
**Information technology — Text and office
systems — Document Printing Application
(DPA) —**

**Part 3:
Management abstract service definitions
and procedures**

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*Technologies de l'information — Bureautique — Application impression
de documents (DPA) —*

Partie 3: Définitions et procédures de service abstrait de gestion

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 10175 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 10175-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

ISO/IEC 10175 consists of the following parts, under the general title *Information technology — Test and office systems — Document Printing Application (DPA)*:

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

Annexes A and B form a normative part of this part of ISO/IEC 10175.

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Information technology — Text and office systems — Document Printing Application (DPA) —

Part 3: Management abstract service definitions and procedures

Section 1 - General

1 Scope

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

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

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

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

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

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

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 10175. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 10175 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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- ISO/IEC 7498-1: 1994, *Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model.*
- ISO/IEC 7498-2: 1989, *Information processing systems - Open Systems Interconnection - Basic Reference Model - Part 2: Security Architecture.*
- ISO/IEC 8824: 1990, *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*
- ISO/IEC 8825: 1990, *Information technology - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*
- ISO/IEC 10021-3: 1990, *Information technology - Text Communication - Message-Oriented Text Interchange Systems (MOTIS) - Part 3: Abstract Service Definition Conventions.*
- ISO/IEC 10175-1: 1996, *Information technology - Text and office systems - Document Printing Application (DPA) - Part 1: Abstract service definition and procedures.*
- IEEE 1387.4 / D9, *Draft Standard for Information Technology - POSIX System Administration - Part 4: Printing Interfaces, IEEE, March 1998.*

3 Definitions

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

4 Abbreviations

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

5 Conventions

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

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Section 2 - DP management abstract service definition

6 DP abstract model

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

7 Abstract association information

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

8 Abstract operations

This clause defines the following abstract-operations:

- a) Clean
- b) Control
- c) Create
- d) Delete
- e) Disable
- f) Enable
- g) Pause
- h) ResubmitJob
- i) Resume
- j) Set
- k) Shutdown

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

The table below lists each of the above abstract-operations and all of the abstract-operations of ISO-IEC 10175-1, 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

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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	

NOTES

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

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

3 The **Clean**, **Shutdown** and **Print** operations may operate asynchronously; i.e. these operations need not complete immediately before returning to the client, based on the state of the relevant object. All other DPA abstract-operations operate synchronously.

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8.1 Common datatypes and values used in DP management abstract operations

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8.1.1 Imported datatypes

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

From ISO/IEC 10175-1 Annex B:

- Attribute,
- AttributeId,
- CommonArguments,
- JobAttrModification,
- ModifyOperator
- ObjectIdentification,

- AccessError,
- AttributeError,
- PrinterError,
- SecurityError,
- SelectionError,
- ServiceError,
- UpdateError

From ISO/IEC 10175-1 Annex C:

- DistinguishedNameString.
- JobIdentifier,
- Message

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

8.1.2 Datatypes common for most DPA abstract operations

8.1.2.1 Common-arguments

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

8.1.2.2 Message

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

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

If messages are specified in one locale and retrieved in another, a variety of results may occur depending on the message specification from the client locale and at the server locale. See the table below for different possible results to **message** at the server. See 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	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	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 changes to the NULL string	message at server remains the NULL string

8.2 DP-User Port Abstract Operation Definitions

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

8.3 DP-Administration Port Abstract-Operation Definitions

Clients may use the abstract-operations described in the following subclauses to administer and control the flow of print-jobs through printers, and to administer and control print objects. Specific print server implementations may limit usage of one or more of these abstract-operations to administrators with sufficient access rights, and/or may vary the facilities provided by a given abstract-operation depending upon the access rights assigned to the individual administrators served by the print server.

8.3.1 Clean

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

- a) If the object is enabled, reject the abstract-operation and report an **inappropriate-object-state** AccessError; otherwise,

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- b) If the object is a physical printer, pause the printer to stop the printer from producing output (see **Pause** operation),
- c) Remove all jobs contained in or scheduled for that object,
- d) Restore the state of the object to what it was when the execution of the **Clean** operation began.

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

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

This abstract-operation is formally defined as follows:

```
Clean ::= ABSTRACT-OPERATION
ARGUMENT      CleanArgument
RESULT        CleanResult
ERRORS        { AccessError,
                SecurityError,
                ServiceError }
```

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

8.3.1.1 Clean-argument

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

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

The following argument elements shall be supported by the server:

object-class

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

object-instance

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**.

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

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

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 behavior of the Clean operation on a job that is

		<p>currently printing shall be consistent with the behavior of the Delete operation on currently printing jobs. See 8.3.4 for a description of the Delete operation.</p> <p>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.</p> <p>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 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>

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message

See 8.1.2.

common-arguments

See 8.1.2 in ISO/IEC 10175-1 for a description of the **CommonArguments** type.

8.3.1.2 Clean-result

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

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

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

8.3.1.3 Clean Abstract-errors

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 8.4 of ISO/IEC 10175-1.

8.3.2 Control

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

This abstract-operation is formally defined as follows:

```
Control ::= ABSTRACT-OPERATION
  ARGUMENT      ControlArgument
  RESULT        ControlResult
  ERRORS        { AccessError,
                  SecurityError,
                  ServiceError }
```

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

8.3.2.1 Control-argument

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

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

The following argument elements shall be supported by the server:

object-class

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

object-instance

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**.

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

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

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 behavior of the Control operation depends on the operations argument element, which may be one or more of the following attributes: <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-

		<p>val-reset-to-factory-default is an implementation option.</p> <ul style="list-style-type: none"> • 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.

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message

See 8.1.2.

operations

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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:

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

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

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

common-argumentsSee 8.1.2 in ISO/IEC 10175-1 for a description of the **CommonArguments** type.**8.3.2.2 Control-result**

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

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

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