-error are defined in [clause](#) 8.4 of ISO/IEC 10175-1.

596 8.3.8 Resubmit-job

597 This abstract-operation allows [an appropriately authorized user](#) ~~an administrator~~ to request that print jobs be
598 resubmitted by a print server to [the](#) specified target printer. [Both the target printer and its associated print server](#)
599 [can be the same as, or different from, the original printer and print server.](#) The resubmit-job request may specify one

600 particular job, or all jobs that have been submitted to a particular printer or server, but which have not yet begun
601 printing.

602 Normally only the owner of a particular job, or an appropriately authorized administrator or operator, may request
603 resubmission of that job, and only an appropriately authorized administrator or operator may request resubmission of
604 all jobs on a printer or server, . However, this is a site and/or enterprise-specific policy decision, not mandated by this
605 International Standard.

~~606 Accounting information for each job submission shall be extracted and reset after the job has finished. When~~
~~607 ResubmitJob is called, the values are set to zero for the new submission. Pertinent job attributes are as follows:~~
~~608 Job-copies-completed, Pages-completed, Impressions-completed, Media-sheets-completed, Octets-completed,~~
~~609 Total-job-octets, and Processing-time.~~

~~610 If a particular job is currently printing, the print server shall reject a request to resubmit that job, and the print server~~
~~611 shall return the **resubmit-job-not-possible UpdateError** to the print client.~~

~~612 Both the new printer and the new print server can be the same as, or different from, the original printer and print~~
~~613 server. Within this discussion of the ResubmitJob operation, the adjectives *new* and *old* are used to distinguish~~
~~614 between instances of jobs, printers and servers. For example, a requester *submits* a job initially to a printer on a~~
~~615 particular server; later, the requester submits a ResubmitJob request to the server, which is now referred to as the *old*~~
~~616 server. The request specifies that the job is to be resubmitted to a *new printer*, which is supported by a *new server*.~~

~~617 Similarly, the term *old job* refers to the job as *submitted* initially to the old printer and server, while the term *new job*~~
~~618 refers to the job that has been *resubmitted*, and which is executed on the new printer and server, regardless of~~
~~619 whether either the new printer or the new server is the same or different from the old printer and server. This~~
~~620 terminology is used regardless of whether the job is resubmitted to the same or a different printer, on the same or a~~
~~621 different server.~~

~~622 If the new print server is different from the old print server, the old print server shall resubmit the print job to the~~
~~623 new print server. The resubmission shall contain all of the original job attributes and any attributes that the old print~~
~~624 server had defaulted. This allows the new print job to be as similar to the original print job as possible.~~

~~625 If the job(s) is resubmitted to a different print server, the old print server shall act as a temporary client, using the~~
~~626 Print abstract-operation to transfer each component of the job(s) to the new print server. If the resubmitted job is to~~
~~627 remain on the original server, the mechanism for resubmission is implementation-specific.~~

628 Single job resubmission

629 A server may accept a ResubmitJob request if the identified job is in one of the following states:

- pending
- paused
- held
- retained

630 The server shall reject the ResubmitJob request and return an **inappropriate-object-state AccessError** to the print
631 client if:

- the job is in a valid state, but **job-state-reasons** indicates ‘documents-needed’
- the job is in any of the other states, i.e.: preprocessing, processing (and printing), interrupted, terminating, completed

632 If the server determines that the job is in an acceptable state and condition, the server begins preparation of the job
633 for resubmission to the new printer/server. The old server shall initialize the new job from the old job; that is, the
634 new job shall contain all of the original job and document attributes and any attributes that the old print server had
635 defaulted. This allows the new print job to be as similar to the original print job as possible. The ResubmitJob
636 argument may also supply a new value for any job or document attribute that can be modified by a ModifyJob

637 operation. In addition, the requester may supply a new value for the **accounting-information** attribute if the new job
638 is to be charged to a different account.

639 NOTE - in a multi-document job, if a document attribute is included in the set of attributes to be modified in the new
640 job, that attribute modification will be applied to each of the documents in the new job.

641 If the new printer is supported by a server that is different from the old server, the old server shall act as a normal
642 print client to the new server, and shall transfer the new job to the new server by means of a series of Print operations
643 created from the old job's job and document attributes, plus the attributes supplied in the ResubmitJob argument. If
644 the new server is the same as the old server, the method of transferring the new job is implementation-specific;
645 however, the effect of the ResubmitJob request, as seen by the client, shall be the same as if the two servers are
646 different.

647 When ~~t~~if a print job resubmission request is accepted, the new (i.e., accepting) print server accepts the initial **create-**
648 **job** print request from the old server, the new server shall assign a new job identifier and shall ~~and~~ return the new
649 identifier to the ~~old (i.e., resubmitting)~~ print server (which may or may not be the same as the new ~~original~~ print
650 server). The old print server shall ~~main~~retain the old instance of the print job in the state it was in when the
651 ResubmitJob request was submitted.

652 When the new print server accepts the **close-job** print request, this signals that the new job has been transferred to
653 the new server successfully. The old server shall then perform the following actions:

- return an object-status to the ResubmitJob client indicating successful resubmission of the job, and providing
the **new-job-identifier**
- adjust the state of the old job, if necessary:
 - if the old job had been in the pending, paused or held state when the ResubmitJob request was received,
the old server shall transition the old job through the terminating state to the retained state;
 - if the old job had already been in the retained state when the ResubmitJob request was received, the old
server shall leave the old job in the retained state.

654 The old job shall remain in the **retained** state until the **job-retention-period** expires, or the job is deleted by some
655 other means; the old job identifier shall remain valid until the ~~old original~~ job exits the completed state.

656 If the new server rejects one of the the new job print requests from the old server:

- If the new server rejects the initial **create-job** print request, no new job identifier is created, and the job is
not instantiated on the new server;
- If the new server rejects any of the subsequent print requests for a new job, the old server shall cancel the
new job on the new server and shall set the **job-retention-period** to 0 (zero) to remove all traces of the new
job on the new server;
- the old job shall remain in the same state it had been in prior to the ResubmitJob request;
- the old server shall return an error to the ResubmitJob client; the error return shall contain the same error
that was returned to the old server in the error return from the new server.

657 Resubmission of all jobs on a printer or server

658 A ResubmitJob request may be submitted to a print server to request that all jobs currently on that server or on a
659 particular associated printer be transferred to a new printer. An operator might invoke a ResubmitJob operation, for
660 example, to to prepare a server or printer for shut down.

661 Not all jobs can be successfully resubmitted by this means. In order to be a candidate for resubmission when its
662 containing server or printer is being resubmitted, a job must be in one of the following states:

- pending
- paused
- held

663 The server shall not resubmit a job if it is not in a proper state and condition for resubmission; i.e., if:

- the job is in a valid state, but **job-state-reasons** indicates 'documents-needed'
- the job is in one of the states: preprocessing, processing (and printing), interrupted, terminating, retained, completed

664 Processing of each of the jobs in a printer/server resubmission shall proceed as specified for the single job
 665 resubmission, with the exception of the return to the ResubmitJob client. ResubmitJob is a synchronous operation;
 666 that is, the old server does not return a result to the client until after each of the jobs on the old printer or server has
 667 either been resubmitted successfully to the new printer/server, or has failed to be resubmitted for some reason.

668 Upon completion of the ResubmitJob operation, the old server shall return an object-status for each job that was on
 669 the old server when the ResubmitJob request was submitted. The object-status for a particular job shall contain the
 670 new-job-identifier if the job was successfully resubmitted. But if the job was *not* successfully resubmitted, the
 671 object-status shall contain *only* the old job identifier for that job. In order to determine the specific reason for the
 672 unsuccessful resubmission of a particular job, the requestor may invoke another ResubmitJob request for that single
 673 job.

674 For each job that was resubmitted successfully, ~~all administrators requesting notification of the~~ **job-resubmitted**
 675 report ~~job~~-event shall be generated by the old server if so requested in the job's **notification-profile** attribute. The
 676 requester shall receive said notification which shall include the old and new job identifier. ~~If a job has not been~~
 677 resubmitted successfully, no notification shall be generated, and the job shall remain on the old server, in the state it
 678 was in when the ResubmitJob request was submitted.

679

680 ~~If the new server indicates that specified compulsory attributes or attribute values are not supported, it shall return~~
 681 ~~the **unsupported-attribute-type** `AttributeError` or the **unsupported-attribute-value** `AttributeError`, respectively,~~
 682 ~~to the print client. If the new server does not accept the job for any other reason, it shall return the appropriate~~
 683 ~~abstract error to the print client. The job shall remain on its original printer.~~

684

685 This abstract-operation is formally defined as follows:

```

686 ResubmitJob ::= ABSTRACT-OPERATION
687     ARGUMENT      ResubmitJobArgument
688     RESULT        ResubmitJobResult
689     ERRORS        { AccessError,
690                    AttributeError,
691                    PrinterError,
692                    SecurityError,
693                    SelectionError,
694                    ServiceError,
695                    UpdateError }

```

696 ~~NOTE—Normally only an appropriately authorized administrator or operator can resubmit a job. However, this is a site~~
 697 ~~and/or enterprise specific policy decision, not mandated by this International Standard.~~

698 8.3.8.1 Resubmit-job-argument

699 The argument of this abstract-operation is formally defined as follows:

```

700 ResubmitJobArgument ::= SEQUENCE {
701     object-class          [0] OBJECT IDENTIFIER,
702                         -- id-oc-job, id-oc-printer,
703                         -- id-oc-server
704     object-identification [1] ObjectIdentification,
705     printer               [2] DistinguishedNameString,
706     job-attr-modification [3] Sequence of JobAttrModification OPTIONAL,
707     message               [4] Message OPTIONAL,
708     common-arguments     [5] CommonArguments OPTIONAL }

```

709 The following argument elements shall be supported by the server:

710 **object-class**

711 This argument element shall specify the object class of the **object-identification**. The **object-class** argument shall be one of the following values: **id-oc-job**, **id-oc-printer**, or **id-oc-server**

713 **object-identification**

714 This argument element shall specify the **object-identification** based on the value of the **object-class** argument element.

716 For each supported **object-class**, the server shall resubmit the specified print jobs to the printer specified by the **printer** argument element. The specified jobs are those associated with the object specified by the **object-identification** identified by the **ObjectIdentification** element. A job must be in the proper state and condition for resubmission of the job to be successful [see 8.3.8, preceding].

720 ~~A specified job that is currently printing shall not be resubmitted, and the **resubmit-job-not-possible-UpdateError** shall be returned to the print client. Any jobs currently printing on a specified printer or server shall not be resubmitted, but no abstract error shall be returned to the print client. A job that is not accepted to print on the printer specified by the **printer** argument element shall not be resubmitted, and no abstract error shall be returned to the print client.~~

725 Each **object-identification** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-identification Values
id-oc-job	job-identifier	Global job identifier. The server shall resubmit only the specified print job. If the specified job is currently printing, the server shall return the resubmit-job-not-possible-UpdateError to the print client.
id-oc-printer	simple-name	Printer name representing a logical or physical printer. The server shall resubmit all currently submitted print jobs for the specified printer. The currently printing job, if any, on the specified printer shall not be resubmitted, and the print server shall not return an abstract error to the print client.
id-oc-server	simple-name	Server name. The server shall resubmit all currently submitted print jobs for all printers that it supports. Any currently printing jobs on any supported printer shall not be resubmitted, and the print server shall not return an abstract error to the print client.

726 **printer**

727 This argument element shall specify a single printer name to which the specified print jobs are to be resubmitted.

728 **job-attr-modification**

729 A ResubmitJob client may specify attributes of the job that are to be modified for submission to the new server and
 730 printer. The conditions governing this component of the ResubmitJob argument are exactly as defined for the same
 731 component of the ModifyJob argument, with one exception: the client may specify a new value for the **accounting-**
 732 **information** attribute to enable the new job to be charged to a different account.

733 **message**

734 See 8.1.2.2.

735 **common-arguments**736 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.737 **8.3.8.2 Resubmit-job-result**

738 The result of this abstract-operation is formally defined as follows:

```
739 ResubmitJobResult ::= SEQUENCE {
740     result-set      [0] SEQUENCE OF ObjectStatus }
741                   -- one result-set for each job resubmitted
742                   -- (or for each job attempted to be resubmitted)
```

743

```
744 ObjectStatus ::= SEQUENCE {
745     object-status [0] SET OF Attribute OPTIONAL }
746                   -- job-identifier and new-job-identifier shall be
747                   -- returned at least. For any jobs that could not
748                   -- be resubmitted, the new-job-identifier attribute
749                   -- shall be omitted as the only error indication.
```

750 NOTE - The reason for the apparent overspecification of SEQUENCE in the above two productions is to permit future
 751 additions to be made without unduly disrupting existing implementations.

752 **object-status**753 The server shall at least return the following job-status attributes of [each](#) resubmitted job:

[new-job-identifier](#) - for each successfully resubmitted (i.e., new) job

[job-identifier](#) - of the old job

754

755 For each job that is successfully resubmitted to the same server or another server, both the **new-job-identifier** and
 756 the **job-identifier** attributes shall be returned. For each job that is not resubmitted successfully, only the **job-**
 757 **identifier** attribute shall be returned.

758 When more than one job is specified, as may be the case when the **object-identification** argument element is of
 759 **object-class id-oc-printer** or **id-oc-server**, the absence of the **new-job-identifier** attribute is the only error
 760 indication that the print client receives [in the ResubmitJobResult](#).

761 *Temporary note - The ObjectStatus type should probably include a SEQUENCE OF PrintResult in order to capture the*
 762 *status of the individual print requests that comprise each resubmitted job. In addition, the syntax of*
 763 *ResubmitJobArgument and ResubmitJobResult should probably include a continuation context in order that the*
 764 *ResubmitJob abstract operation can operate asynchronously in the same manner as the ListObjectAttributes abstract*
 765 *operation.*

766 8.3.8.3 Resubmit-job Abstract-errors

767 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
768 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

769 [When the ResubmitJob request has failed because the new server has returned an error in response to a Print
770 operation submitted by the old server, the old server shall then return that error to the ResubmitJob client.](#)

771 8.3.9 Resume

772 This abstract-operation allows an administrator to resume a paused print server or a paused printer.

773 An administrator with appropriate privileges shall use the **Pause** operation to pause the printer and server.

774 This abstract-operation is formally defined as follows:

```
775     Resume ::= ABSTRACT-OPERATION
776           ARGUMENT      ResumeArgument
777           RESULT        ResumeResult
778           ERRORS        { AccessError,
779                           AttributeError,
780                           SecurityError,
781                           SelectionError,
782                           ServiceError }
```

783 NOTE - Normally only an appropriately authorized administrator may resume an object. However, this is a site and/or
784 enterprise-specific policy decision, not mandated by this International Standard.

785 8.3.9.1 Resume-argument

786 The argument of this abstract-operation is formally defined as follows:

```
787     ResumeArgument ::= SEQUENCE {
788       object-class          [0] OBJECT IDENTIFIER,
789                           -- id-oc-printer, id-oc-server
790       object-identification [1] ObjectIdentification,
791       message               [2] Message OPTIONAL,
792                           -- value of id-att-printer-message,
793                           -- id-att-server-message, id-att-message
794       common-arguments     [3] CommonArguments OPTIONAL }
```

795 The following argument elements shall be supported by the server:

796 **object-class**

797 This argument element shall specify the object class of the **object-identification**. The **object-class** argument shall be
798 one of the following values: **id-oc-printer** or **id-oc-server**.

799 **object-identification**

800 This argument element shall specify the **object-identification** based on the value of the **object-class** argument
801 element. The administrator shall specify one **object-identification** value associated with the **object-class**.

802 For each supported **object-class**, the server shall start the paused object specified by the **object-identification**
803 identified by the **ObjectIdentification** element.

804 A print server shall either accept or reject a request to resume an **object-identification**. The print server shall return
805 any attribute warnings or abstract-errors to the print client.

806 Each **object-identification** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-identification Values
id-oc-printer	simple-name	Printer name representing a physical printer. When resumed, a physical printer shall resume printing its currently assigned print job, if any, at the same unspecified pausable point where it was stopped. Use of the Pause and Resume operations for a logical printer is not supported.
id-oc-server	simple-name	Server name. when resumed, the print server shall begin distributing print jobs to printers.

807 **message**

808 See 8.1.2.

809 **common-arguments**

810 See [clause](#) 8.1.2 in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

811 8.3.9.2 Resume-result

812 The result of this abstract-operation is formally defined as follows:

```
813     ResumeResult ::= SEQUENCE {
814         object-status      [0] SET OF Attribute OPTIONAL }
```

815 The server may return object-status attributes of the resumed object.

816 8.3.9.3 Resume Abstract-errors

817 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server will return a particular abstract-error are defined in [clause](#) 8.4 of ISO/IEC 10175-1.

819 8.3.10 Set

820 This abstract-operation allows an administrator to set attribute values of a specified printing object.

821 Some restrictions on modifications to attributes of object classes apply and are described below.

822 The server shall be able to modify the following Job Object attributes:

- all Job Information attributes except for id-att-job-identifier, id-att-job-originator, id-att-job-owner, and id-att-initial-value-job
- all Job Results Handling attributes
- all Job Event Handling attributes
- all Job Scheduling Instruction attributes
- all Printer Selection attributes except for id-att-printer-name-requested

823 The server shall not modify the following Job Object attributes: Access and Accounting attributes, Job Security attributes, Job Status attributes, and Job Size attributes.

- The server shall be able to modify the following Document Object attributes:
- all Document Information attributes
- all Document Production Instructions attributes except for id-att-initial-value-document
- all Document Description attributes except for id-att-document-content and id-att-transfer-method
- all Document Characteristic attributes

825 The server shall not modify the following Document Object attributes: Document Status attributes.

826 The list of attributes in each of the above categories shall contain at least the list of attributes defined in the ISO/IEC
827 10175-1-~~(++)~~ standard definition of these categories. The addition of attributes to these general categories beyond
828 those defined in the ISO/IEC 10175-1 ~~(++)~~ standard is implementation defined.

829 Restrictions on modifications to other attributes of other object classes are implementation-defined.

830 There are four "modification" operations: **replace**, **add-values**, **remove-values**, **set-to-default**.

831 NOTE 1 - The client may change whether a document attribute or a job attribute is compulsory or non-compulsory. If
832 an attribute is to be specified as non-compulsory, then the non-compulsory-attributes attribute (for a document
833 attribute) or the job-non-compulsory-attributes attribute (for a job attribute) shall contain the attribute-~~id-type~~
834 ~~ObjectIdentifier~~ of the attribute that the server is to consider as non-compulsory. If an attribute is to be specified as
835 compulsory, then the non-compulsory-attributes attribute or the job-non-compulsory-attributes attribute shall *not*
836 contain the attribute-~~id-type~~ ~~ObjectIdentifier~~ of the attributes that the server is to consider as compulsory.

837 The server shall perform the requested modifications on the specified print object. Changes made by the server shall
838 be persistent, that is, objects shall retain their modified values across system restarts.

839 The behavior of a server when using the **Set** abstract-operation to modify job attributes or document attributes shall
840 be the same as the behavior when using the **ModifyJob** abstract-operation. See ~~clause~~ 8.2.2 in ISO/IEC 10175-1 for
841 a description of the **ModifyJob** abstract-operation.

842 However, for printer and server object classes, the ability of a server to successfully set a printer attribute or a server
843 attribute, and the resulting effect, depends upon the attribute involved and upon the presence of the attribute-type
844 object identifier in the **printer-non-compulsory-attributes** attribute or the **server-non-compulsory-attributes**
845 attribute. If the server cannot perform the specified modification for any compulsory attribute (e.g., due to
846 conflicting requirements, unavailability of a feature, or current status of the object), the server shall reject the **Set**
847 abstract-operation.

848 In general, the server shall ignore or reject modifications to particular printer or server attributes in a **Set** abstract-
849 operation in a manner consistent with the treatment they would have received had they been submitted in the **Create**
850 abstract-operation arguments. However, if it is necessary to reject a specified modification to any attribute (e.g., a
851 compulsory attribute with an unsupported value is specified), then the server shall reject the entire **Set** abstract-
852 operation and the printer or server attributes will remain unchanged.

853 In particular, if an attempt is made to remove an attribute from the value of the **printer-non-compulsory-attributes**
854 or **server-non-compulsory-attributes**, the server shall reject the **Set** abstract-operation if such a value would have
855 caused the original **Create** abstract-operation to be rejected. In this case, the server shall report an **invalid-non-**
856 **compulsory-attribute-modification AttributeError**.

857 The server shall reject any **Set** abstract-operation that attempts to modify (1) the attributes that this International
858 Standard specifies as non-modifiable or (2) the attributes for which the server does not support modification, and
859 shall return an **illegal-modification AttributeError** to the print client. If the server rejects a modification because it
860 does not support modification of an attribute or attributes, the server shall identify all such attributes in the
861 **AttributeError** returned.

862 This abstract-operation is formally defined as follows:

```

863 Set ::= ABSTRACT-OPERATION
864     ARGUMENT      SetArgument
865     RESULT        SetResult
866     ERRORS        { AccessError,
867                   SecurityError,
868                   ServiceError }
    
```

869 NOTE 2 - Normally only an appropriately authorized administrator set object attributes. However, this is a site and/or
 870 enterprise-specific policy decision, not mandated by this International Standard.

871 **8.3.10.1 Set-argument**

872 The argument of this abstract-operation is formally defined as follows:

```

873 SetArgument ::= SEQUENCE {
874     object-class      [0] OBJECT IDENTIFIER, -- id-oc-xxx
875     object-identification [1] ObjectIdentification,
876     message           [2] Message OPTIONAL,
877     attr-modification [3] SEQUENCE OF AttrModification OPTIONAL,
878     common-arguments [4] CommonArguments OPTIONAL }
879 AttrModification ::= SEQUENCE {
880     attribute-id      [0] AttributeId,
881     attribute-values [1] SET OF ANY -- DEFINED BY attribute-id -- OPTIONAL,
882     modify-operator [2] ModifyOperator DEFAULT replace }
    
```

883
 884 The following argument elements shall be supported by the server:

885 **object-class**

886 This argument element shall specify the object class of the **object-identification** to modify. The **object-class**
 887 argument shall be one of the following values: **id-oc-auxiliary-sheet**, **id-oc-auxiliary-sheet-package**, **id-oc-**
 888 **delivery-method**, **id-oc-document**, **id-oc-finishing**, **id-oc-font**, **id-oc-initial-value-document**, **id-oc-initial-value-**
 889 **job**, **id-oc-imposition**, **id-oc-job**, **id-oc-medium**, **id-oc-output**, **id-oc-printer**, **id-oc-resource**, **id-oc-resource-**
 890 **context**, **id-oc-scheduler**, **id-oc-server**, or **id-oc-transfer-method**.

891 **object-identification**

892 This argument element shall specify the **object-identification** based on the value of the **object-class** argument
 893 element. The administrator shall specify one **object-identification** value associated with the **object-class**.

894 For each supported **object-class**, the server shall set the attributes for the object specified by the **object-**
 895 **identification** identified by the **ObjectIdentification** element.

896 A print server shall either accept or reject a request to set attributes for an **object-identification**. The print server
 897 shall return any attribute warnings or abstract-errors to the print client.

898 Each **object-identification** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-identification Values
id-oc-job	job-identifier	Global job identifier. The server shall modify or set job and document attributes of previously submitted print jobs which have not yet begun printing on the physical printer. If the job has already begun printing, the results are unspecified.

		The effect of modifying job and/or document attributes on a print job is the same as if that job or document had been submitted originally with the modified attribute values. Scheduling of the job may be impacted, depending on the print server implementation and the attribute modifications made.
id-oc-document	document-identifier	Document identifier. Documents are numbered starting with 1. The ability to modify a currently printing document is implementation-defined. The effect of modifying document attributes on a document is the same as if that document had been submitted originally with the modified attribute values. Scheduling of the print job may be impacted, depending on the print server implementation and the attribute modifications made.
id-oc-printer	simple-name	Printer name representing a logical or physical printer.
id-oc-server	simple-name	Server name.
id-oc-initial-value-document	name-or-oid	Initial-value-document name. Contains the attributes of the document class that the server may default when constructing a document object.
id-oc-initial-value-job	name-or-oid	Initial-value-job name. Contains the attributes of the job class that the server may default when constructing a job object.
id-oc-auxiliary-sheet	name-or-oid	Start sheet, end sheet, separator sheet name.
id-oc-auxiliary-sheet-package	name-or-oid	Predefined package of start sheets, end sheets, and separator sheets referenced by a single name.
id-oc-delivery-method	object-identifier	Delivery method identifier; such as for print job output.
id-oc-finishing	name-or-oid	Finishing method name; such as stapling, folding, or binding.
id-oc-font	font-reference	Font name.
id-oc-imposition	name-or-oid	Imposition method name; such as 2-up or 4-up.
id-oc-medium	name-or-oid	Media name; such as iso-a4-white or north-american-letter.
id-oc-output	object-identifier	Output method identifier; such as sorting or collating.
id-oc-resource	name-or-oid	Resource identifier; such as overlay or logo.
id-oc-resource-context	name-or-oid	Resource context name; encapsulate details about the server's environment that, when used with a resource name, uniquely identifies a resource in the environment of that server.
id-oc-scheduler	object-identifier	Scheduler name; determines the order in which jobs are sent to physical printer.
id-oc-transfer-method	object-identifier	Transfer method identifier; such as ftam , with-request , or push-by-client .

899 message

900 See 8.1.2.

901 attr-modification

902 This argument element shall specify the modification to be performed on the **object-identification**, and contains the
 903 following necessary information:

- 904 a) **attribute-id**: identification of attribute to be modified
- 905 b) **attribute-values**: value(s) to be assigned to the attribute (if appropriate)
- 906 c) **modify-operator**: type of modification to be performed. Possible modification types are described in
 907 the following table:

modify-operator Value	Description
replace	Replaces the entire value of of the attribute identified by attribute-id with the value(s) specified in attribute-values , or adds the attribute to the print object, if the attribute was not present.
add-values	Adds the values specified in attribute-values to the attribute. identified by attribute-id
remove-values	Removes the value(s) specified in attribute-values from the attribute identified by attribute-id to the server-default.
set-to-default	Sets the value of the attribute identified by attribute-id to the server-default.

908 **common-arguments**

909 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

910 **8.3.10.2 Set-result**

911 The result of this abstract-operation is formally defined as follows:

```

912 SetResult ::= SEQUENCE {
913     object-status [0] SET OF Attribute OPTIONAL }
    
```

914 The server shall return the supported subset of the **object-status** attributes of the object whose attributes were set.

915 The following table contains a list of attributes for each **object-class**.

Object	object-class Specification	Attributes
Job	id-oc-job	id-att-job-identifier id-att-job-name id-att-current-job-state id-att-job-state-reasons id-att-intervening-jobs id-att-printer-name-requested id-att-printers-assigned id-att-total-job-octets id-att-job-owner
Document	id-oc-document	id-att-document-sequence-number id-att-document-format id-att-document-state id-att-octet-count id-att-copy-count id-att-sides id-att-document-type
Printer	id-oc-printer	id-att-printer-name id-att-printer-realization

		id-att-printer-state id-att-availability id-att-associated-server id-att-printer-locations id-att-printer-associated-printers id-att-scheduler-ready
Server	id-oc-server	id-att-server-name id-att-server-state id-att-availability id-att-logical-printers-supported id-att-physical-printers-supported
Medium	id-oc-medium	id-att-medium-identifier id-att-associated-server id-att-medium-realization id-att-medium-type id-att-medium-associated-media id-att-medium-size id-att-medium-dimensions id-att-medium-sides id-att-medium-color
Imposition	id-oc-imposition	id-att-imposition-identifier id-att-associated-server id-att-imposition-specification id-att-number-up
Initial-value-job	id-oc-initial-value-job	id-att-initial-value-job-identifier id-att-associated-server id-att-logical-printers-ready id-att-physical-printers-ready id-att-printer-locations-requested id-att-printer-models-requested id-att-job-retention-period
Initial-value-document	id-oc-initial-value-document	id-att-initial-value-document-identifier id-att-associated-server id-att-logical-printers-ready id-att-physical-printers-ready id-att-copy-count id-att-sides id-att-document-format
Font	id-oc-font	id-att-font-identifier id-att-associated-server id-att-file-reference
Auxiliary-sheet	id-oc-auxiliary-sheet	id-att-auxiliary-sheet-identifier id-att-auxiliary-sheet-medium id-att-associated-server
Auxiliary-sheet-package	id-oc-auxiliary-sheet-package	id-att-auxiliary-sheet-package-identifier id-att-associated-server
Transfer-method	id-oc-transfer-method	id-att-transfer-method-identifier id-att-transfer-method-type id-att-document-reference-type id-att-associated-server
Resource	id-oc-resource	id-att-resource-name id-att-resource-type

		id-att-associated-server id-att-file-reference
Resource-context	id-oc-resource-context	id-att-resource-context-identifier id-att-context-address id-att-associated-server
Delivery-method	id-oc-delivery-method	id-att-delivery-method-identifier id-att-associated-server
Finishing	id-oc-finishing	id-att-finishing-identification id-att-finishing-realization id-att-associated-server id-att-finishing-specification id-att-finishing-associated-finishings
Output	id-oc-output	id-att-output-identifier id-att-associated-server
Scheduler	id-oc-scheduler	id-att-scheduler-identifier id-att-associated-server

916 8.3.10.3 Set Abstract-errors

917 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
918 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

919 8.3.11 Shutdown

920 This abstract-operation allows an administrator to shutdown a specified print server or physical printer.

921 The means for restarting a printer or server which has been shutdown with this operation is provided by the **Control**
922 operation with the **reset** attribute set to **reset-power-cycle**.

923 The **when** argument element shall specify how much processing must occur before the shutdown can take place. The
924 server shall stop printing currently printing jobs either immediately (as soon as the printer technology allows), or as
925 indicated by the **when** argument element.

926 The server shall keep any jobs that had been submitted to the printer or server and continue processing them when
927 the printer or server is restarted. The server may also submit the jobs to an alternate physical printer, if one is
928 available.

929 When a print server [begins a shutdown operation](#), it ~~is~~ first disables [itself](#). This shall prevent new print jobs from
930 being accepted. Currently scheduled print jobs on a print server being shutdown shall be saved [by the server](#); the
931 print jobs shall be re-scheduled when the print server is restarted.

932 The order in which jobs will be printed shall not be changed by the invocation of the **Shutdown** operation.

933 The ability to shutdown physical printers is an implementation option.

934 [This operation may operate asynchronously; i.e., this operation need not complete immediately before returning.](#)

935 This abstract-operation is formally defined as follows:

```

936     Shutdown ::= ABSTRACT-OPERATION
937         ARGUMENT      ShutdownArgument
938         RESULT        ShutdownResult
939         ERRORS        { AccessError,
940                        SecurityError,
941                        ServiceError }

```

942 NOTE - Normally only an appropriately authorized administrator may shutdown an object. However, this is a site
943 and/or enterprise-specific policy decision, not mandated by this International Standard.

944 **8.3.11.1 Shutdown-argument**

945 The argument of this abstract-operation is formally defined as follows:

```

946     ShutdownArgument ::= SEQUENCE {
947         object-class      [0] OBJECT IDENTIFIER,
948                             -- id-oc-server, -id-oc-printer
949         object-instance  [1] ObjectIdentification,
950                             -- choice depends on class
951         message          [2] Message OPTIONAL,
952         when              [3] OBJECT IDENTIFIER,
953                             -- now, after-current, after-all
954         common-arguments [4] CommonArguments OPTIONAL }

```

955 The following argument elements shall be supported by the server:

956 **object-class**957 This argument element shall specify the object class of the **object-instance**. The **object-class** argument shall be one of the following values: **id-oc-printer** or **id-oc-server**.959 **object-instance**960 This argument element shall specify the **object-instance** based on the value of the **object-class** argument element. 961 The administrator shall specify one **object-instance** value associated with the **object-class**.962 For each supported **object-class**, the server shall shutdown the object specified by the **object-instance** identified by 963 the **ObjectIdentification** element.964 A print server shall either accept or reject a request to shut down an **object-instance**. The print server shall return 965 any attribute warnings or abstract-errors to the print client.966 Each **object-instance** shall take one of the following forms:

object-class Specification	ObjectIdentification element	object-instance Values
id-oc-printer	simple-name	Printer name representing a physical printer. The server shall: <ol style="list-style-type: none"> Disable the physical printer. This prevents the physical printer from accepting new print requests. Based on the value of the when argument element, stop printing as soon as possible (now), allow the physical printer to complete its current print job (after-current), or allow the physical printer to complete all jobs currently submitted to it (after-all). Place the physical printer in the shutdown state. Restart is accomplished by the Control operation with the reset attribute set to id-val-reset-power-cycle. Use of the Shutdown operation for a logical printer is not supported.
id-oc-server	simple-name	Server name. To shut down a server, the print server shall: <ol style="list-style-type: none"> Disable the server. This prevents the print server from accepting new print jobs. If the value of the when argument element is not

		<p>after-all, place the print server in the on-request state. This prevents print jobs from being assigned to physical printers.</p> <p>c) Based on the value of the when argument element, for each physical printer stop printing as soon as possible (now), allow physical printers to complete their current print jobs (after-current), or allow the physical printers to complete all jobs currently submitted to them (after-all).</p> <p>d) Place each physical printer in the paused state.</p> <p>e) Remove entries in the name service for all objects supported by this print server, if such entries exist and are required by the server implementation.</p> <p>f) Place the print server in the terminating state.</p> <p>g) Retain (save) any jobs not yet printed to be re-scheduled on server start-up.</p>
--	--	---

967 **message**

968 See 8.1.2.

969 **when**

970 This argument element shall specify how much processing must occur before the shutdown can take place. The
 971 when argument shall be one of the following values:

Descriptive Name:	Object Identifier	action taken:
now	id-val-generic-now	Aborts current jobs as soon as possible
after-current	id-val-generic-after-current	Currently printing jobs finish printing
after-all	id-val-generic-after-all	All submitted print jobs finish printing

972 ~~Temporary~~NOTE - these object identifier values are ~~to be~~ defined in Annex A of ISO/IEC 10175-1.

973 If some condition prevents a printer or server from shutting down promptly, an administrator may invoke another
 974 Shutdown operation with a more severe **when** value; i.e., if the original **when** value was 'after-all', the administrator
 975 may invoke Shutdown with a **when** value of 'after-current' or 'now'. If the original **when** value was 'after-current',
 976 the administrator may invoke a subsequent Shutdown with a **when** value of 'now'. But note that the converse is not
 977 true; i.e., if an administrator attempts to invoke Shutdown with a **when** value of 'after-all' while a Shutdown
 978 operation that had been invoked with a **when** value of 'now' or 'after-current' is currently executing, the new
 979 Shutdown operation will be rejected.

980

981 **common-arguments**

982 See [clause 8.1.2](#) in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

983 **8.3.11.2 Shutdown-result**

984 The result of this abstract-operation is formally defined as follows:

```

985     ShutdownResult ::= SEQUENCE {
986         object-status    [0] SET OF Attribute OPTIONAL }
    
```

987 The server shall return specified printer-status attributes of the shutdown object.

988 8.3.11.3 Shutdown Abstract-errors

989 If the request fails, the server shall return one of the listed abstract-errors. The circumstances under which the server
990 will return a particular abstract-error are defined in [clause 8.4](#) of ISO/IEC 10175-1.

991 8.4 Abstract-Errors

992 See [clause 8.4](#) of ISO/IEC 10175-1.

993 Many reasons for failure of an operation are generally not specified by the operation descriptions. Operations may
994 terminate prematurely and return an abstract-error to the print client if they encounter invalid usage of argument
995 elements (see [clause 8.4.2](#) of ISO/IEC 10175-1, **Attribute-error**); difficulties accessing objects (see [clause 8.4.1](#) of
996 ISO/IEC 10175-1, **Access-error**, [clause 8.4.6](#) of ISO/IEC 10175-1, **Selection-error**, or [clause 8.4.8](#) of ISO/IEC
997 10175-1, **Update-error**); or difficulties associated with the privileges of the process (see [clause 8.4.5](#) of ISO/IEC
998 10175-1, **Security-error**). When an unrecoverable error condition is encountered, the operation shall return an
999 abstract-error to the print client (see [clause 8.4.4](#) of ISO/IEC 10175-1, **Printer-error** or [clause 8.4.7](#) of ISO/IEC
1000 10175-1, **Service-error**).

1001 *Temporary Note—The following subclauses provide descriptions of the abstract errors ServiceError and*
1002 *UpdateError, with two additional problem values required for this part of ISO/IEC 10175. An Addendum is to be*
1003 *proposed to revise these abstract error definitions in ISO/IEC 10175-1, as indicated in the following subclauses. The*
1004 *clause numbers shown are those of ISO/IEC 10175-1.*

1005 8.4.7—Service-error

1006 A **ServiceError** reports a problem related to the provision of the service, which is not due to an incorrect abstract-
1007 operation request or the requester's access rights.

```

1008 ServiceError ::= ABSTRACT-ERROR
1009 — PARAMETER ServiceErrorSequence

1010 ServiceErrorSequence ::= SEQUENCE-OF
1011 — SEQUENCE {
1012 — problem [0] ServiceProblem,
1013 — attribute [1] Attribute OPTIONAL,
1014 — object-identification [2] ObjectIdentification, — see 8.2.4.1
1015 — error-message [3] ErrorMessage }

1016 ServiceProblem ::= CHOICE {
1017 — standard-problem ENUMERATED {
1018 — server-busy (1),
1019 — server-unavailable (2),
1020 — operation-too-complex (3),
1021 — resource-limit-exceeded (4),
1022 — unclassified-server-error (5),
1023 — too-many-items-in-list (6),
1024 — compulsory-resource-not-available (7),
1025 — cancel-document-unsupported (8),
1026 — modify-document-unsupported (9),
1027 — print-multiple-documents-unsupported (10),
1028 — unsupported-parameter-value (11),
1029 — invalid-checkpoint (12),
1030 — invalid-continuation-context (13),
1031 — pause-limit-exceeded (14),
1032 — unsupported-operation (15),
1033 — clean-logical-printer-unsupported (16) }, — new-problem
1034 — extended-problem OBJECT-IDENTIFIER }

```

1035 A **ServiceProblem** reported may be one of the following:

1036 a) ~~through o)~~ See ISO/IEC 10175-1.

1037 *Temporary note* — New service problem for DPA-3:

1038 p) **clean logical printer unsupported**: A client attempted to clean a logical printer that is considered by the
1039 server to be a gateway, as opposed to a container.

1040 8.4.8 — Update-error

1041 An **UpdateError** reports a problem encountered when a client attempts to modify (update), explicitly, an existing
1042 DPA Object. Cancellation of a print job and resubmission of a print job are also considered here as modifications.

1043 ~~UpdateError ::= ABSTRACT ERROR~~

1044 ~~— PARAMETER UpdateErrorSequence~~

1045 ~~UpdateErrorSequence ::= SEQUENCE {~~

1046 ~~— problem [0] UpdateProblem,~~

1047 ~~— object identification [1] ObjectIdentification, — see ISO/IEC 10175-1,~~

1048 ~~— error message [2] ErrorMessage }~~ ~~— clause 8.2.4.1~~

1049 ~~— error message [2] ErrorMessage }~~

1050 ~~UpdateProblem ::= CHOICE {~~

1051 ~~— standard problem ENUMERATED {~~

1052 ~~— no modifications allowed (1),~~

1053 ~~— insufficient update rights (2),~~

1054 ~~— previous operation incomplete (4),~~

1055 ~~— cancellation not possible (5),~~

1056 ~~— resubmit job not possible (6), — new problem~~

1057 ~~— deletion not possible (7)}, — new problem~~

1058 ~~— extended problem OBJECT IDENTIFIER }~~

1059 An **UpdateProblem** may be one of the following:

1060 a) ~~through d)~~: See ISO/IEC 10175-1.

1061 *Temporary note* — New update problems for DPA-3:

1062 e) **resubmit job not possible**: A client made an attempt to resubmit a print job that was in a state for which
1063 the server implementation does not support resubmission, such as while the job is printing (most server
1064 implementations should permit cancellation while printing) or was already complete.

1065 f) **deletion not possible**: A client attempted to delete a server or physical printer object that currently
1066 contained jobs.

1067 8.5 Abstract-Events

1068 See clause 8.5 of ISO/IEC 10175-1.

1069 *Temporary Note* — The following **event-report** types are required for this part of ISO/IEC 10175. An Addendum is to
1070 be proposed to add these **event-report** definitions in ISO/IEC 10175-1. The clause number shown is for that
1071 subclause of ISO/IEC 10175-1 to which the new event-report types are to be added.

1072 8.5.4 — Event-report class

1073 A report event occurs whenever a significant point in the processing of the job occurs. The following report event
1074 types are defined:

1075 a) ~~through l)~~ — See ISO/IEC 10175-1.

1076 *Temporary note* — New event-report types for DPA-3:

- 1077 ~~j) **id-val-event-report-job-cancelled:** The server has completed cancelling the print job.~~
- 1078 ~~k) **id-val-event-report-printer-cleaned:** The clean operation has been completed on the printer.~~
- 1079 ~~l) **id-val-event-report-server-cleaned:** The clean operation has been completed on the server.~~

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Annex A

(normative)

Formal definition of the DPA management abstract service

This Annex is a supplement to section two, formally defining the Document Printing management abstract service. It employs ASN.1 and the ABSTRACT-OPERATION and ABSTRACT-ERROR macros of ISO/IEC 10021-3.

The order of the ASN.1 productions in this Annex follows the order of the operation definitions in clause 8. In case of discrepancies between this Annex and clause 8, this Annex shall take precedence.

```
-- File: DPA_3AB.ASN, Version 0-1.0, 5-December-199720-October-1996
-- Version 0.1, 20-October-1996
-- Version 1.0, 5-December-1997: Removed temporary notes;
-- Removed temporary definitions of abstract-errors
-- [these are now defined in Part 1 via Technical Corrigendum 1]

-- ANNEX AB

-- FORMAL DEFINITION OF THE DPA MANAGEMENT ABSTRACT SERVICE

-- This normative annex is an integral part of this part of ISO/IEC
-- 10175.

-- This Annex is a supplement to section two and formally defines the
-- Document Printing management abstract service. It employs ASN.1 and the
-- ABSTRACT-OPERATION and ABSTRACT-ERROR macros of ISO/IEC 10021-3.

DPAManagementAbstractService {iso standard dpa(10175) part-3(3) modules(0)
    abstract-service(1) }
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- PROLOGUE --
-- EXPORTS everything --

IMPORTS

-- Abstract service macros --
ABSTRACT-ERROR, ABSTRACT-OPERATION
    FROM AbstractServiceNotation
    { joint-iso-ccitt mhs-motis(6) asdc(2) modules(0) notation(1) }

-- Data types from DPA abstract service (see ISO/IEC 10175-1 ANNEX B) --
Attribute, AttributeId, CommonArguments, JobAttrModification, ModifyOperator,
ObjectIdentification,
```

```

1128 AccessError, AttributeError, PrinterError, SecurityError,
1129 SelectionError,
1130 ServiceError, UpdateError
1131 FROM DPAAbstractService
1132     { iso standard dpa(10175) part-1(1) modules(0) abstract-service(1) }
1133
1134 -- Data types from DPA attributes (see ISO/IEC 10175-1 ANNEX C) --
1135 Message, JobIdentifier, DistinguishedNameString
1136 FROM DPASstandardAttributes
1137     {iso standard dpa(10175) part-1(1) modules(0) attributes(2) }
1138
1139
1140 -- end of IMPORTS
1141
1142

```

```

1143 -----
1144
1145 ----- DPA ABSTRACT OBJECTS -----
1146

```

Temporary Note—The the dp-administration-port is currently defined in ISO/IEC 10175-1, but does not include the additional abstract operations defined in this part of ISO/IEC 10175. An Addendum will be proposed to revise the dp-administration-port definition in ISO/IEC 10175-1 to conform to the following definition; when the addendum is approved, this syntax definition will be removed from this part of ISO/IEC 10175.

```

1147
1148 dp-administration-port PORT
1149 -----
1150 CONSUMER INVOKES {
1151 promote-job, ----- -- PromoteJob
1152 interrupt-job, ----- -- InterruptJob
1153 pause-job, ----- -- PauseJob
1154 resume-job } ----- -- ResumeJob
1155 -----
1156 ::= id-pt-dp-administration
1157
1158
1159

```

```

1160 -----
1161
1162 -- ABSTRACT OPERATIONS --
1163
1164 -- Clean --
1165
1166 Clean ::= ABSTRACT-OPERATION
1167     ARGUMENT      CleanArgument
1168     RESULT        CleanResult
1169     ERRORS        { AccessError,
1170                   SecurityError,
1171                   ServiceError }
1172

```

```

1173 CleanArgument ::= SEQUENCE {
1174     object-class      [0] OBJECT IDENTIFIER,
1175                     -- id-oc-server, id-oc-printer
1176     object-instance  [1] ObjectIdentification,
1177                     -- choice depends on object class
1178     message          [2] Message OPTIONAL,
1179     common-arguments [3] CommonArguments OPTIONAL }
1180
1181
1182 CleanResult ::= SEQUENCE {
1183     object-status [0] SET OF Attribute OPTIONAL }
1184
1185 -----
1186
1187 -- Control --
1188
1189 Control ::= ABSTRACT-OPERATION
1190     ARGUMENT      ControlArgument
1191     RESULT        ControlResult
1192     ERRORS        { AccessError,
1193                   SecurityError,
1194                   ServiceError }
1195
1196 ControlArgument ::= SEQUENCE {
1197     object-class      [0] OBJECT IDENTIFIER,
1198                     -- id-oc-server, id-oc-printer
1199     object-instance  [1] ObjectIdentification,
1200                     -- choice depends on object class
1201     message          [2] Message OPTIONAL,
1202     operations       [3] SEQUENCE OF Attribute,
1203                     -- operands and parameters
1204                     -- Current operations: reset and trace
1205     common-arguments [4] CommonArguments OPTIONAL }
1206
1207 ControlResult ::= SEQUENCE {
1208     object-status [0] SET OF Attribute OPTIONAL }
1209
1210 -----
1211
1212 -- Create --
1213
1214 Create ::= ABSTRACT-OPERATION
1215     ARGUMENT      CreateArgument
1216     RESULT        CreateResult
1217     ERRORS        { AccessError,
1218                   SecurityError,
1219                   SelectionError,
1220                   ServiceError }

```



```

1221 CreateArgument ::= SEQUENCE {
1222     object-class      [0] OBJECT IDENTIFIER, -- id-oc-xxx
1223     -- any id-oc-xxx, excluding job and document
1224     object-instance   [1] ObjectIdentification,
1225     -- instance identifier depends on class
1226     message           [2] Message OPTIONAL,
1227     copy-from         [3] ObjectIdentification OPTIONAL,
1228     -- initial value object (IVO)
1229     force-creation    [4] BOOLEAN DEFAULT FALSE,
1230     -- recreate if necessary
1231     object-attributes [5] SET OF Attribute OPTIONAL,
1232     -- attributes of new object instance
1233     common-arguments  [6] CommonArguments OPTIONAL }
1234
1235 CreateResult ::= SEQUENCE {
1236     object-status     [0] SET OF Attribute }
1237
1238 -----
1239
1240 -- Delete --
1241
1242 Delete ::= ABSTRACT-OPERATION
1243     ARGUMENT      DeleteArgument
1244     RESULT        DeleteResult
1245     ERRORS        { AccessError,
1246                   SecurityError,
1247                   ServiceError,
1248                   UpdateError }
1249
1250 DeleteArgument ::= SEQUENCE {
1251     object-class      [0] OBJECT IDENTIFIER,
1252     -- any id-oc, including job and server
1253     object-instance   [1] ObjectIdentification,
1254     -- choice depends on class
1255     message           [2] Message OPTIONAL,
1256     common-arguments [3] CommonArguments OPTIONAL }
1257
1258 DeleteResult ::= SEQUENCE {
1259     object-status     [0] SET OF Attribute OPTIONAL }
1260
1261
1262 -- Disable --
1263
1264 Disable ::= ABSTRACT-OPERATION
1265     ARGUMENT      DisableArgument
1266     RESULT        DisableResult
1267     ERRORS        { AccessError,
1268                   SecurityError,
1269                   ServiceError }
1270
1271 DisableArgument ::= SEQUENCE {
1272     object-class      [0] OBJECT IDENTIFIER,
1273     -- id-oc-server, -id-oc-printer
1274     object-instance   [1] ObjectIdentification,

```

```

1274             -- choice depends on class
1275     message      [2] Message OPTIONAL,
1276             -- value of id-att-server-message,
1277             -- id-att-printer-message
1278     common-arguments [3] CommonArguments OPTIONAL }
1279
1280 DisableResult ::= SEQUENCE {
1281     object-status  [0] SET OF Attribute OPTIONAL }
1282
1283
1284 -- Enable --
1285
1286 Enable ::= ABSTRACT-OPERATION
1287     ARGUMENT      EnableArgument
1288     RESULT        EnableResult
1289     ERRORS        { AccessError,
1290                   SecurityError,
1291                   ServiceError }
1292
1293 EnableArgument ::= SEQUENCE {
1294     object-class   [0] OBJECT IDENTIFIER,
1295                   -- id-oc-server, -id-oc-printer
1296     object-instance [1] ObjectIdentification,
1297                   -- choice depends on class
1298     message        [2] Message OPTIONAL,
1299                   -- value of id-att-server-message,
1300                   -- id-att-printer-message
1301     common-arguments [3] CommonArguments OPTIONAL }
1302
1303 EnableResult ::= SEQUENCE {
1304     object-status  [0] SET OF Attribute OPTIONAL }
1305
1306 -----
1307 -- Pause --
1308
1309 Pause ::= ABSTRACT-OPERATION
1310     ARGUMENT      PauseArgument
1311     RESULT        PauseResult
1312     ERRORS        { AccessError,
1313                   AttributeError,
1314                   SecurityError,
1315                   SelectionError,
1316                   ServiceError }
1317
1318 PauseArgument ::= SEQUENCE {
1319     object-class   [0] OBJECT IDENTIFIER,
1320                   -- id-oc-printer, id-oc-server
1321     object-identification [1] ObjectIdentification,
1322     message        [2] Message OPTIONAL,
1323                   -- value of id-att-printer-message,
1324                   -- id-att-server-message, id-att-message
1325     common-arguments [3] CommonArguments OPTIONAL }
1326

```

```

1327 PauseResult ::= SEQUENCE {
1328     affected-job-identifier [0] JobIdentifier OPTIONAL,
1329                             --returned if a job was printing on the
1330                             --printer being paused
1331     paused-object-status    [1] SET OF Attribute OPTIONAL }
1332
1333 -----
1334
1335 -- ResubmitJob --
1336
1337 ResubmitJob ::= ABSTRACT-OPERATION
1338     ARGUMENT      ResubmitJobArgument
1339     RESULT        ResubmitJobResult
1340     ERRORS        { AccessError,
1341                    AttributeError,
1342                    PrinterError,
1343                    SecurityError,
1344                    SelectionError,
1345                    ServiceError,
1346                    UpdateError }
1347
1348 ResubmitJobArgument ::= SEQUENCE {
1349     object-class            [0] OBJECT IDENTIFIER,
1350                             -- id-oc-job, id-oc-printer,
1351                             -- id-oc-server
1352     object-identification [1] ObjectIdentification,
1353     printer                [2] DistinguishedNameString,
1354     job-attr-modification [3] Sequence of JobAttrModification OPTIONAL,
1355     message                [43] Message OPTIONAL,
1356     common-arguments       [54] CommonArguments OPTIONAL }
1357
1358 ResubmitJobResult ::= SEQUENCE {
1359     result-set [0] SEQUENCE OF ObjectStatus }
1360     -- one result-set for each job resubmitted
1361     -- (or for each job attempted to be resubmitted)
1362
1363 ObjectStatus ::= SEQUENCE {
1364     object-status [0] SET OF Attribute OPTIONAL }
1365     -- job-identifier and new-job-identifier shall be
1366     -- returned at least. For any jobs that could not
1367     -- be resubmitted, the new-job-identifier attribute
1368     -- shall be omitted as the only error indication.
1369
1370
1371 -----
1372
1373 -- Resume --
1374 Resume ::= ABSTRACT-OPERATION
1375     ARGUMENT      ResumeArgument
1376     RESULT        ResumeResult
1377     ERRORS        { AccessError,
1378                    AttributeError,
1379                    SecurityError,

```

```

1380             SelectionError,
1381             ServiceError }
1382
1383 ResumeArgument ::= SEQUENCE {
1384     object-class          [0] OBJECT IDENTIFIER,
1385                          -- id-oc-printer, id-oc-server
1386     object-identification [1] ObjectIdentification,
1387     message               [2] Message OPTIONAL,
1388                          -- value of id-att-printer-message,
1389                          -- id-att-server-message, id-att-message
1390     common-arguments     [3] CommonArguments OPTIONAL }
1391
1392 ResumeResult ::= SEQUENCE {
1393     object-status         [0] SET OF Attribute OPTIONAL }
1394
1395 -----
1396
1397 -- Set --
1398
1399 Set ::= ABSTRACT-OPERATION
1400     ARGUMENT      SetArgument
1401     RESULT        SetResult
1402     ERRORS        { AccessError,
1403                   SecurityError,
1404                   ServiceError }
1405
1406 SetArgument ::= SEQUENCE {
1407     object-class          [0] OBJECT IDENTIFIER, -- id-oc-xxx
1408     object-identification [1] ObjectIdentification,
1409     message               [2] Message OPTIONAL,
1410     attr-modification     [3] SEQUENCE OF AttrModification OPTIONAL,
1411     common-arguments     [4] CommonArguments OPTIONAL }
1412
1413 AttrModification ::= SEQUENCE {
1414     attribute-id          [0] AttributeId,
1415     attribute-values      [1] SET OF ANY -- DEFINED BY attribute-id -- OPTIONAL,
1416     modify-operator      [2] ModifyOperator DEFAULT replace }
1417
1418 SetResult ::= SEQUENCE {
1419     object-status         [0] SET OF Attribute OPTIONAL }
1420
1421 -----
1422
1423 -- Shutdown --
1424 Shutdown ::= ABSTRACT-OPERATION
1425     ARGUMENT      ShutdownArgument
1426     RESULT        ShutdownResult
1427     ERRORS        { AccessError,
1428                   SecurityError,
1429                   ServiceError }
1430
1431 ShutdownArgument ::= SEQUENCE {
1432     object-class          [0] OBJECT IDENTIFIER,

```

```

1433         -- id-oc-server, -id-oc-printer
1434     object-instance [1] ObjectIdentification,
1435         -- choice depends on class
1436     message         [2] Message OPTIONAL,
1437     when            [3] OBJECT IDENTIFIER,
1438         -- now, after-current, after-all
1439         -- [see Part 1, Annex A for OID definition]
1440     common-arguments [4] CommonArguments OPTIONAL }
1441
1442 ShutdownResult ::= SEQUENCE {
1443     object-status   [0] SET OF Attribute OPTIONAL }

```

```

1444 -----

```

```

1445
1446
1447 -- ABSTRACT ERRORS --
1448

```

See Part 1, Annex B, of this International Standard.

Temporary Note—The abstract errors ServiceError and UpdateError are currently defined in ISO/IEC 10175, but they are repeated here to show the inclusion one new ServiceProblem and two new UpdateProblems that are required for this part of ISO/IEC 10175. An Addendum will be proposed to revise the ServiceError and UpdateError definitions in ISO/IEC 10175-1; when the addendum is approved, this syntax definition will be removed from this part of ISO/IEC 10175.

~~Service Error~~

~~ServiceError ::= ABSTRACT ERROR~~

~~PARAMETER ServiceErrorSequence~~

~~ServiceErrorSequence ::= SEQUENCE OF~~

~~SEQUENCE {~~

~~problem [0] ServiceProblem,~~

~~attribute [1] Attribute OPTIONAL,~~

~~object identification [2] ObjectIdentification, ~~see 8.2.4.1~~~~

~~error message [3] ErrorMessage }~~

```

1467 ServiceProblem ::= CHOICE {
1468   standard-problem ENUMERATED {
1469     server-busy (1),
1470     server-unavailable (2),
1471     operation-too-complex (3),
1472     resource-limit-exceeded (4),
1473     unclassified-server-error (5),
1474     too-many-items-in-list (6),
1475     compulsory-resource-not-available (7),
1476     cancel-document-unsupported (8),
1477     modify-document-unsupported (9),
1478     print-multiple-documents-unsupported (10),
1479     unsupported-parameter-value (11),
1480     invalid-checkpoint (12),
1481     invalid-continuation-context (13),
1482     pause-limit-exceeded (14),
1483     unsupported-operation (15),
1484     clean-logical-printer-unsupported (16) }, new-problem
1485   extended-problem OBJECT IDENTIFIER }
1486
1487 Update-error
1488
1489 UpdateError ::= ABSTRACT-ERROR
1490   PARAMETER UpdateErrorSequence
1491
1492 UpdateErrorSequence ::= SEQUENCE {
1493   problem [0] UpdateProblem,
1494   object-identification [1] ObjectIdentification, see ISO/IEC 10175-1
1495   clause 8.2.4.1
1496   error-message [2] ErrorMessage }
1497
1498 UpdateProblem ::= CHOICE {
1499   standard-problem ENUMERATED {
1500     no-modifications-allowed (1),
1501     insufficient-update-rights (2),
1502     previous-operation-incomplete (4),
1503     cancellation-not-possible (5),
1504     resubmit-job-not-possible (6), new-problem
1505     deletion-not-possible (7)}, new-problem
1506   extended-problem OBJECT IDENTIFIER }
1507
1508
1509
1510 END -- of DPAManagementAbstractService --
1511

```

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Annex B

(normative)

Conformance requirements

1518 This Annex is a supplement to section two. Its purpose is to define different levels of DP-Server functionality in
1519 terms of the level of support provided for the abstract operations and attributes defined in this International Standard.
1520 These levels are to be used in specifying the conformance levels which particular DP-Servers purport to implement,
1521 and thus, which features and facilities clients of those DP-Servers may expect to access.

1522 Two levels of functionality are defined in ISO/IEC 10175-1, levels 1 and 2; for each level, an additional set of
1523 attributes is specified for multiple-document job support, indicated by the letter M. Thus, level 1M indicates the
1524 server supports the basic set of operations and attributes, and can support multiple-document jobs. See ISO/IEC
1525 10175-1, Annex E, for specifications of these conformance requirements.

1526 This part of ISO/IEC 10175 defines one additional level of conformance, level 3; additional conformance
1527 requirements are also specified for level 3 systems providing multiple-document support, designated level 3M.

1528 The Conformance level operation and attribute sets are defined in the following sub-clauses:

1529 B.1 Conformance level 3

1530 A server conforming to level 3 shall support the operations, objects, and attributes specified for level 2 conformance,
1531 and in addition shall support the following operations, ~~objects,~~ and attributes, as a minimum:

1532 a) Abstract operations supported:

1533 Clean
1534 Control
1535 Create
1536 Delete
1537 Disable
1538 Enable
1539 Pause
1540 Resume
1541 Set
1542 Shutdown

1543 b) ~~Objects supported:~~

1544 ~~— TBD~~

1545 ~~e) Attributes supported:~~

1546 ~~enabled~~ ~~TBD~~

1547 B.2 Conformance level 3M

1548 This classification is applicable to level 3 servers that support multiple-document jobs.

1549 A server conforming to level 3M shall support the operations, objects, and attributes specified for level 3
1550 conformance, and shall in addition adhere to the conformance requirements specified for level 2M.

1551

Annex C

(informative)

Issues to Resolve in Conjunction with DPA Part 1

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~~The issues below relate to all parts of DPA as a whole. These issues have surfaced as a result of the creation of the DPA Part 3 document.~~

~~To all reviewers: Please provide feedback on the following issues. A few potential solutions are provided, but there may be more.~~

~~a) — Do we need Access Control Lists for controlling access to objects?~~

~~b) — Attributes Requested by the client~~

~~The Set and Create operations in POSIX allows the client to specify attributes for which the server will return the value. Below are potential resolutions to this issue.~~

~~1) — Require the server to return with the result all attribute values listed in POSIX as "requested attributes" for the Set operation and for the Create operation.~~

~~1) — Don't return any attribute values, and thus require the client to call ListObjectAttributes to obtain all of the desired attribute values.~~

~~1) — Other?~~

~~c) — Set operation errors, for values that the server cannot support~~

~~The Set operation allows the client to specify one or more attributes to be set. If Set is able to set some of the attributes, but is unable to set others, how should the result be returned to the client? Note that the server may have already acted on some settings before it reached the first attribute that it could not set. Currently, DPA Part 1 doesn't accommodate a multi valued result. Below are potential resolutions to this issue.~~

~~1) — Perform the Set operation, and return a list of the attributes that the server could not set, but do not return an error. This involves adding a multi-valued Set result component that contains all attributes that failed.~~

~~1) — Require the server to pre-scan all attributes to determine if there are any that it knows it cannot set. If there are any that the server cannot set, reject the Set operation with an error.~~

~~1) — Perform the Set operation, and when the server reaches the first attribute that it determines that it cannot set, return an error to the client, and return the first attribute that failed in the Set result.~~

~~1) — Other?~~

~~d) — Should new attributes, errors and events that are required by this part of ISO/IEC 10175 be defined in this part, or should they be defined in an addendum or corrigendum to part 1 of ISO/IEC 10175?~~

Annex D

(informative)

Proposed Additions to DPA Part 1

D.1 Additional items

The items below are proposed additions to DPA Part 1; alternatively, some or all of these additions may be included in this part of ISO/IEC 10175. These additions have surfaced as a result of the creation of the DPA Part 3 document.

D.1.1 New **UpdateError** type needed: ~~resubmit-job-not-possible~~

This new **UpdateError** is needed for the ~~Resubmit-job~~ operation. If the job to be resubmitted is currently printing, the request shall be rejected and the print server shall return the ~~resubmit-job-not-possible UpdateError~~ to the print client.

D.1.2 Two new attributes for ~~id-oc-printer~~ and ~~id-oc-server~~ needed: ~~object-non-compulsory-attributes~~ and ~~object-ignored-attributes~~

These new attributes are needed for the ~~Create~~ operation. The ~~non-compulsory-attributes~~ attribute will provide a means for the print client to specify which object attributes the server may ignore when they cannot be satisfied during the ~~Create~~ operation. If a non-compulsory attribute cannot be satisfied, the server shall create the object and shall add the attribute oid of the problem attribute to the ~~ignored-attributes~~ attribute. However, if the problem attribute is not specified in the ~~non-compulsory-attributes~~ attribute, the server shall reject the request, and shall return the appropriate **AttributeError** to the print client.

D.1.3 New **Event-report** type needed: ~~id-val-event-report-job-cancelled~~

This new **Event-report** type is needed for the ~~CancelJob~~ operation. Since the ~~CancelJob~~ operation is asynchronous, the print client does not know when this operation has been completed. Upon completion of the ~~CancelJob~~ operation, the server shall notify the print client with the ~~id-val-event-report-job-cancelled~~ event.

D.1.4 New **Event-report** types needed: ~~id-val-event-report-printer-cleaned~~, and ~~id-val-event-report-server-cleaned~~

These new **Event-report** types are needed for the ~~Clean~~ operation. Since the ~~Clean~~ operation relies on the asynchronous ~~CancelJob~~ operation, the ~~Clean~~ operation is also asynchronous. Thus, the print client does not know when the ~~Clean~~ operation has been completed on a printer or on a server. Upon completion of the cleaning of a printer, the server shall notify the print client with the ~~id-val-event-report-printer-cleaned~~ event; upon completion of the cleaning of a server, the server shall notify the print client with the ~~id-val-event-report-server-cleaned~~ event.

D.1.5 New **UpdateError** type needed: ~~deletion-not-possible~~

This new **UpdateError** is needed for the ~~Delete~~ operation. If the server or physical printer to be deleted currently contains jobs, the request shall be rejected and the print server shall return the ~~deletion-not-possible UpdateError~~ to the print client.

D.1.6 New **ServiceError** type needed: ~~clean-logical-printer-unsupported~~

This new **ServiceError** is needed for the ~~Clean~~ operation. If the printer to be cleaned is a logical printer which is considered by the server implementation to be a gateway, as opposed to a container, the request

1629 shall be rejected and the print server shall return the ~~clean-logical-printer-unsupported-ServiceError~~ to
1630 the print client.

1631 ~~D.1.7~~ New attributes needed: ~~reset and trace-enable~~

1632 These new attributes are needed for the ~~operations~~ argument element of the ~~Control~~ operation.

1633 ~~D.1.8~~ New attribute values needed: ~~id-val-power-cycle-reset, id-val-reset-to-nvram and~~
1634 ~~id-val-reset-to-factory-defaults~~

1635 These new attribute values are needed for the ~~reset~~ attribute, which is an argument element of the ~~Control~~
1636 operation.

1637 ~~D.1.9~~ New ~~Event-report~~ type needed: ~~id-val-event-report-job-resubmitted~~

1638 This new ~~Event-report~~ type is needed for the ~~ResubmitJob~~ operation. Since the ~~ResubmitJob~~ operation is
1639 asynchronous, the print client does not know when this operation has been completed, or when individual
1640 resubmitted jobs have been accepted by a print server. Upon acceptance of each job included in a
1641 resubmission request, the server shall notify the print client with the ~~id-val-event-report-job-resubmitted~~
1642 event.

1643 ~~D.2~~ State Transition Tables

1644 State Transition Tables should be added to ISO/IEC 10175-1 for the following objects:

- 1645 • ~~Physical printer object~~ — see ~~D.2.1~~
- 1646 • ~~Logical printer object~~ — see ~~D.2.2~~
- 1647 • ~~Server object~~ — see ~~D.2.3~~

1648

1 **D.2.1 — Physical Printer State Transitions**

2 The following is the State Transition Table for the Physical Printer object.

DPA Printer States													
printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown	
DPA operations													
CancelJob (see Note 12)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle or connecting-to-printer (see Note 4)	idle or printing (see Note 4)	paused	idle or job-start-wait (see Note 4)	idle or job-end-wait (see Note 4)	idle or job-password-wait (see Note 4)	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Clean (see Note 12)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle	idle	paused	idle	idle	idle	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Control (power-cycle-reset)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle	idle	idle	idle	idle	idle	idle (see Note 3)	idle (see Note 3)	idle	idle
Control (reset-to-nvram)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle	idle	idle	idle	idle	idle	idle (see Note 3)	idle (see Note 3)	idle	inappropriate-object-state Access-error
Control (reset-to-factory-defaults)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle	idle	idle	idle	idle	idle	idle (see Note 3)	idle (see Note 3)	idle	inappropriate-object-state Access-error

DPA Printer States														
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown	
Create	idle	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	printer-object does not exist or object-already-exists Selection-error (see Note 6)	inappropriate-object-state Access-error	printer-object does not exist or object-already-exists Selection-error (see Note 6)
Delete	unknown-identification Selection-error	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	printer-object does not exist	inappropriate-object-state Access-error	printer-object does not exist
Disable (see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (disabled)	connecting-to-printer (disabled)	printing (disabled)	paused (disabled)	job-start-wait (disabled)	job-end-wait (disabled)	job-password-wait (disabled)	needs-attention (disabled)	needs-key-operator (disabled)	inappropriate-object-state Access-error	inappropriate-object-state Access-error	
Enable (see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (enabled)	connecting-to-printer (enabled)	printing (enabled)	paused (enabled)	job-start-wait (enabled)	job-end-wait (enabled)	job-password-wait (enabled)	needs-attention (enabled)	needs-key-operator (enabled)	inappropriate-object-state Access-error	inappropriate-object-state Access-error	
Interrupt Job	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	idle	idle	inappropriate-object-state Access-error	idle	idle	idle	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error	
ListObject Attributes	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error	

4

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
ModifyJob	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer or idle (see Note 9)	printing or idle (see Note 9) or needs-attention or needs-key-operator (see Note 10)	paused	job-start-wait or idle (see Note 9)	job-end-wait or idle (see Note 9)	job-password-wait or idle (see Note 9)	needs-attention or needs-key-operator or printing (see Note 11)	needs-key-operator or needs-attention or printing (see Note 11)	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Pause	unknown-identification Selection-error	inappropriate-object-state Access-error	paused	paused	paused	inappropriate-object-state Access-error	paused	paused	paused	paused	paused	inappropriate-object-state Access-error	inappropriate-object-state Access-error
PauseJob	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Print	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (see Note 7)	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Promote Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Resubmit Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (see Note 7)	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
Resume	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	state from which printer entered paused-state (see Note 2)	printing	idle	printing	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Resume Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Set	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer or idle (see Note 9)	printing or idle (see Note 9) or needs-attention or needs-key-operator (see Note 10)	paused	job-start-wait or idle (see Note 9)	job-end-wait or idle (see Note 9)	job-password-wait or idle (see Note 9)	needs-attention or needs-key-operator or printing (see Note 11)	needs-key-operator or needs-attention or printing (see Note 11)	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Shutdown	unknown-identification Selection-error	inappropriate-object-state Access-error	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Conditions and events													
job becomes available	n/a	n/a	connecting-to-printer or printing (see Note 8);	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	n/a	n/a
connection to-printer completes	n/a	n/a	n/a	printing	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

6

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
current job completes	n/a	n/a	n/a	n/a	idle	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
server aborts job	n/a	n/a	idle	idle	idle	paused	idle	idle	idle	needs-attention	needs-key-operator	n/a	n/a
output device senses that it needs human attention (no special skills required) —(see Note 5)	n/a	n/a	needs-attention	needs-attention	needs-attention	needs-attention	needs-attention	needs-attention	needs-attention	needs-attention	needs-key-operator	n/a	n/a
output device senses that it needs the attention of a key operator —(see Note 5)	n/a	n/a	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	needs-key-operator	n/a	n/a
output device senses reason for needing attention has been satisfied	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	state from which printer entered needs-attention state	state from which printer entered needs-key-operator state	n/a	n/a
job-start-wait job attribute set on current job being processed	n/a	n/a	n/a	connecting-to-printer	job-start-wait	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	n/a	n/a

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DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
job-end-wait job attribute set on-current job being processed	n/a	n/a	n/a	connecting-to-printer	job-end-wait	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	n/a	n/a
job-password-wait job attribute set on-current job being processed	n/a	n/a	n/a	connecting-to-printer	job-password-wait	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	n/a	n/a
operator performs output device implementation-specific action to resume printer	n/a	n/a	n/a	n/a	n/a	state from which printer entered paused state (see Note 2)	printing	idle	printing	n/a	n/a	n/a	n/a
server was unable to get a response from the printer in the time specified by the printers printer-timeout-period attribute	n/a	n/a	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out

8

DPA Printer States														
printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown		
printer becomes available without operator intervention after having timed out	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	idle	n/a

9

NOTES

- 10 1— The ~~Disable~~ and ~~Enable~~ operations control the ability of the printer to accept new jobs, and does not change the printer state. The printer proceeds from state to state in a disabled mode just as it does in an enabled mode. When the enabled mode is set, the printer accepts new print jobs; when disabled mode is set, the printer does not accept new print jobs.
- 11 1— For ~~Resume~~ operation in ~~paused~~ state:
- 12 • If printer entered ~~paused~~ state from ~~idle~~, ~~connecting-to-printer~~, ~~printing~~, ~~needs-attention~~ or ~~needs-key-operator~~ state, it shall return to that state.
 - 13 • If printer entered ~~paused~~ state from ~~job-start-wait~~ or ~~job-password-wait~~ states, it shall return to the ~~printing~~ state.
 - 14 • If printer entered ~~paused~~ state from ~~job-end-wait~~ states, it shall return to the ~~idle~~ state.
- 15 1— After the ~~Control~~ operation is invoked for a ~~power-cycle-reset~~, ~~reset-to-nvram~~ or ~~reset-to-factory-defaults~~, if the previous condition that caused the printer to be in the ~~needs-attention~~ or ~~needs-key-operator~~ states still exists, the hardware shall again sense its existence and shall return the printer to the appropriate state.
- 16 1— If the ~~CancelJob~~ operation is acting on the current job being processed, the printer transitions to the ~~idle~~ state; otherwise, the printer remains in the original state.
- 17 1— When the output device senses the need for operator attention, the required operator skills depend on the nature of the task to be performed. Example tasks for which no special skills are required are as follows: adding paper, clearing a jam, changing the medium, etc. Example printer-specific tasks of a key-operator are as follows: adding toner or developer, attending to a hardware fault, etc.
- 18 1— For the ~~Create~~ operation, if the argument element ~~force-creation~~ = ~~TRUE~~, and a printer object already exists, the server deletes the existing object and creates a new one. If ~~force-creation~~ = ~~FALSE~~, the server returns the ~~object-already-exists~~ Selection-error.
- 19 1— For the ~~Print~~ and ~~ResubmitJob~~ operations, this standard assumes that some finite amount of time is required to completely receive the job.
- 20 1— When a job becomes available and the printer is in the ~~idle~~ state, the printer transitions to the ~~connecting-to-printer~~ state if a connection to the printer is necessary, and to the ~~printing~~ state if a connection to the printer is NOT necessary.
- 21 1— For the ~~ModifyJob~~ and ~~Set~~ operations, if the user modifies the ~~job-abort-criteria~~ or ~~document-abort-criteria~~ attributes when the printer is processing the job (i.e. ~~connecting-to-printer~~, ~~printing~~, ~~job-start-wait~~, ~~job-end-wait~~, ~~job-password-wait~~ printer states) such that the ~~criterion-threshold~~ for the ~~error-count~~, ~~warning-count~~, or

~~processing time~~ becomes less than that which has already accumulated for the current job, the printer shall abort the job and shall transition to the **idle** state. Otherwise, the printer shall remain in the original state.

~~1 For the **ModifyJob** and **Set** operations, if the user modifies the **job-results-handling** or **printer-selection** job attributes, or the **document-production-instructions** or **document-characteristics** document attributes, when the printer is in the **printing** state, and the printer cannot support the new settings, the printer shall transition to either the **needs-attention** state or the **needs-key-operator** state, depending on the required level of human intervention. Otherwise, the printer shall remain in the **printing** state.~~

~~1 For the **ModifyJob** and **Set** operations, if the user modifies the **job-results-handling** or **printer-selection** job attributes, or the **document-production-instructions** or **document-characteristics** document attributes, when the printer is in the **needs-attention** state or the **needs-key-operator** state, and this modification resolves the reason that the printer was in the original state, the printer shall transition to the **printing** state. Otherwise, the printer shall remain in the original state.~~

~~1 There may be some delay in the completion of the **Clean** operation when invoked since its semantics are like those of the **CancelJob** operation, and the **CancelJob** operation is an asynchronous operation.~~

10 **D.2.2 — Logical Printer State Transitions**

11 The following is the State Transition Table for the Logical Printer object. This table assumes that the logical printer states are derived solely from the physical printer states.
12 There are three configurations to consider:

- 13 a) ~~The “one to one” case of one logical printer associated with one physical printer:~~
- 14 a) ~~The “fan in” case of multiple logical printers associated with one physical printer:~~
- 15 a) ~~The “fan out” case of one logical printer associated with multiple physical printers:~~

16 For both the “one to one” case and the “fan in” case above, the state of the logical printer directly reflects the state of the physical printer.

17 However, for the “fan out” case, determining the state of the logical printer is more complicated, and thus, shall be derived from the algorithm below.

18 The algorithm to determine the state of a logical printer is as follows:

19 The state of a logical printer, LP, that is associated with n physical printers, PP1, PP2, ..., PPn, is the first state in the following sequential list that matches the state
20 of any one of the n associated physical printers:

- 21 a) ~~idle~~
- 22 a) ~~printing~~
- 23 a) ~~connecting to printer~~
- 24 a) ~~needs attention~~
- 25 a) ~~needs key operator~~
- 26 a) ~~job end wait~~
- 27 a) ~~job start wait~~
- 28 a) ~~job password wait~~
- 29 a) ~~paused~~
- 30 a) ~~shutdown~~
- 31 a) ~~timed out~~
- 32 a) ~~unknown~~

33 The sequence of states in the above algorithm for determining the logical printer state from the physical printer state is based on the following prioritizing criteria:

- 34 a) ~~Priority is given to the printer state which is least affected by the client or user interactions: For example, without any user involvement, the printer could find~~
35 ~~itself in the **idle, printing, connecting to printer, needs attention** and **needs key operator** states, whereas the following states arise from specific attributes~~
36 ~~set by the client or from explicit client or user operations such as **Pause** or **Shutdown**: **job end wait, job start wait, job password wait, paused** and~~
37 ~~**shutdown** states.~~

58 a) Priority is given to the printer state which allows a client's job to get printed the soonest. For example, a client's job should get printed the soonest if the printer
 59 is in the **idle** state, next soonest if in the **printing** state since the ~~connecting-to-printer~~ could take some time, next soonest in the ~~connecting-to-printer~~ state,
 60 followed by ~~needs-attention~~ and ~~needs-key-operator~~ states. The same criteria was applied to the second five states in the list.

61 a) Priority is given to the printer state which is likely to be the easiest transition to the **printing** state. For example, a client's job is likely to get printed sooner if
 62 the printer is in the **job-start-wait** state versus the **job-password-wait**, since the former may require any operator to change the paper in tray 1 and the latter
 63 may require a specific operator to enter a private password. The same criteria was applied to the ~~shutdown~~, ~~timed-out~~ and ~~unknown~~ states.

64 Below are a few examples of the derivation of the logical printer state for the case of three physical printers (PP1, PP2, PP3) associated with a single logical printer (LP):

- 65 • If PP1, PP2 and PP3 are all in the **printing** state, then LP is in the **printing** state.
- 66 • If PP1 is in the **idle** state, PP2 is in the **printing** state and PP3 is in the ~~needs-attention~~ state, then LP is in the **idle** state.
- 67 • If PP1 and PP2 are in the **printing** state and PP3 is in the ~~needs-attention~~ state, then LP is in the **printing** state.
- 68 • If PP1 is in the **job-start-wait** state, PP2 is in the **paused** state, and PP3 is in the ~~needs-attention~~ state, then LP is in the **job-start-wait** state.
- 69 • If PP1 is in the ~~needs-key-operator~~ state, PP2 is in the **paused** state, and PP3 is in the ~~shutdown~~ state, then LP is in the ~~needs-key-operator~~ state.

60 The following is the State Transition Table for the Logical Printer object:

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
DPA operations													
CancelJob (see Note 9)		inappropriate-object-state Access-error	idle	idle or connecting-to-printer (see Note 3)	unknown-identification Selection-error	paused	idle or job-start-wait (see Note 3)	idle or job-end-wait (see Note 3)	idle or job-password-wait (see Note 3)	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Clean (see Note 9)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	idle	idle	paused	idle	idle	idle	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
Control (power-cycle-reset) (see Note 2)	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError
Control (reset-to-nvram) (see Note 2)	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError
Control (reset-to-factory-defaults) (see Note 2)	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError
Create	idle or unknown (see Note 10)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	printer object does not exist or object-already-exists Selection-error (see Note 4)	inappropriate-object-state Access-error	printer object does not exist or object-already-exists Selection-error (see Note 4)
Delete	unknown-identification Selection-error	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	printer object does not exist	inappropriate-object-state Access-error	printer object does not exist
Disable (see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (disabled)	connecting-to-printer (disabled)	printing (disabled)	paused (disabled)	job-start-wait (disabled)	job-end-wait (disabled)	job-password-wait (disabled)	needs-attention (disabled)	needs-key-operator (disabled)	inappropriate-object-state Access-error	inappropriate-object-state Access-error

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
Enable —(see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (enabled)	connecting-to-printer (enabled)	printing (enabled)	paused (enabled)	job-start-wait (enabled)	job-end-wait (enabled)	job-password-wait (enabled)	needs-attention (enabled)	needs-key-operator (enabled)	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Interrupt Job	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	idle	idle	inappropriate-object-state Access-error	idle	idle	idle	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
ListObject Attributes	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
ModifyJob	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer or idle (see Note 6)	printing or idle (see Note 6) or needs-attention or needs-key-operator (see Note 7)	paused	job-start-wait or idle (see Note 6)	job-end-wait or idle (see Note 6)	job-password-wait or idle (see Note 6)	needs-attention or needs-key-operator or printing (see Note 8)	needs-key-operator or needs-attention or printing (see Note 8)	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Pause —(see Note 2)	unsupported-operation ServiceError or	unsupported-operation ServiceError or	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError or	unsupported-operation ServiceError or	unsupported-operation ServiceError or
PauseJob	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error

DPA Printer States													
	printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown
Print	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (see-Note-5)	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Promote Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Resubmit Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle (see-Note-5)	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Resume (see-Note-2)	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError
Resume Job	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	inappropriate-object-state Access-error	inappropriate-object-state Access-error
Set	unknown-identification Selection-error	inappropriate-object-state Access-error	idle	connecting-to-printer-to-printer or idle (see-Note-6)	printing or idle (see-Note-6) or needs-attention or needs-key-operator (see-Note-7)	paused	job-start-wait or idle (see-Note-6)	job-end-wait or idle (see-Note-6)	job-password-wait or idle (see-Note-6)	needs-attention or needs-key-operator or printing (see-Note-8)	needs-key-operator or needs-attention or printing (see-Note-8)	inappropriate-object-state Access-error	inappropriate-object-state Access-error

DPA Printer States													
printer object does not exist	unknown	idle	connecting-to-printer	printing	paused	job-start-wait	job-end-wait	job-password-wait	needs-attention	needs-key-operator	timed-out	shutdown	
Shutdown (see Note 2)	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError	unsupported-operation ServiceError
Conditions and events													
current job completes	n/a	n/a	n/a	n/a	idle	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
server aborts job	n/a	n/a	idle	idle	idle	paused	idle	idle	idle	needs-attention	needs-key-operator	n/a	n/a
server was unable to get a response from the printer in the time specified by the printers printer-timeout-period attribute	n/a	n/a	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out	timed-out
printer becomes available without operator intervention after having timed-out	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	idle	n/a

NOTES

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D.2.3 — Server State Transitions

The following is the State Transition Table for the Server object.

DPA Server (Generic) States								
	server-object does not exist	unknown	initializing	ready	busy	on-request	unavailable	terminating
DPA operations								
CancelJob —(see Note 8)	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	ready or busy (see Note 3)	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
Clean —(see Note 8)	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	ready	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
Control (power-cycle-reset)	unknown-identification Selection-error	inappropriate-object-state Access-error	initializing	initializing	initializing	initializing	initializing	initializing
Control (reset-to-nvram)	unknown-identification Selection-error	inappropriate-object-state Access-error	initializing	initializing	initializing	initializing	initializing	initializing
Control (reset-to-factory-defaults)	unknown-identification Selection-error	inappropriate-object-state Access-error	initializing	initializing	initializing	initializing	initializing	initializing
Create	initializing	server-object does not exist or object-already-exists Selection-error (see Note 4)	server-object does not exist or object-already-exists Selection-error (see Note 4)	server-object does not exist or object-already-exists Selection-error (see Note 4)	server-object does not exist or object-already-exists Selection-error (see Note 4)	server-object does not exist or object-already-exists Selection-error (see Note 4)	service-unavailable Service-error	server-object does not exist or object-already-exists Selection-error (see Note 4)
Delete	unknown-identification Selection-error	server-object does not exist	server-object does not exist	server-object does not exist	server-object does not exist	server-object does not exist	service-unavailable Service-error	server-object does not exist
Disable —(see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready (disabled)	busy (disabled)	on-request (disabled)	service-unavailable Service-error	inappropriate-object-state Access-error
Enable —(see Note 1)	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready (enabled)	busy (enabled)	on-request (enabled)	service-unavailable Service-error	inappropriate-object-state Access-error
DPA Server (Generic) States								

	server-object does not exist	unknown	initializing	ready	busy	on-request	unavailable	terminating
InterruptJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
ListObjectAttributes	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	busy	on-request	service-unavailable Service-error	terminating
ModifyJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	busy or ready (see Note 5) or on-request (see Note 6)	on-request or busy (see Note 7)	service-unavailable Service-error	inappropriate-object-state Access-error
Pause	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	on-request	on-request	inappropriate-object-state Access-error	service-unavailable Service-error	inappropriate-object-state Access-error
PauseJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	busy	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
Print	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	busy	busy	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
PromoteJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	busy	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
ResubmitJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	busy	busy	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
Resume	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	state from which server entered on-request state (see Note 2)	service-unavailable Service-error	inappropriate-object-state Access-error
ResumeJob	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	busy	on-request	service-unavailable Service-error	inappropriate-object-state Access-error
Set	unknown-identification Selection-error	inappropriate-object-state Access-error	inappropriate-object-state Access-error	ready	busy—or ready (see Note 5) or on-request (see Note 6)	on-request or busy (see Note 7)	service-unavailable Service-error	inappropriate-object-state Access-error
DPA Server (Generic) States								

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	server-object does not exist	unknown	initializing	ready	busy	on-request	unavailable	terminating
Shutdown	unknown-identification Selection-error	inappropriate-object-state Access-error	terminating	terminating	terminating	terminating	service-unavailable Service-error	inappropriate-object-state-Access-error
Conditions and events								
initialization completes	n/a	n/a	ready	n/a	n/a	n/a	n/a	n/a
job—becomes available	n/a	n/a	n/a	busy	busy	on-request	n/a	n/a
job completes	n/a	n/a	n/a	n/a	ready or busy (see Note 3)	n/a	n/a	n/a
server—aborts job	n/a	n/a	n/a	n/a	ready or busy (see Note 3)	n/a	n/a	n/a
server—senses that it needs human attention	n/a	n/a	on-request	on-request	on-request	on-request	n/a	n/a
server becomes available after impl. specific human-intervention at the server	n/a	n/a	n/a	n/a	n/a	state from which server entered on-request state for the following states only: initializing, ready, or busy	n/a	n/a
server becomes available without human-intervention	n/a	n/a	n/a	n/a	n/a	n/a	ready	n/a

NOTES

- 1— The **Disable** and **Enable** operations control the ability of the server to accept new jobs, and does not change the server state. The server proceeds from state to state in a disabled mode just as it does in an enabled mode. When the enabled mode is set, the server accepts new print jobs; when disabled mode is set, the server does not accept new print jobs.
- 1— For **Resume** operation in **on-request** state, if the server entered **on-request** state from the **initializing**, **ready**, or **busy** state, it shall return to that state
- 1— When the client invokes the **CancelJob** operation, when the server aborts a job, or when a job completes, and the server is in the **busy** state, the server transitions to the **ready** state if the current job being processed is the only job on the server, and the server remains in the **busy** state if the current job being processed is NOT the only job on the server.
- 1— For the **Create** operation, if the argument element **force-creation** = **TRUE**, and a server object already exists, the server deletes the existing object and creates a new one. If **force-creation** = **FALSE**, the server returns the **object-already-exists Selection-error**.
- 1— For the **ModifyJob** and **Set** operations, if the user modifies the **job-abort-criteria** or **document-abort-criteria** attributes when the server is in the **busy** state such that the **criterion-threshold** for the **error-count**, **warning-count**, or **processing-time** becomes less than that which has already accumulated for the current job, and if the current job being processed is the only job on the server, the printer shall abort the job, and the server shall transition to the **ready** state. Otherwise, the server shall remain in the **busy** state.
- 1— For the **ModifyJob** and **Set** operations, if the user modifies the **job-results-handling** or **printer-selection** job attributes, or the **document-production-instructions** or **document-characteristics** document attributes, when the server is in the **busy** state, and the server cannot support the new settings, the server shall transition to the **on-request** state. Otherwise, the server shall remain in the **busy** state.
- 1— For the **ModifyJob** and **Set** operations, if the user modifies the **job-results-handling** or **printer-selection** job attributes, or the **document-production-instructions** or **document-characteristics** document attributes, when the server is in the **on-request** state, and this modification resolves the reason that the server was in the **on-request** state, the server shall transition to the **busy** state. Otherwise, the server shall remain in the **on-request** state.
- 1— There may be some delay in the completion of the **Clean** operation when invoked since its semantics are like those of the **CancelJob** operation, and the **CancelJob** operation is an asynchronous operation.

