

1.1 Service Operations

A User makes a Service request by interacting through a local Client (via the MFD console) or through a remote Client via its software application user interface. Each Service provides the same set of service interfaces for the co-located local Client or a Remote Client. The Client can operate via a local interface, a local area network, or the Internet.

The individual Service specifications identify all operations applicable to that Service, some of which may be unique to that Service. The MFD Operations described in this section are common to more than one Service, with the “<service>” component in the operation name identifying the specific Service to which the operation request is addressed. To the extent these operations are implemented by a Service, they MUST conform to the MFD Operation definitions in this section.

All operations consist of a Request issued by a client and a Response returned by the Service. All Requests are sent to the target Service except Startup<service>Service, which is sent to the MFD System. A Service MUST respond to every request addressed to it. Some responses may just indicate that the request was or was not honored, perhaps with explanation messages; others will contain requested or related information, perhaps with additional explanatory “reasons” information.

The MFP operations applicable to two or more Services are listed in **Table** along with references to their antecedent Printer operations. The operations are, for the most part, derived from IPP Print Service operations defined in RFC2911 [ref], REF3390[ref] and RFC3998 [ref] and further discussed in the PWG IPP 2.0 document [ref] and the IPP Job and Printer Extensions-Set 2 document [ref]. The print specific context has been extended to MFD Services. Several print operations have been omitted as inapplicable to MFD Services as a whole, while a few operations have been added.

Table 1 MFD Common Operations and Antecedents

MDF Operation	Antecedent IPP Operation	Antecedent Reference		Access*
Add<service>HardcopyDocument	Send-URI**	[RFC2911]		User
Cancel<service>Document	Cancel-Document	[PWG5100.5]	4.5	User
Cancel<service>Job	Cancel-Job	[RFC2911]	3.3.3	User
Cancel<service>Jobs	Cancel-Jobs	[JPS2]	5.1	Admin
CancelCurrent<service>Job	Cancel-Current-Job	[RFC3998]	4.2	User
CancelMy<service>Jobs	Cancel-My-Jobs	[JPS2]	5.2	User
Close<service>Job	Close-Job	[JPS2]	5.3	User
Create<service>Job	Create-Job Print-Job	[RFC2911]	3.1.4 3.2.1	User
Disable<service>Service	Disable-Printer	[RFC3998]	3.1.1	Admin
Enable<service>Service	Enable-Printer	[RFC3998]	3.1.2	Admin
Get<service>DocumentElements	Get-Document-Attributes	[PWG5100.5]	4.3	User
Get<service>Documents	Get-Documents	[PWG5100.5]	3.3	User
Get<service>JobElements	Get-Job-Attributes	[RFC2911]	3.3.4	User
Get<service>JobHistory	Get-Jobs (which-Jobs element = 'completed')	[RFC2911]	3.2.6	User
Get<service>ServiceElements	Get-Printer-Attributes, Get-Printer-Supported-Values	[RFC2911], [RFC3380]	3.2.5	User
GetActive<service>Jobs	Get-Jobs (which-jobs element = 'not-completed')	[RFC2911]	3.2.6	User
Hold<service>Job	Hold-Job	[RFC2911]	3.3.5	User

MDF Operation	Antecedent IPP Operation	Antecedent Reference		Access*
HoldNew<service>Jobs	Hold-New-Jobs	[RFC3998]	3.3.1	Admin
Pause<service>Service	Pause-Printer	[RFC2911]	3.2.7	Admin
Pause<service>ServiceAfterCurrentJob	Pause-Printer-After-Current-Job	[RFC3998]	3.2.1	Admin
Promote<service>Job	Promote-Job Schedule-Job-After	[RFC3998] [RFC3998]	4.4.1	Admin
Release<service>Job	Release-Job	[RFC2911]	3.3.6	User
ReleaseNew<service>Jobs	Release-Held-New-Jobs	[RFC3998]	3.3.2	Admin
Restart<service>Service	Restart-Printer	[RFC3998]	3.5.1	Admin
Resubmit<service>Job	Resubmit-Job	[JPS2]	5.4	User
Resume<service>Job	Resume-Job	[RFC3998]	4.3.2	User
Resume<service>Service	Resume-Printer	[RFC2911]	3.2.8	Admin
Send<service>Document	Send-Document	[RFC2911]	3.3.1	User
Send<service>URI	Send-URI	[RFC2911]	3.3.2	User
Set<service>DocumentElements	Set-Document-Attributes	[PWG5100.5]	4.4	User
Set<service>JobElements	Set-Job-Attributes	[RFC3380]	4.2	User
Set<service>ServiceElements	Set-Printer-Attributes	[RFC3380]	4.1	Admin
Shutdown<service>Service	Shutdown-Printer	[RFC3998]	3.5.2	Admin
Startup<service>Service	Startup-Printer	[RFC3998]	3.5.3	Admin
SuspendCurrent<service>Job	Suspend-Current-Job	[RFC3998]	4.3.1	User

Notes:

* For operations where a User may set job elements or otherwise directly affect the state or parameters of a Job, the User must be either the Job owner of record or must be an Administrator or Operator. For operations where a User has access to Job or Service information (Get<service>JobElement, Get<service>JobHistory and Get<service>Jobs), site policy determines what information is made available to Users who are not Administrators or Operators and who do not own the jobs about which the information is provided.

** Although the Add<service>HardcopyDocument operation is a “new” operation created to address the input to Services accepting Hardcopy versus Digital Documents, the purpose and form of the operation is parallel to the IPP Send-URL operation

The MFD operation definitions in this section are generic. Depending on the encoding used by the binding, the actual identification of the operation may be different. For example, IPP uses a numeric code. Further, depending on the addressing inherent in the transport, the operation requests might include an implicit rather than explicit identification of the Service. For example, IPP operations coming on the TCP port 631 are inherently Print Service operations.

The MFD Operation definitions are divided between basic or User (Job-oriented) operations and administrative operations. The basic MFD operations are listed in Table 49. These operations are concerned primarily with creating, monitoring, modifying and canceling Jobs and Job-related elements. Basic operations are available to Users including Administrators and Operators, although any operation affecting a Job or Document is restricted to the Job Owner or to an Administrator or Operator. Identification and authentication of the User as Job Owner depends upon the Service and binding, as well as the specific implementation. For example, the Copy Service may consider whoever is present at the machine to be the Job Owner.

Site Policy may cause a Service to restrict information provided to a User who is not an Administrator or Operator. Administrative Operations, accessible only to Administrators (and Operators), are concerned primarily with managing the Service and are listed in Table 52. Note that for some Services where the User is present at the device (such as Copy), certain operations may consider any User that is present at the implementing device as having Administrator access.

Table 2 – Basic MFD Interface Requests and Responses

Operation	Request Parameters (Notes 2)	Response Parameters (Notes 3)	Note
Add<service>HardcopyDocument	InputSource, JobId, DocumentTicket(optional), ElementsNaturalLanguage(optional), LastDocument(optional), RequestingUserName	DocumentNumber, UnsupportedAttributes(optional)	
Cancel<service>Document	DocumentNumber, ElementsNaturalLanguage(optional), JobId, Message (optional) , RequestingUserName		
Cancel<service>Job	ElementsNaturalLanguage(optional), JobId, Message (optional) , RequestingUserName		
CancelCurrent<service>Job	ElementsNaturalLanguage(optional), JobId(optional), Message (optional) , RequestingUserName		
CancelMy<service>Jobs	JobIds (optional) Message (optional) , RequestingUserName	JobIds (optional)	1
Close<service>Job	JobId, RequestingUserName		
Create<service>Job	ElementsNaturalLanguage(optional), JobTicket (optional) , RequestingUserName	JobId, Unsupported Elements(optional)	
GetActive<service>Jobs	ElementsNaturalLanguageRequested(optional), Limit(optional) , RequestingUserName	ElementsNaturalLanguage(optional), JobSummaries (includes JobID, JobName, JobOriginatingUserName, JobState and perhaps JobStateReasons)(optional)	
Get<service>DocumentElements	Document Number, ElementsNaturalLanguageRequested(optional), JobId, RequestedElements(optional), RequestingUserName	DocumentElements(optional), ElementsNaturalLanguage(optional)	
Get<service>Documents	ElementsNaturalLanguageRequested(optional), JobId, RequestedElements(optional), RequestingUserName	Documents(list of DocumentSummaries)(optional), ElementsNaturalLanguage(optional), JobID, JobName	
Get<service>JobElements	ElementsNaturalLanguageRequested(optional), JobId, RequestedElements (JobReceipt, JobStatus, or JobTicket.)(optional) , RequestingUserName	JobElements, ElementsNaturalLanguage(optional)	
Get<service>JobHistory	ElementsNaturalLanguageRequested(optional), Limit(optional) , RequestingUserName	ElementsNaturalLanguage(optional), JobSummaries (includes JobID, JobName, JobOriginatingUserName, JobState and perhaps JobStateReasons)	
Get<service>ServiceElements	ElementsNaturalLanguageRequested(optional), RequestedElements (ServiceCapabilities, ServiceConfiguration, ServiceDescription, ServiceStatus or DefaultJobTicket.)(optional) , RequestingUserName	ElementsNaturalLanguage(optional), ServiceElements(optional)	
Hold<service>Job	ElementsNaturalLanguageRequested(optional), JobHoldUntil or JobHoldUntilTime, JobId, Message(optional), RequestingUserName		
Release<service>Job	ElementsNaturalLanguageRequested(optional), JobId, Message(optional), RequestingUserName		
Resubmit<service>Job	ElementsNaturalLanguageRequested(optional), JobId, JobTicket (optional) , RequestingUserName	JobId, Unsupported Elements(optional)	
Resume<service>Job	ElementsNaturalLanguageRequested(optional), JobId, Message(optional)RequestingUserName		
Send<service>Document	ElementsNaturalLanguageRequested(optional), DocumentTicket (optional) , JobId, LastDocument(optional), RequestingUserName, DocumentData	DocumentNumber, Unsupported Elements(optional)	

Operation	Request Parameters (Notes 2)	Response Parameters (Notes 3)	Note
Send<service>Uri	DocumentUri, ElementsNaturalLanguageRequested(optional), DocumentTicket (optional) , JobId, LastDocument(optional), RequestingUserName	DocumentNumber, Unsupported Elements(optional)	
Set<service>DocumentElements	DocumentNumber, ElementsNaturalLanguage(optional), DocumentTicket, JobId, Message(optional), RequestingUserName	Unsupported Elements(optional)	
Set<service>JobElements	ElementsNaturalLanguage(optional), JobTicket, JobId, Message(optional), RequestingUserName	Unsupported Elements(optional)	
SuspendCurrent<service>Job	ElementsNaturalLanguage(optional), JobId(optional), Message(optional), RequestingUserName		
Validate<service>DocumentTicket	ElementsNaturalLanguageRequested(optional), DocumentTicket , RequestingUserName	Unsupported Elements(optional)	
Validate <service>JobTicket	ElementsNaturalLanguage(optional), JobTicket, RequestingUserName	Unsupported Elements(optional)	

Notes:

Note 1: Response includes identified but un-cancellable Jobs

Note 2: The RequestingUserName, is used by the Service to determine whether the requestor is an Administrator, Operator or the Job Owner and is therefore authorized to make the request. Some implementations may require further authentication of the requestor's identity. If the requestor is not determined to have access, the Service MUST reject the request.

Note 3: All responses must include correlation to request and whether request was successful or failed.

1.1.1 Basic Service Operations

The common Basic operations are listed in Table 49; they are concerned with creating and controlling Jobs and Documents within Jobs. The Operations include those by which a client gets Service elements to allow selection of Services and formulation of Job Tickets. Some of these operations do affect the state of a Job. ese operations directly affects the state or configuration of the Service except to the extent that creating or canceling a Job may initiate a sequence that affects the Service.

Any Job-oriented basic operation MUST be rejected by a Service if the operation requestor is not the Job owner or an Administrator or Operator; that is,

1.1.1.1 Add<service>HardcopyDocument

The Add<service>HardcopyDocument operation allows a client to prepare a Service to accept a Hardcopy Document via a scanner subunit and to add it to an identified Job. It is analogous to the Send<service>Document and Send<service>Uri operations except that it is applicable to Services for which input Documents are obtained by a scan of a region of a media sheet side, such as FaxOut and EmailOut.

The Service MUST reject this request and send an appropriate message if:

1. The requestor is not the owner of the identified Job, or is not an Administrator or Operator;
2. The Service has already closed inputs to the identified Job, or the Job is not found.

Otherwise, provided the request is properly constructed, complete and references valid objects, the Service MUST accept the request, MUST close the Job if the LastDocument element is asserted, MUST be prepared to add DocumentData from the identified input to the identified Job, and MUST respond to the request.

1.1.1.2 Cancel<service>Document

The Cancel<service>Document operation allows a client to cancel a specified Document in a specified Job of the specified Service any time from when the time the Document is created up to, but not including, the time that the Document is Completed, Canceled, or Aborted. Because a Document might already be in Processing by the time a Cancel<service>Document request is received, some portion of the Document processing might be completed before the it is actually terminated.

The Cancel<service>Document operation does not remove the Document from the Job or the Service, but does set the specified Document's DocumentState DocumentStatus element to Canceled and the Document's DocumentStateReasons element to an appropriate value. If the Job containing the Document is again submitted using Resubmit<service>Job, the canceled Document is also submitted for processing. Thus Cancel<service>Document has the same semantics as Cancel<service>Job which cancels only the processing of the Job but does not delete the Job object itself.

The Cancel<service>Document operation does not affect the states of any of the other Documents in the Job. If the Job is in the Processing state and there are more Documents to be processed, the Service does continue to process the un-canceled Documents. If there are no further Documents to process, the Job is advanced to the Completed state.

The Service MUST reject the operation and return an appropriate response message if the operation requestor is not either the Job owner or a Service or System operator or administrator. Otherwise, the Service MUST accept or reject the Cancel<service>Document request based on the document's current state and, if the request is accepted, the Service MUST transition the Document to the indicated new state as follows:

Table 3 - DocumentState Change by Cancel<service>Document

Initial DocumentState	New DocumentState	Service response
Pending	Canceled	success
Processing	Canceled	success
Processing	Processing (if there is a significant delay in transitioning to Canceled. Also, the DocumentState value must be set to indicate that the Document is transitioning to Canceled).	success
Processing, but with DocumentState value indicating Document is transitioning to Canceled .	(Operation has no effect on DocumentState , which may be Processing or Canceled depending on progress of previously initiated transition)	client error
Completed	Completed	client error
Canceled	Canceled	client error
Aborted	Aborted	client error

Once a "success" response has been sent, the implementation guarantees that the Document will eventually end up in the Canceled state. Between the time that the Cancel<service>Document request is accepted and when the Document enters the Canceled Document-state, the DocumentStateReasons element MUST contain a value which indicates to any later query that, although the Document might still be Processing, it will eventually end up in the Canceled state.

1.1.1.3 Cancel<service>Job

The Cancel<service>Job operation changes the state of the identified Job to Canceled, provided that the Job is not already in or in a mode leading directly to a termination state. (i.e., Completed, Canceled, or Aborted.) See Table 51. Because a Job might already be active by the time a Cancel<service>Job is received, a portion of the Job may be done before the Job is actually terminated.

The Service MUST accept or reject the request based on the Job's current state. If the request is accepted, the Job state is transitioned to Canceled and the Service will issue a success response. See transition diagram under Job State. If the implementation requires some significant time to cancel a Job in the Processing or ProcessingStopped states, the Service MUST set the Job's JobStateReasons to a value indicating that the Job is transitioning to a Canceled state. If the Job already has a JobStateReasons indicating that it is transitioning to a Canceled state, then the Service MUST reject a Cancel<service>Job operation

Table 4 –Legal Transitions Effected by Cancel<service>Job Operation

Current JobState	Condition	New JobState	Request Response	Note
Pending	-	Canceled	Success	
PendingHeld	-	Canceled	Success	
Processing		Canceled	Success	
	Implementation takes time to effect cancel.	Processing	Success	JobStateReasons will be set to ProcessingToStopPoint value
	JobStateReasons is set to ProcessingToStopPoint	Processing	Failure	Job already progressing to canceled state
Processing Stopped		Canceled	Success	
	Implementation takes time to effect cancel.	Processing Stopped	Success	JobStateReasons will be set to ProcessingToStopPoint value
	JobStateReasons is set to ProcessingToStopPoint	Processing Stopped	Failure	Job already progressing to canceled state
Completed		Completed	Failure	Job already terminated
Canceled		Canceled	Failure	Job already terminated
Aborted		Aborted	Failure	Job already terminated

1.1.1.4 CancelCurrent<service>Job

The CancelCurrent<service>Job operation allows a client to cause the Service to terminate processing on the currently processing Job and to move that Job to the Canceled state. As with any other Basic operation directly affecting a Job, this operation is accepted by the Service only if the originator is the Owner of the affected Job(s) or is an Administrator or Operator.

There is the potential that the current Job may have changed between the time a client requests this operation and the time the Service implements it. Therefore, if the intent is to cancel a particular Job the Client MAY include an optional JobId parameter in the request.

1. If the JobId is included in the request and that Job is currently in the Processing or ProcessingStopped state and the operation requestor has access rights to that Job, the Service MUST accept the request and cancel the Job.
2. If no JobId is included in the request and the operation requestor has access rights to the Job currently in the Processing or ProcessingStopped state, the Service MUST accept the request and cancel that Job.

3. If more than one Job is in the Processing or ProcessingStopped state, all currently processing Jobs to which the request originator has access MUST be canceled unless the operation included the optional JobId, in which case only the identified Job is canceled.
4. If the JobId is included in the request and that Job is not currently in the Processing or ProcessingStopped state; or if the requestor does not have access rights to the identified Job, the Service MUST reject the request and return the appropriate error code.
5. If there is no Job currently in the Processing or ProcessingStopped state or if the requestor does not have access rights to any Job that is in the Processing or ProcessingStopped state, the Service MUST reject the request and return the appropriate error code.

1.1.1.5 CancelMy<service>Jobs

The CancelMy<service>Jobs operation permits a user to cancel all of their own identified non-Terminated Jobs or, if no specific Jobs are identified in the request, to cancel all of their own non-Terminated Jobs in the Service. This operation works like the Cancel-Job operation except that the operation can apply to multiple Jobs. The client specifies the set of candidate Jobs to be canceled by supplying and/or omitting the JobIds. The Service MUST check the access rights of the requesting user against *all* of the candidate Jobs. If *any* of the candidate Jobs are not owned by the requesting user, the Service MUST NOT cancel any Jobs and MUST return the appropriate error status code along with the list of any JobIds that were specifically identified in the operation request but to which the User is not authorized access.

If this check succeeds, then (and only then) the Service MUST accept or reject the request based on the current state of each of the candidate Jobs and must transition each Job to the indicated new state as shown in Table 51. If any of the candidate Jobs that were not already in a Terminating state cannot be canceled, the Service MUST NOT cancel any Jobs and MUST return the appropriate error status code along with the list of JobIds for those Jobs which were specifically identified in the operation request but could not be canceled. If the requested Jobs include some Jobs that are already in a terminating state, this circumstance in itself MUST NOT interfere with the canceling of non-terminated candidate Jobs, but SHOULD result in the return of a warning message identifying the specifically identified Jobs that already were in a Terminating state.

1.1.1.6 Close<service>Job Operation

The Close-Job operation allows a client to close Job inputs to those Services accepting Documents, even when the last Document input operation for the Job (Send<service>Document, Send<service>URI or Add<service>Document) did not include the LastDocument element with a 'true' value. This Close<service>Job operation supersedes and, if supported by the Service, is preferable to the practice of using a Send<service>Document with no document data but with a LastDocument element containing a 'true' value to close inputs.

The Service MUST reject this operation request if the target Job is not found or if the requestor is not the Job Owner or an Administrator. Otherwise, the Service MUST accept this operation request even if the target Job is already closed and regardless of JobState. Closing the Job MUST cause the Service to reject any subsequent Document input operation for the target Job, but MUST NOT affect the execution of any previously accepted Document input operation.

1.1.1.7 Create<service>Job

The Create<service>Job operation allows a Client to request creation of a Job in the Service. Upon creation, the Job is in Pending state and available for scheduling unless a Job Processing instruction prevents this. (e.g. JobHoldUntil puts it in PendingHeld state) The Create<service>Job operation MUST fail if the Service's IsAcceptingJobs element value is 'false'.

Job Processing is done on one or more Documents. Unlike the antecedent IPP Print-Job operation, the MFD Create<service>Job may involve more than one Document. Depending upon the type of Service,

the input may be a HardcopyDocument or a DigitalDocument. In either case, the source(s) of the input document(s) as well as the destination(s) of the output document(s) are identified in the JobTicket submitted in the Create<service>Job Request,

Once a Job is created, Documents may be input as part of that Job by Send<service>Document, Send<service>URI or, for Services that accept hardcopy input, Add<Service>Document operations. In Service implementations that do not accept multiple documents (i.e., MultipleDocumentJobsSupported = False), document input is closed after one Document is accepted. In Service implementations that do accept multiple documents (i.e., MultipleDocumentJobsSupported = True), there may be multiple Send<service>Document, Send<service>URI or Add<Service>Document operations. There are two methods of indicating when all Documents have been input:

1. issuing a Close<service>Document request
2. issuing a Send<service>Document, Send<service>URI or Add<Service>Document request with the LastDocument element = True

To avoid a possible hang condition, Service implementations supporting multiple Document Jobs must also support the MultipleOperationTimeout element that indicates the minimum number of seconds the Service will wait for the next Send or Add operation before taking some recovery action. If, for some reason, there is a longer period between Create<service>Job and valid Send or Add operations, or between sequential Send or Add operations, the Client MUST send Send or Add requests, even if they are empty, to reset the timeout. If there is a multiple operation timeout, the Service will take remedial action according to the value that Service has indicated in its MultipleOperationTimeoutAction element.

1.1.1.8 Get<Service>DocumentElements

The Get<Service>DocumentElements operation allows a Client to obtain detailed information about the specified Document within the specified Job. This operation is parallel to the Get<service>Job-Elements operation, but with the target and response elements relating to a Document rather than a Job.

The Client requests specific groups of elements (complex elements) contained within the Document. The Document Data is not part of the Document and cannot be retrieved using this operation. However the location of the Document Data is available. The allowed values for RequestedElements are DocumentReceipt, DocumentStatus and DocumentTicket. Vendors may extend the allowed values.

The Service MUST return the DocumentDescription element values that a client supplied in the Document Creation operation (Create<service>Job, Send<service>Document or Send<service>URI) or provided in Set<service>DocumentElements operation a plus any additional Document Description elements that the Service has generated, such as DocumentState. The Service MUST NOT return any Job level elements that the Document inherits from the Job level but MUST return Document elements specified at the Document level. It is NOT REQUIRED that a specific Document include all elements belonging to a group (since some elements are optional). However, it is REQUIRED that the Service support all these group names for the Document object.

1.1.1.9 Get<service>Documents

The Get<service>Documents operation allows a client to retrieve the list of Documents belonging to the identified Job. A Document summary containing a group of Document element names with their values will be returned for each Document in the Job.

This operation is similar to the Get<service>JobHistory and Get<service>ActiveJob operations except that it returns elements from Documents rather than identified Jobs. As with the Get<service>DocumentElements operation, the Service MUST return only those elements that are in the DocumentTicket.

1.1.1.10 Get<service>JobElements

The Get<Service>JobElements operation allows a Client to obtain detailed information on the specified Job. Unlike the antecedent IPP Get-Job-Attributes operation, the Get<Service>JobElements request may not specify individual elements. Rather, the Client requests specific groups of elements contained within the Job. The allowed values for RequestedElements are JobReceipt, JobStatus, or JobTicket. Vendors may extend the allowed values.

The Service MUST reject this request if the requestor is not authorized access to the identified Job,

1.1.1.11 Get<service>JobHistory

The Get<service>JobHistory operation provides summary information on all Jobs that have reached a terminating state (i.e. Completed, Canceled, Aborted). As such, it is similar to the antecedent Get-Jobs operation with the which-jobs element set to 'completed'. Unlike Get-Jobs, Get<service>JobHistory may not include a RequestedElements argument; rather, it always returns a JobSummary for each terminated Job including JobId, JobName, JobOriginatingUserName, JobState and perhaps JobStateReasons and other service specific information.

When the operation is exercised by a User that is not an Administrator, the Job summary may not include all of the summary information, depending upon site security policy.

1.1.1.12 Get<service>ServiceElements

The Get<service>ServiceElements operation allows a Client to obtain detailed information on the elements and their values supported by the Service. Unlike the antecedent IPP Get-Printer-Attributes operation, the Get<Service>ServiceElements request may not specify individual elements. Rather, the Client requests information on one or more specific group of elements. The allowed values for RequestedElements are ServiceCapabilities, ServiceConfiguration, ServiceDescription, ServiceStatus or DefaultJobTicket. Vendors may extend the allowed values.

Some Services may accept an additional argument in a Get<service>ServiceElements request to further filter the response, much as the antecedent IPP Get-Printer-Attributes operation accepted the Document-Format element. The individual Service documents identify such arguments if any, their effect and whether support is mandatory.

In addition to the status message, the Service response includes the set of requested element names and their values for all supported elements. The response NEED NOT contain the requested element names for any elements not supported by the Service.

1.1.1.13 GetActive<service>Jobs

The GetActive<service>Jobs operation provides summary information on all Jobs in the Pending or Processing state. As such, it is equivalent to the antecedent Get-Jobs operation with the which-jobs element set to 'not-completed'. Unlike the antecedent Get-Jobs operation, GetActive<service>Jobs may not include a RequestedElements argument; rather, it always returns a JobSummary for each Active Job with the summary including JobId, JobName, JobOriginatingUserName, JobState and perhaps JobStateReasons and other service specific information.

1.1.1.14 When the operation is exercised by a User that is not an Administrator or Operator, the Job summary may not include all of the summary information, depending upon site security policy.Hold<service>Job

The Hold<service>Job operation allows a client acting for the Job Owner or an Administrator or Operator to hold a Pending Job in the queue so that it is not eligible for scheduling. The Job transitions as a result

of a Hold<service>Job operation depend upon the current Job state, as indicated in Table 53. The Hold<service>Job request can specify hold until a specific date-time (JobHoldUntilTime) or according to a keyword (JobHoldUntil), where the keyword can specify a period (such as “third-shift”) or be indefinite. A given Hold<service>Job request can specify only one hold condition. In the case of multiple Hold<service>Job requests, the last accepted request overrides the condition imposed by any previous Hold<service>Request.

The restraint imposed by a Hold<service>Job is removed by a Release<service>Job operation directed to the same Job. If a Service implementation supports Hold<service>Job, it must also support Release<service>Job and vice-versa.

Table 5 - Transitions Resulting from HoldJob Operation

Current JobState	New JobState	Status	Note
Pending	PendingHeld	Success	See Note 1
Pending	Pending	Success	See Note 2
PendingHeld	PendingHeld	Success	See Note 1
PendingHeld	Pending	Success	See Note 2
Processing	Processing	Failure	
ProcessingStopped	ProcessingStopped	Failure	
Completed	Completed	Failure	
Canceled	Canceled	Failure	
Aborted	Aborted	Failure	

Note 1: If the implementation supports multiple reasons for a Job to be in the PendingHeld state, the Server MUST add the JobHoldUntilSpecified value to the Job's JobStateReasons element.

Note 2: If the Service supports the JobHoldUntil and/or the JobHoldUntilTime elements, but the specified time period has already started (or is the NoHold value) and there are no other reasons to hold the Job, the Service MUST make the Job be a candidate for processing immediately by putting the Job in the Pending state.

If the HoldJob operation is supported, then the ReleaseJob operation MUST be supported, and vice-versa. The OPTIONAL JobHoldUntil or JobHoldUntilTime parameter allows a client to specify whether to hold the Job until a specified time, indefinitely or until a specified time period. The Service MUST accept or reject the request based on the Job's current state and transition the Job to the indicated new state as follows. A HoldJob request is rejected when the identified Job is in the Processing or ProcessingStopped states.

1.1.1.15 Release<service>Job

The Release<service>Job operation allows a client acting for the Job Owner or an Administrator or Operator to release a previously held Job from the PendingHeld state so that it is eligible for scheduling, provided that there is no other reason to keep the Job in the PendingHeld state. That is, the restraint imposed by a Hold<service>Job operation is removed by a Release<service>Job operation directed to the same Job. If a Service implementation supports Hold<service>Job, it must also support Release<service>Job and vice-versa.

The Job Transitions as a result of a Hold<service>Job operation depend upon the current Job state, as indicated in **Table 53**.

Table 6 - Job State Transitions Resulting from ReleaseJob Operation

Current Job State	New Job State	Status	Comment
Pending	Pending	success	
Pending-Held	Pending-Held	success	See note below
Pending-Held	Pending	success	

Processing	Processing	success	
Processing- Stopped	Processing- Stopped	success	
Completed	Completed	Failure	
Canceled	Canceled	Failure	
Aborted	Aborted	Failure	

Note: If there are other reasons to keep the Job in the PendingHeld state, such as resources not available, the Job remains in the PendingHeld state. Thus the PendingHeld state is not just for Jobs that have the Job Hold applied to them, but are for any reason that keeps the Job from being a candidate for scheduling and processing.

1.1.1.16 Resubmit<service>Job

The Resubmit<service>Job operation allows a client acting for the Job Owner or an Administrator or Operator to resubmit a previously completed Job, but with the option of providing new JobTicket information (other than input DocumentData or input DocumentData descriptive information.)

The Resubmit<service>Job operation is applicable only to a Retained Job. A retained Job is one which remains in the Service after it has been completed or canceled. This may be incidentally or because it is a saved Job, which is a Completed or Canceled Job with a JobSaveDisposition element value that indicates that the Job, including DocumentData if any, should not be deleted or aged-out after the Job is completed. (Add Retained Document definition to terminology)

If a Resubmit<service>Job operation is accepted, the state of the retained Job is not changed; rather, a new Job is created from the identified retained Job and submitted with an implicit CreateJob request.

1. If the Resubmit<service>Job request contains a processing element that was in the retained Job but with a different value, the value supplied in the Resubmit<service>Job operation MUST override the original value (if supported by the Service).
2. If the Resubmit<service>Job request contains a processing element that was not in the retained Job, the element with the value supplied with the Resubmit<service>Job operation MUST be applied (if supported by the Service)
3. For any processing element in the original retained Job the value of which is not changed in the Resubmit<service>Job request, that element and its value MUST be applied to newly created Job except that a JobSaveDisposition element value indicating that the Job should be saved, and certain other Service-specific element values, MUST NOT be copied but are applied to the new Job only if they are in the Resubmit<service>Job request.

The newly created Job is moved to the Pending or PendingHeld Job state with the same element values as the original saved Job (except for the save element). If any of the documents in the saved Job were passed by reference (Send<service>URI or Send>service>URI), the Service MUST re-fetch the data, since the semantics of Restart<service>Job are to repeat all Job processing. The Service MUST assign new JobUri and JobId values to the newly created Job; the JobDescription elements that accumulate Job progress, such as JobImpressionsCompleted, JobMediaSheetsCompleted, and JobKOctetsProcessed, MUST be an accurate record for the newly created Job.

The Service MUST accept or reject the Resubmit<service>Job Request based on the authority of the requester and the referenced Job's current state. The Requester must either be the Job owner or an operator or administrator of the Service. The target Job must be retained with a Completed or Canceled state.

1.1.1.17 Resume<service>Job

The Resume<service>Job operation allows a client acting for the Job Owner or an Administrator or Operator to resume the identified Job at the point where it was suspended. Provided that no other condition exists that forces the Job to the PendingStopped state, the Service moves the Job from the ProcessingStopped state to the Pending state and removes the JobSuspended value from the Job's StateReasons element. If the identified Job is not in the ProcessingStopped state with the JobSuspended

value in the Job's StateReasons element, the Service MUST reject the request and return an appropriate status code, since the Job was not suspended.

If a Service supports Suspend<service>Job or SuspendCurrent<service>Job operations, it MUST support the Resume<service>Job operation, and vice-versa.

1.1.1.18 Send<service>Document

The Send<service>Document operation allows a client acting for the Job Owner or an Administrator or Operator to input a DigitalDocument to a Service as part of an already created Job. In response to the Create<service>Job, the Service will have returned the JobURI and the JobId. For each Document that the client desires to add to this Job, the client issues a Send<service>Document request which includes the JobId and contains the entire stream of document data for one Document.

If the Service supports this operation but does not support multiple documents per Job, Document input is closed after the first document is accepted and the Service MUST reject subsequent Send<service>Document requests associated with the same Job. Similarly, if the Service does support multiple documents per Job, the Service MUST reject Send<service>Document requests associated with a given Job after inputs to that Job have been closed either a Close<service>Job operation or a previous Send<service>Document with a 'true' value for the LastDocument element. Note that the Client may send and the Service must accept a Send<service>Document request with a 'true' value for the LastDocument element to close input to that Job, even if that request includes no Document data.

See the Create<system>Job description for discussion of issues relating to excessive delay between multiple Send<service>Document requests.

The Service MUST reject a Send<service>Document request and send an appropriate message if:

1. The requestor is not the owner of the identified Job, or is not an Administrator or operator
2. The Service has already closed inputs to the identified Job,
3. The Service does not support the specified URI Scheme, or
4. The Job is not found.

Otherwise, the Service MUST accept the request, MUST close the Job if the LastDocument element is asserted, MUST add the supplied DocumentData (if any) to the identified Job, and MUST respond to the request

1.1.1.19 Send<service>Uri

The Send<service>URI operation allows a client acting for the Job Owner or an Administrator or Operator to input a DigitalDocument to a Service as part of an already created Job. As such, the Send<service>URI operation is identical to the Send<service>Document except that a client supplies a URI reference (DocumentUri element) rather than the DocumentData itself. If a Service supports both operations, clients can use both Send<service>URI and Send<service>Document operations to add new Documents to an existing multi-Document Job.

As with Send<service>Document, if the Service supports Send<service>URI but does not support multiple documents per Job, the Service MUST reject subsequent Send<service>URI requests associated with the same Job. Similarly, if the Service does support multiple documents per Job, the Service MUST reject Send<service>URI requests associated with a given Job after inputs to that Job have been closed. Job inputs can be closed either by a Close<service>Job operation or a Send<service>Document (NOT a Send<service>URI) request with a 'true' value for the LastDocument element. Note that the Client may send and the Service must accept a Send<service>Document request with a 'true' value for the LastDocument element to close input to that Job even if that request includes no Document data.

The Service MUST reject this request and send an appropriate message if:

1. The requestor is not the owner of the identified Job, or is not an Administrator or operator
2. The Service has already closed inputs to the identified Job,
3. The Job is not found or.
4. The Service does not support the URI Scheme specified.

Otherwise, the Service MUST accept the request, MUST close the Job if the LastDocument element is asserted, MUST add the DocumentData (if any) to the identified Job, and MUST respond to the request

See the Create<system>Job description for discussion of issues relating to excessive delay between multiple Send<service>URI requests.

1.1.1.20 Set<service>DocumentElements

The Set<service>DocumentElements operation allows a Client, operating for the Job Owner or an Administrator, to set the values of identified elements of the specified Document within the specified Job. This operation is parallel to the Set<service>JobElements and Set<service>ServiceElements operations and it follows the same rules for validation, but with the target and response elements relating to a Document rather than a Job or the Service.

The Client must fully identify the elements to be set as well as the set values. The only settable elements are those within the DocumentTicket. The Document Data is not part of the Document and cannot be changed using this operation. If a Document was originally submitted without a given settable element that the Set<service>DocumentElements request attempts to set, the Service adds the specified element to the Document.

If the client identifies a Document element but does not specify a value for that element, then the Service MUST remove the element and all of its values from the Document. The semantic effect of the client supplying the element with no value in a Set<service>DocumentElements operation MUST be the same as if the element had not originally been supplied with the Document. This corresponds to the action of the out-of-band value "DeleteElement" in the antecedent IPP Set-Document-Attributes operation. Any subsequent Get<service>DocumentElements or Get<service>Documents request MUST NOT return any element that has been deleted. However, a client can re-establish such a deleted Document element with any supported value(s) using a subsequent Set<service>DocumentElements operation.

If the client supplies an element in a Set<service>DocumentElements request with no value and that element is not present in the Document object, the Service ignores that supplied element in the request, does not return the element in the Unsupported Elements group, and returns the 'success' status code, provided that there are no other problems with the request.

The validation of the Set<service>DocumentElements request is performed by the Service as if the Document had been submitted originally with the new element values (and the deleted elements removed); i.e., all modified Document elements and values must be supported in combination with the Document elements not modified. If such a Document Creation operation would have been accepted, then the Set<service>DocumentElements MUST be accepted. If such a Document Creation operation would have been rejected, then the Set<service>DocumentElements MUST be rejected and the Document MUST be unchanged. In addition, if any of the supplied elements are not supported, are not settable, or the values are not supported, the Service MUST reject the entire operation; the Service MUST NOT partially set some of the supplied elements. In other words, after the operation, all the supplied elements MUST be set or none of them MUST be set, thus making the Set<service>DocumentElements an atomic operation.

The value of JobMandatoryElements supplied in the original Create<service>Job request, if any, MUST have no effect on the behavior of the Set<service>DocumentElements operation. Rather, the Service must consider that any element or element value in a Set<service>DocumentElements operation is

mandatory. The Service MUST reject any request to set a Document element to an unsupported value or to a value that would conflict with another Document element value.

The Service MUST accept or reject the Set<service>DocumentElements operation when the Document's DocumentState element has the values shown in Table 6. Although the Document's current state affects whether the Service accepts or rejects the Set<service>DocumentElements request, the operation MUST NOT change the state of the Document object (since the Document is a passive object and the Document state is a subset of the JobState). For example, if the operation creates a request for unavailable resources, the Job (but not the Document) transitions to a new state.

Table 7 - Actions on Set<service>DocumentElements Depending on Document State

Current DocumentState	Service Action	Service Response
Pending	Element and/or Element values are changed	Success
Pending, <u>but resources needed for changed elements are not ready</u>	Element and/or Element values are changed. The Job MAY change state, but the Document MUST NOT change state	Success
Processing	Element and/or element values may or may not be changed depending on implementation, the elements being set and at what point Document is in Processing	Success or ClientError, depending upon whether changes are implemented
Completed	Element and/or Element values are not changed	ClientError
Canceled		
Aborted		

1.1.1.21 Set<service>JobElements

The Set<Service>JobElements operation allows a Client operating for the Job Owner or an Administrator, to set the values of identified elements of the specified Job. The Client must fully identify the elements to be set as well as the set values. In the response, the Service returns success or rejects the entire request with indications of which element or elements could not be set to the specified values.

This operation is parallel to the Set<service>DocumentElements and Set<service>ServiceElements operations and it follows the same rules for validation, but with the target and response elements relating to a Job rather than a Document or the Service

If the client identifies a Job element but does not specify a value for that element, then the Service MUST remove the element and all of its values from the Job. The semantic effect of the client supplying the element with no value in a Set<service>JobElements operation MUST be the same as if the element had not originally been supplied with the Job. This corresponds to the action of the out-of-band value "DeleteElement" in the antecedent IPP Set-Job-Attributes operation. Any subsequent Get<service>JobElements or Get<service>Jobs request MUST NOT return any element that has been deleted. However, a client can re-establish such a deleted Job element with any supported value(s) using a subsequent Set<service>JobElements operation.

If the client supplies an element in a Set<service>JobElements request with the DeleteElement value and that element is not present on the Job object, the Service ignores that supplied element in the request, does not return the element in the Unsupported Elements group, and returns the 'success' status code, provided that there are no other problems with the request.

The validation of the Set<service>JobElements request is performed by the Service as if the Job had been submitted originally with the new element values (and the deleted elements removed); i.e., all modified Job elements and values must be supported in combination with the Job elements not modified. If such a Job Creation operation would have been accepted, then the Set<service>JobElements request MUST be accepted. If such a Creation operation would have been rejected, then the

Set<service>JobElements MUST be rejected and the Job MUST be unchanged. In addition, if any of the supplied elements are not supported, are not settable, or the values are not supported, the Service MUST reject the entire operation; the Service MUST NOT partially set some of the supplied elements. In other words, after the operation, all the supplied elements MUST be set or none of them MUST be set, thus making the Set<service>JobElements an atomic operation.

The value of JobMandatoryElements supplied in the original Create<service>Job request, if any, MUST have no effect on the behavior of the Set<service>JobElements operation. Rather, the Service must consider that any element or element value in a Set<service>JobElements operation is mandatory. The Service MUST reject any request to set a Job element to an unsupported value or to a value that would conflict with another Job element value.

The Service MUST accept or reject the Set<service>JobElements operation when the Job's JobState element has the values shown in Table 6. Although the Job's current state affects whether the Service accepts or rejects the Set<service>JobElements request, the operation MUST NOT change the state of the Job object (since the Job is a passive object and the Job state is a subset of the JobState). For example, if the operation creates a request for unavailable resources, the Job (but not the Job) transitions to a new state.

1.1.1.22 SuspendCurrent<service>Job

The SuspendCurrent<service>Job operation allows a Client operating for the Job Owner or an Administrator, to suspend a Job by setting a condition in a Job that is currently in the Processing or ProcessingStopped state. This condition, reflected by the JobSuspended value in that Job's JobStateReasons element, causes that Job to be in the ProcessingStopped state. The Service is able to process other Jobs normally, provided that no other inhibiting conditions exist. Note that a Job may be in the ProcessingStopped state for other reasons and that, once it has been suspended, the Job will remain in the ProcessingStopped state even after the other conditions have been removed.

There is the potential that the current Job may have changed between the time a client requests this operation and the time the Service implements it. Therefore, if the intent is to suspend a particular Job, the Client can include an optional JobId parameter in the request.

The target Job is:

- a) The Job identified by the JobId, if included in the request
- b) If the JobId is not included in the request, any Jobs in the Processing or ProcessingStopped state to which the requestor has access rights.

The Service MUST reject the request and send an appropriate message if:

1. There is no target Job in the Processing or ProcessingStopped state to which the requestor has access rights.
2. The target Job or all potential target Jobs have already been suspended.

The Service MUST accept the request, cancel any target Job(s) that have not been previously suspended, and return an appropriate message if:

1. The target JobId is included in the request and that Job is currently in the Processing or ProcessingStopped state (but is not suspended), and the requestor has access rights,
2. If no JobId is included and the requestor has access rights to the Job that is currently in the Processing or ProcessingStopped state (but is not suspended), the Service MUST accept the request and suspend that Job.
3. If more than one Job is in the Processing or ProcessingStopped state (but are not suspended), all such Jobs MUST be suspended unless the operation request included the optional JobId, in which case only the identified target Job MUST be suspended.

4. If the JobId is included in the request and that Job is not currently in the Processing or ProcessingStopped state; or if the JobId is not included and there is no Job currently in the Processing or ProcessingStopped state, the Service MUST reject the request and return the appropriate error code.
5. If the JobId is included in the request and that Job has been suspended; or if no JobId is included and is currently in the Processing or ProcessingStopped state, the Service MUST reject the request and return the appropriate error code.

The Resume<service>Job operation releases a suspended Job. If a Service supports SuspendCurrent<service>Job operation, it MUST support the Resume<service>Job operation, and vice-versa.

1.1.2 Administrative Service Operations

Administrative Service operations directly affect the Service as a whole or affect the jobs of multiple JobOwners. Access is reserved for Administrators or Operators. The MFD Administrative Service Operations are listed in Table 52 and are described below.

Table 8 - Administrative Operations

Operation	Request Parameters (Notes 2)	Response Parameters (Notes 3)	Note
Cancel<service>Jobs	ElementsNaturalLanguage(optional), JobIds(optional), Message (optional) , RequestingUserName	JobIds (optional)	1
Disable<service>Service	ElementsNaturalLanguage(optional), Message (optional) , RequestingUserName		
Enable<service>Service	ElementsNaturalLanguage(optional), Message (optional) , RequestingUserName	-	
HoldNew<service>Jobs	ElementsNaturalLanguageRequested(optional), JobHoldUntil or JobHoldUntilTime, Message(optional), RequestingUserName		
Pause<service>Service	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		
Pause<service>ServiceAfterCurrentJob	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		
Promote<service>Job	ElementsNaturalLanguageRequested(optional), JobId, Message(optional), PredecessorJobID(optional) , RequestingUserName		
ReleaseNew<service>Jobs	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		
Restart<service>Service	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		
Resume<service>Job	ElementsNaturalLanguageRequested(optional), JobId, Message(optional)RequestingUserName		
Resume<service>Service	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		
Set<service>ServiceElements	DefaultJobTicket(optional), ElementsNaturalLanguageRequested(optional), Capabilities(optional), CapabilitiesReady(optional), Description(optional), Message(optional), RequestingUserName	Unsupported Elements(optional)	

Operation	Request Parameters (Notes 2)	Response Parameters (Notes 3)	Note
Shutdown<service>Service	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		4
Startup<service>Service	ElementsNaturalLanguageRequested(optional), Message(optional), RequestingUserName		

Notes:

Note 1: Response includes identified but un-cancellable Jobs

Note 2: The RequestingUserName, is used by the Service to determine whether the requestor is an Administrator, Operator or the Job Owner and is therefore authorized to make the request. Some implementations may require further authentication of the requestor's identity. If the requestor is not determined to have access, the Service MUST reject the request..

Note 3: All responses must include correlation to request and whether request was successful or failed.

Note 4: Forcing the Service state may also force the state of any active Jobs to Aborted.

1.1.2.1 Cancel<service>Jobs

The Cancel<service>Jobs operation allows the Operator or Administrator of the Service to cancel all identified non-Terminated Jobs or, if no specific Jobs are identified in the request, to cancel all non-Terminated Jobs in the Service. It differs from the Cancel<service>Job operation in that it works on a number of Jobs at once. If, following the Legal Job state Transitions in **Table**, the Service cannot **successfully** cancel all explicitly or implicitly requested Jobs **that are nto already in the terminated state** , it MUST NOT cancel any Jobs but MUST return an error code. In this case, the Service MUST also return the list of JobIds for those Jobs that were expicity identified in the request but could not be canceled.

The set of candidate Jobs to be canceled is specified by the supplied JobIds. If no JobIds are supplied, it is implicit that all Jobs that are not in a Terminating state are to be canceled. As with all Administrative operations, the Service MUST check the access rights of the requesting user. Provided that the requester has access rights, the Service MUST check the current state of each of the candidate Jobs. If any of the candidate Jobs cannot be canceled, the Service MUST NOT cancel any Jobs and MUST return the indicated error status code along with the list of offending JobId values. If there are no Jobs that cannot be canceled, the Service MUST transition each identified Job to the indicated new state as shown in Table 51.

Table x –Legal Transitions Effected by Cancel<service>Jobs Operation

Current JobState	Condition	New JobState	Request Response	Note
Pending	-	Canceled	Success	
PendingHeld	-	Canceled	Success	
Processing		Canceled	Success	
	Implementation takes time to effect cancel.	Processing	Success	JobStateReasons will be set to ProcessingToStopPoint value
	JobStateReasons is set to ProcessingToStopPoint	Processing	Failure	Job already progressing to canceled state
Processing Stopped		Canceled	Success	
	Implementation takes time to effect cancel.	Processing Stopped	Success	JobStateReasons will be set to ProcessingToStopPoint value
	JobStateReasons is set to ProcessingToStopPoint	Processing Stopped	Failure	Job already progressing to canceled state
Completed		Completed	Failure	Job already terminated
Canceled		Canceled	Failure	Job already terminated
Aborted		Aborted	Failure	Job already terminated

1.1.2.2 Disable<service>Service

The Disable<service>Service operation prevents the Service from creating any new Jobs by negating the IsAcceptingJobs element. This operation has no effect upon the Service State and the Service is still able to process operations other than Create<service>Job. All previously created or submitted Jobs and all Jobs currently processing continue unaffected.

If the requestor is determined to have proper access, the Service MUST accept this request and MUST negate the IsAcceptingJobs element.

The IsAcceptingJobs element value is reaffirmed by the Enable<service>Service operation. If an implementation supports Disable<service>Service it must also support Enable<service>Service and vice-versa.

1.1.2.3 Enable<service>Service

The Enable<service>Service operation asserts the IsAcceptingJobs element to allow the Service to accept new Create<service>Job requests. The operation has no effect upon the Service State or any other operation requests the Service may receive.

If the requestor is determined to have proper access, the Service MUST accept this request and MUST assert the IsAcceptingJobs element. The Service MUST then be able to accept and implement Create<Service>Job requests, provided that no other inhibiting condition exists.

If a Service implementation supports Disable<service>Service it must also support Enable<service>Service and vice-versa.

1.1.2.4 HoldNew<service>Jobs

The HoldNew<service>Jobs operation allows a client to prevent any new Jobs from being eligible for scheduling by forcing all newly-created Jobs to the PendingHeld state with a JobHoldUntil or JobHoldUntilTime Job Processing element added, depending upon the element supplied with the HoldNew<service>Jobs operation request. The operation has the same effect as a Hold<service>Jobs operation except that any Jobs in the Pending or Processing state when the HoldNew<service>Jobs request is accepted are allowed to go to completion, provided that no other conditions or operations prevent this.

This operation sets a Boolean service element called IsHoldingNewJobs. With this set, any incoming new job will be given a JobStateReason indicating that Job is held by Service.

The JobHoldUntil parameter allows a client to specify holding new Jobs indefinitely or until a specified named time period. The JobHoldUntilTime parameter allows a client to hold new Jobs until a specified time. Provided that the requestor is authorized and the operation and requested parameters are supported, a Service MUST accept a HoldNew<service>Jobs request and MUST add the supplied 'JobHoldUntil' or JobHoldUntilTime element to the Jobs. This HoldNew<service>Job condition may be cleared by a ReleaseNew<Service>Jobs operation.

If the HoldNewJobs operation is supported, then the ReleaseNew<Service>Jobs operation MUST be supported, and vice-versa

1.1.2.5 Pause<service>Service

The Pause<service>Service operation allows a client to send the Service to the Stopped state. In this Service state, the Service MUST NOT advance any Job to Job Processing state. Depending on implementation, the Pause operation MAY also stop the Service from continuing to process any current

Job, sending the Job to the ProcessingStopped state. That is, depending upon implementation, any Job that is currently in the Processing state is sent to the ProcessingStopped state as soon as the implementation permits; or the Job continues to a termination state as determined by other conditions. The Service MUST still accept CreateJob operations to create new Jobs, provided that there are no other conditions preventing it.

If the Pause operation is supported, then the Resume operation MUST also be supported, and vice-versa.

Service State transitions resulting from a Pause operation are identified in Table 54. Pause implementation should be done as soon as the possible after the request is accepted. If the implementation will take more than negligible time to stop processing (perhaps to finish processing the current Job), the Service may remain in the 'Processing' state but MUST add the 'MovingToPaused' value to the Service's StateReasons element. When the Service transitions to the 'Stopped' state, it removes the 'MovingToPaused' value and adds the 'Paused' value to the Service's StateReasons element. If the implementation permits the current Job to stop in mid processing, the Service transitions directly to the 'Stopped' state with the Service's StateReasons element set to the 'Paused' value and the current Job transitions to the 'ProcessingStopped' state with the JobStateReasons element set to the 'Stopped' value.

For any Jobs in the 'Pending' or 'PendingHeld' state, the 'Stopped' value of the Jobs' JobStateReasons element also applies. However, the Service NEED NOT update those Jobs' JobStateReasons element and need only return the 'Stopped' value when those Jobs are queried (so-called lazy evaluation).

Provided that the requestor is authorized, the Service MUST accept the Pause<service>Service request in any Service state and, if so indicated, transition the Service to the indicated new State before responding as follows:

Table 9 - Transitions Resulting from Pause Operation

Current Service State	New Service State	StateReason	Status	Notes
Idle	Stopped	Paused	Success	
Processing	Processing	MovingToPaused	Success	See Note 1
Processing	Stopped	Paused	Success	See Note 2
Stopped	Stopped	Paused	Success	

Note 1: Implementations that do not stop processing of the current Job respond as indicated. When the current Job has entered a termination state and processing is stopped, the Service State goes from 'Processing' to 'Stopped' and the 'StateReason' value goes from 'MovingToPaused' to 'Paused'.

Note 2: In instances where there is no current Job in the Processing state, and in implementations that are able to pause the current Job, the Service goes immediately to the 'Stopped' state with 'StateReason' 'Paused' value. In the latter case, the current Job goes to the 'ProcessingSTopped' state with a JobStateReasons element value of 'Stopped'.

1.1.2.6 Pause<service>ServiceAfterCurrentJob

The Pause<service>ServiceAfterCurrentJob operation allows a client to stop the Service from processing any Jobs once any Jobs currently in Processing are completed. This operation has no effect on the current Jobs and the Service MUST complete the processing of the current Jobs, provided that no other condition or operations preclude it. The Service MUST still accept CreateJob operations to create new Jobs, but MUST prevent any Jobs from entering the 'Processing' state. If the Pause<service>ServiceAfterCurrentJob operation is supported, then the Resume<service>Service operation MUST also be supported.

Service State transitions resulting from a Pause<service>ServiceAfterCurrentJob operation are identified in Table 55. Note that the response to the Pause<service>ServiceAfterCurrentJob request and the

Pause<service>Service request are exactly the same in implementations where the Service implementation is not able to pause Jobs currently in the Processing state.

If the implementation will take more than negligible time to finish processing the current Jobs, the Service will remain in the Processing state and must add the 'MovingToPaused' value to the Service's StateReasons element. When the Service transitions to the 'Stopped' state, it removes the 'MovingToPaused' value and adds the 'Paused' value to the Service's StateReasons element.

For any Jobs in the 'Pending' or 'PendingHeld' state, their state is unchanged but the JobStateReasons element must be set to the 'Stopped' value. However, the Service NEED NOT update those Jobs' JobStateReasons element and only need return the 'Stopped' value when those Jobs are queried (so-called lazy evaluation).

Provided that the requestor is authorized, the Service MUST accept the request in any Service state and MUST transition the Service to the indicated new State as follows before returning the operation response.

Table 10 –System States Changes in Response to Pause<system>SystemAfterCurrentJob Operation

Current Service State	New Service State	StateReason	Status	
Idle	Stopped	Paused	Success	
Processing	Processing	MovingToPaused	Success	See Note
Stopped	Stopped	Paused	Success	

Note : Once the currently processing Jobs reach a Terminating state, the Service state will transition to 'Stopped' and the MovingToPaused StateReason will be remove and replaced with 'Paused'

1.1.2.7 Promote<service>Job

The Promote<service>Job operation schedules the identified Job to be processed next, after the currently processing Jobs or, if the request includes the predecessor JobId, immediately after the identified predecessor Job. The Promote<service>Job operation is a combination of the IPP Promote-Job and Schedule-Job-After operations. If the predecessor Job is not specified, it acts in the same way as the antecedent IPP Promote-Job operation. If the predecessor Job is specified, it acts the same way as the antecedent IPP Schedule-Job-After operation.

The identified target Job must be in the 'Pending' state. If the identified target Job is not in the 'Pending' state or if the predecessor Job is identified and it is not in the 'Pending', 'Processing' or 'ProcessingStopped' state, the Service MUST reject the request and return an appropriate status code. If the Promote<service>Job request is accepted, the target Job MUST be processed immediately after the current Jobs or identified predecessor Job reaches a Termination state (Canceled, Completed or Aborted)

Note that the action of this operation is consistent even if a previous Promote<service>Job Request has caused some other Job to be scheduled after the current or predecessor Job; that is, within the rescheduling time limitations of the Service, the Job identified in the last Promote<service>Job Request accepted will be processed next.

1.1.2.8 ReleaseNew<service>Jobs

The ReleaseNew<service>Jobs operation allows a client to remove the condition initiated by HoldNew<service>Jobs and to release all Jobs previously forced to a PendingHeld state by the HoldNew<service>Jobs initiated condition so that these Jobs are eligible for scheduling. This is done by

remove the 'JobHoldUntilSpecified' and 'JobHeldByService' values from the Job's JobStateReasons element and changing the Jobs' states to 'Pending'.

Provided that the requestor is authorized, the Service MUST accept this request in any Service state and the Service MUST remove the 'JobHoldUntilSpecified' value from the Job's JobStateReasons element for any Job previously forced to a PendingHeld state by the HoldNew<service>Jobs initiated condition.

If the ReleaseNew<service>Jobs operation is supported, then the HoldNew<service>Jobs operation MUST be supported, and vice-versa.

1.1.2.9 Restart<service>Service

The Restart<service>Service operation causes a Service in any state, even a previously shut down instance of a Service, to be initialized and set to the Idle state, provided that no errors occur or conditions exist that would prevent normal operation. The handling of Jobs that were in the Processing, Pending, PendingHeld, and ProcessingHeld states state prior to Restart is implementation dependent, but a Service Restart MUST be performed as gracefully as possible and in a way preserving the content and integrity of any non-terminated Jobs. Job history data, if supported, SHOULD also be preserved; a particular Service may make this mandatory.

Provided that the requestor is authorized, the Service MUST accept the request Restart<service>Service regardless of its current state. Providing that no conditions exist that would normally prevent these actions, the Service MUST reinitialize its State to Idle, clear the StateReasons element and set the IsAcceptingJobs element to true.

1.1.2.10 Resume<service>Service

The Resume<service>Service operation allows a client to cause the Service to resume scheduling Jobs after scheduling has been paused. Provided that the requestor is authorized and the Service supports this operation, a Service MUST accept a Resume<service>Service request regardless of the current Service state; see **table**. If there are no other reasons why the Service is in the Stopped state, this operation returns the Service from the Stopped state to the Idle or Processing state from which it was paused, and removes the 'Paused' value to the Service's StateReasons element.

If the Resume<service>Service operation is supported, then the Pause<service>Service operation MUST be supported, and vice-versa.

Table 11 - System State Changes in Response to Resume<service>Service

Current Service state	New Service state-	response	Comment
Idle	Idle	success	
Processing	Processing	success	
Stopped	Processing	success	If there are Jobs to be processed
Stopped	Idle	success	If there are no Jobs to be processed.
Stopped	Stopped	success	If other conditions causing a Stopped state exist

1.1.2.11 Set<service>ServiceElements

The Set<service>ServiceElements operation allows a Client to set the values of identified elements in the Service, provided that they are settable. Settable Elements may be in ServiceCapabilities, ServiceConfiguration, ServiceDescription and DefaultJobTicket but not in ServiceStatus.

The Service MUST reject the entire request with indications of which element or elements could not be set if a client request attempts to:

1. Set a non-settable element (including an element not in the ServiceCapabilities, ServiceConfiguration, ServiceDescription or DefaultJobTicket groups, a read-only element, and an element not supported or not supported as a writable element in the specific Service implementation)
2. Set a settable element to an invalid value or to a value that conflicts with the values of other Service elements, including elements being set in the same request.
3. Set a greater number of elements in one operation than are supported by the Service implementation (a Service implementation NEED NOT support set of more than one element at a time).

A Set<service>ServiceElements operation that specifies an element but provides no value for that element is not an error but rather a request to eliminate that element and whatever value it has.

If there is no reason to reject setting all of the specified elements to the specified values or elimination of the element, the Service MUST accept this operation request when it is in the Idle or Stopped state, and SHOULD accept the request when it is in the Processing state.

If the Service accepts the request, only those elements specified in the request are changed unless the definition of one or more of the set elements explicitly specifies an effect upon some other element.

1.1.2.12 Shutdown<service>Service

The Shutdown<service>Service operation forces the Service to the 'Down' state from any state that it is in, in an orderly manner. That is, the Service MUST stop accepting any further client requests, and MUST stop scheduling Jobs for processing as soon as the implementation allows, although it SHOULD complete the processing of any currently processing Jobs. Once down, the Service will no longer respond to any Client requests other than Restart<service>Service request. As with the antecedent IPP Shutdown-Printer operation all Jobs MUST be preserved. , As with Restart<service>Service, Service shutdown must be performed as gracefully as possible and in a way in preserving the content and integrity of any non-terminated Jobs. Job history data, if supported, SHOULD also be preserved.

Once shut down, a Service can be roused from its Down state by a Restart<service>Service operation. **If a Service implementation supports Shutdown<service>Service it must also support Restart<service>Service and vice-versa.** In the down state, the only operation request that a service will respond to is a Restart<service>Service operation.

Provided that the requestor is authorized, the Service MUST accept this operation and following an orderly progression, transition to the Down state regardless of the current state of the Service.

Messages . job state reasons

Response messages – fault codes

Changes made on Basis of 6 April Face to Face comments

First Section

- Paragraph added to indicate that site policy may restrict info to user and may prevent user from overriding administrator job setting

Table 1

- Add<service>HardcopyDocument: the antecedent is SendUri (from RFC 2911), similar to SendUri but not the same.
- Indicate that for Get<service>JobElement, Get<service>JobHistory and Get<service>Jobs user only gets the information he/she is authorized to as determined by the site policy.

Table 2:

- Pete provided new tables and notes
 - All Get and Set operations that include localized string data, the request and response including messages must include NaturalLanguageElement.
 - Cancel<service>Job : make consistent with IPP antecedent
 - Get<service>Document – the return is a list of document summaries. RequestedElement shouldn't be included in the request, only include the JobID. All Get Job and Document operations return summary information only.
 - GetActive<service>Jobs & Get<service>JobHistory – limited optional.
 - Set<service>Doc/JobElement – the format of RequestedElement is a sparsely populated doc/job ticket, if not, we will need Xpath for the name/value pair of all elements passed in.

Basic Service Operations:

- CancelMy<service>Jobs – Text change to indicate that, if the service cannot cancel all the requested jobs successfully, it must return an error unless the jobs that cannot be canceled are already in a terminated state. The service should return a warning for the jobs reached a terminated state, not an error.
 - Question about note in minutes that only administrator has the privilege to cancel the jobs that are already in a terminated state. (Need to see the consensus from IPP JPS2 semantics).
- Get<service>DocumentElements – Clarify that Job level elements that affect Document Processing are not returned, only elements set at the document level.
- Get<service>Documents – Clarify that operation returns document summaries.
- Get<service> JobHistory –include the ability to apply the site security policy to obscure/limit the returned information
- GetActiveServiceJob – same comment as JobHistory.
- Hold<service>Job – Clarify specific time, specific period (keyword) or indefinite parameter; clarify that last hold condition overwrite any previously specified condition; indicate that site policy can prevent user to replace admin's setting, or holdunitl across operations.
- Resubmit<service>Job – Add: Only job owner or admin can resubmit the jobs.
- Resume<service>job – Add only owner/operator/admin can resume the job .
- SendDocument – if URI scheme is not supported, reject. Report Error – “not supported URI”.
- SetServiceDocumentElement – Setting an element with NO Value has the same effect as IPP out-of-band DeleteElement.
- Set<service>JobElements - Setting an element with NO Value has the same effect as DeleteElement.

Table 8 –

- Pete provided new tables and notes

Admin Operations

- Cancel<service>Jobs - Text change to indicate that, if the service cannot cancel all the requested jobs successfully, it must return an error unless the jobs that cannot be canceled are already in a terminated state. The service should return a warning for the jobs reached a terminated state, not an error.
- HoldNew<service>Jobs – add mention of IsHoldingNewJobs
-