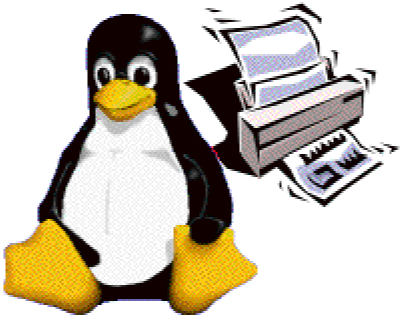
Job Ticket
Application Programming Interface
(JTAPI)

Version 0.92
September 2, 2004



Abstract

The Free Standards Group (FSG) OpenPrinting Job Ticket Application Programming Interface (JTAPI) provides an abstract interface for applications to read, edit, and write document processing job tickets (defined outside this specification). This specification defines an abstract model of objects (jobs, documents, etc.) and their operations and attributes for document processing (e.g. scanning, printing, copying, etc.). This specification also defines C language bindings of this abstract object model (including standard header files).

Copyright Notice

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1. Introduction

This specification describes and defines the Free Standards Group (FSG) Open Printing Job Ticket Application Programming Interface (JTAPI) for the Free Standards Group. The JTAPI defines the abstract interface and does define a specific job ticket, job ticket file format or job ticket syntax. An implementation of the JTAPI produces and/or consumes one or more standard or vendor specific job tickets formats.

This specification is intended for software developers, designers and architects that need to read and/or write job tickets.

The purpose of this specification is to define an open standard, the Job Ticket Application Programming, for open printing on Linux/Unix/Posix/Windows/Macintosh/Embedded platforms. A JTAPI implementation produces and consumes job tickets. The JTAPI is job ticket syntax neutral. The JTAPI isolates an application from the syntax of a job ticket to hind details and the structural complexity of specific job ticket along with interoperability between different job ticket file formats. The JTAPI abstract model is programming language neutral.

2. Background

The International Cooperation for the Integration of Process in Prepress, Press and Postpress (CIP4) is a joint initiative of vendors for the graphical arts industry [cip4]. CIP4 has published a Job Definition Format (JDF) specification. JDF is a comprehensive XML-based file format proposed industry standard for end-to-end job ticket specifications combined with a message description standard and message interchange protocol to cover all aspects of the commercial printing workflows.

JDF / 1.0 was published April of 2001. JDF / 1.1 was published in August 2002 [jdf]. JDF / 1.2 is due to be published the end of 2003. Yearly updates are foreseen as the needs of the printing industry evolve.

The Printer Working Group (PWG) is a joint initiative of printer vendors and print system providers to develop printing protocol standards for use on the Internet and within enterprises on their intra nets [pwg]. The PWG has published the Internet Printing Protocol (IPP) in September 2000 [rfc2910, rfc2911]

The PWG is in the process of publishing the PWG Semantic Model which summarizes the printing semantics common to a number of printing protocols, centered on the IPP semantics [pwg-sm]. The PWG Semantic Model includes an XML Schema definition. Therefore, an XML Job Ticket using the semantics of the PWG Semantic Model is possible.

3. Overview

3.1 Print Environments

[Describe the Embedded Mobile, Desktop/Home, Office/Network, and Production environments.]

3.2 High Level Model

The JTAPI is object oriented extensible API. Figure 1.0 and 2.0 diagrams the JTAPI high level model and the relationship between JTAPI objects. A job ticket information object (JobTicketInfo) contains one job object (Job) where the job contains zero or more document objects (Document). The JobDocumentPage object is abstract and contains functionality that is common to jobs, documents, and specific pages in a job or document. Each of the other objects in the diagrams represents functionality that can be specified for the Job, Document, and PageOverrides objects. For example, the Media object represents the media that the job, document, or specific pages in the job or document is to be imaged/printed on. The section following the diagrams contains more detailed descriptions of each of the objects in the JTAPI model.

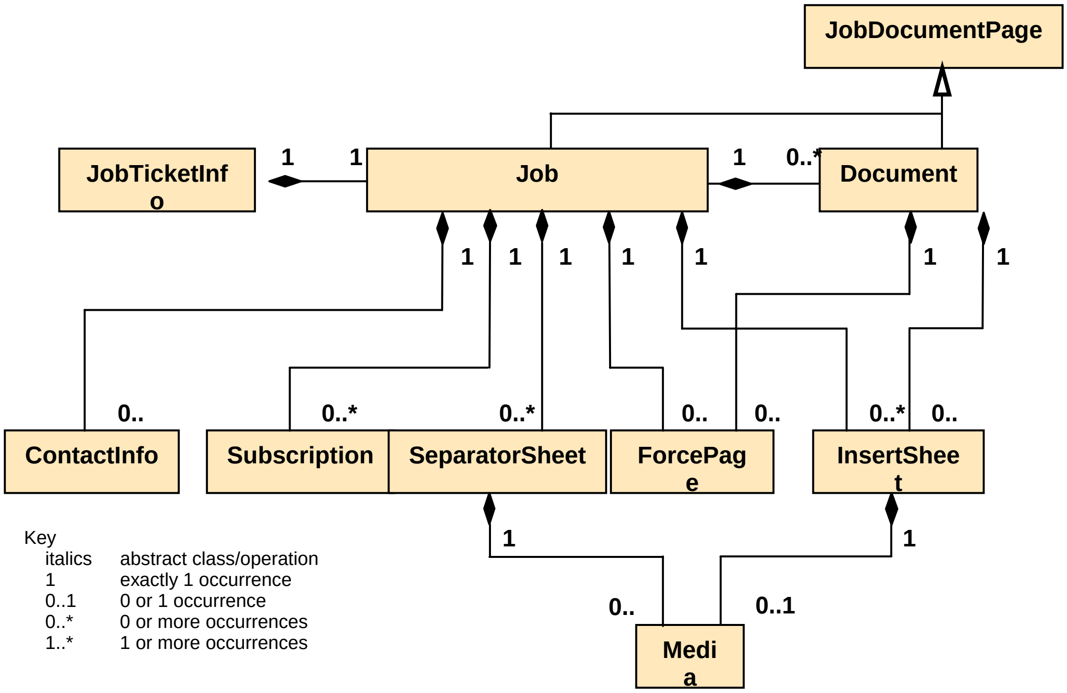

Figure 1.0 JTAPI High Level Object Model

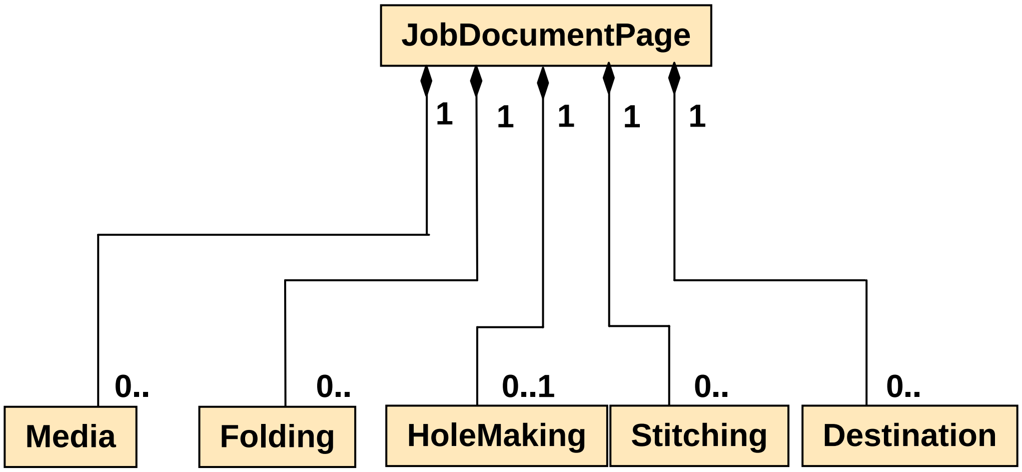

Figure 2.0 JTAPI JobDocumentPage High Level Object Model

3.3 Linking with JTAPI

The Job Ticket API can be provided in the form of a static link library, a dynamic link library and/or RPC client/services configuration. Linking of library and RPC details are operating system dependent and will not be elaborated in this specification. API interfaces for the three forms of the API implementation are discussed further in the following sections.

[Issue: RPC is a concern because of security issue that come with RPC implementation .]

3.4 Conformance with JTAPI

A conforming library implementation of the Job Ticket API v1.0:

(1) MUST support the abstract object model defined in Section 8 of this specification;

(2) MUST publish one or more sets of standard header files verbatim from Section 23, Section 24 or Section 25 of this specification;

(3) MAY publish one or more sets of vendor extension header files;

(4) MUST support every required object and attribute (with at least one supported value) defined in this specification;

(5) MAY support any optional object or attribute (with at least one supported value) defined in this specification;

(6) Must support read/write to one or more industry standard or vendor specific job ticket formats (defined outside this specification)".

(7) MUST identify supported job ticket formats in any claim of conformance to this specification.

3.5 Internationalization

Each library implementation of the Job Ticket API MUST accept a charset tag [RFC2978] to specify the character set and encoding for all text strings in the JT_Charset. Each library implementation of the Job Ticket API MUST default to the UTF-8 [RFC2279] transform of [ISO10646] for text strings.

3.6 Security

The Job Ticket API does NOT support the transfer of any user security credentials. Each implementation of the Job Ticket API is a library that may be statically or dynamically linked with an application program. The application program itself may be authenticated and authorized by the native host operating system (by means outside the scope of this specification) for read and/or write access to job tickets stored on local or network file systems. A conforming implementation MUST not store any sensitive information (password, private keys, etc). The JTAPI does not define or support encryption of a job ticket.

Need a discussion on RPC and security.

4. Application Programming Interface Summary

Object	**Header**	**API Request**	
---	fsgjt.h	fsgitOpenJTAPI	void**
---	fsgjt.h	fsgitFlushJTAPI	void*
---	fsgjt.h	fsgitCloseJTAPI	void*
all	fsgjt.h	fsgjtDestroy	object
all	fsgjt.h	fsgjtGet	object, attribute
all	fsgjt.h	fsgjtSet	object, attribute
all	fsgjt.h	fsgjtSetIntegerAttribute	object, attribute, value
all	fsgjt.h	fsgjtSetObjectAttribute	object, attribute, value
all	fsgjt.h	fsgjtSetObjectAttributeList	object, attribute, list
all	fsgjt.h	fsgjtSetStringAttribute	object, attribute, value
all	fsgjt.h	fsgjtSetStringAttributeList	object, attribute, values
all	fsgjt_attribute.h	fsgjtNewAttribute	attribute, name, type, value
all	fsgjt_attribute.h	fsgjtDestoryAttribute	attribute
all	fsgjt_attribute.h	fsgjtAddValue	attribute, value
all	fsgjt_attribute.h	fsgjtGetName	attribute, name
all	fsgjt_attribute.h	fsgjtGetNumValues	attribute, numValues
all	fsgjt_attribute.h	fsgjtGetValueType	attribute, type
all	fsgjt_attribute.h	fsgjtReplaceValue	attribute, value
all	fsgjt_attribute.h	fsgjtResetToFirstValue	attribute
all	fsgjt_destination.h	fsgjtNewDestination	destinationObject, uri
document	fsgjt_document.h	fsgjtNewDocument	documentObject
document	fsgjt_document.h	fsgjtNewDocumentFromURI	documentObject, uri
stitching	fsgjt_stitching.h	fsgjtNewStitching	stitchingObject, stitchType
media	fsgjt_media.h	fsgjtNewMedia	mediaObject, name
job	fsgjt_job.h	fsgjtNewJob	jobObject
job	fsgjt_job.h	fsgjtNewJobFromDocument	jobObject, documentObj
job ticket info	fsgjt_job_ticket_info.h	fsgjtNewJobTicketInfo	jobTicketInfoObject, typeAndVersion
job ticket info	fsgjt_job_ticket_info.h	fsgJtNewJobTicketFromURI	jobTicketInfoObject, uri, typeAndVersion
job ticket info	fsgjt_job_ticket_info.h	fsgJtNewJobTicketFromBuffer	jobTicketInfoObject, buffer, bufferSize, typeAndVersion
job ticket info	fsgjt_job_ticket_info.h	fsgJtNewJobTicketFromJob	jobTicketInfoObject, job, typeAndVersion
job ticket info	fsgjt_job_ticket_info.h	fsgJtNewJobTicketToBuffer	jobTicketInfoObject, buffer, bufferSize
job ticket info	fsgjt_job_ticket_info.h	fsgJtNewJobTicketToURI	jobTicketInfoObject, uri

5. Top Level Application Programming Interface

The top level JTAPI is used for system level and/or a specific implementation of JTAPI to perform initialization and release of resources and/or system level protocols.

5.1 fsgjtOpenJTAPI

Syntax:	fsgjt_return_code_t fsgjtOpenJTAPI(jtapi_struct);		
Parameters:	void **	jtapi_struct	An optional opaque structure that to be returned by the specific instantiation of the JTAPI
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_MISSING_PARAM		
Impact Level:	Library		
Description:	Initializes the JTAPI library and returns a structure that is utilized by the specific JTAPI library instantiation.		
Constraints, Limitation, Restrictions	This API call must be called before calling any other JTAPI calls.		
Also See:	fsgjtCloseJTAPI		

5.2 fsgjtFlushJTAPI

Syntax:	fsgjt_return_code_t fsgjtFlushJTAPI(jtapi_struct);		
Parameters:	void *	jtapi_struct	The opaque structure that was returned from the fsgjtOpenJTAPI call for this specific instantiation of the JTAPI
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_MISSING_PARAM		
Impact Level:	Library		
Description:	Releases all objects and dynamic memory allocations and closes any I/O channels associate with this session.		
Constraints, Limitation, Restrictions			
Also See:	fsgjtCloseJTAPI		

5.3 fsgjtCloseJTAPI

Syntax:	fsgjt_return_code_t fsgjtCloseJTAPI(jtapi_struct);		
Parameters:	void *	jtapi_struct	The opaque structure that was returned from the fsgjtOpenJTAPI call for this specific instantiation of the JTAPI
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_MISSING_PARAM		
Impact Level:	Library		
Description:	Releases the JTAPI library, removes any dynamic memory allocations and closes any I/O channels. This call will execute an fsgjtFlushJTAPI call.		
Constraints, Limitation, Restrictions	This API call must be called after calling any other JTAPI calls.		
Also See:	fsgjtOpenJTAPI		

6. Functional Level Application Programming Interface

Functional level JTAPI calls for used to create, manipulate and store job tickets. The API's are segmented into generic API calls that are useable for any object, attribute API calls that useable for any attribute, and API calls for specific objects.

6.1 fsgjtDestroy

Syntax:	fsgjt_return_code_t fsgjtDestroy(object);		
Parameters:	fsgjt_object_t	Object	Pointer to the object to free.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Object		
Description:	Free the memory used by the provided object.		
Constraints, Limitation, Restrictions	"fsghjtDestory MUST be called to free each object allocation during session, otherwise memory leaks will occur. Before calling fsgitCloseJTAPI, fsghjtDestory MUST be called to free each object allocation during session. Destroying higher level objects will automatically destroy lower level objects.		
Also See:	fsgjtFlushJTAPI		

6.2 fsgjtGet

Syntax:	fsgjt_attribute_t fsgjtGet(object, attribute);		
Parameters:	fsgjt_object_t	object	Pointer to the object from which to get the attribute.
	char *	attribute	Name of the attribute to get.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Gets the attribute having the provided name.		
Constraints, Limitation, Restrictions			
Also See:			

6.3 fsgjtSet

Syntax:	fsgjt_return_code_t fsgjtSet(object, attribute);		
Parameters:	fsgjt_object_t	object	Pointer to the object in which to set the attribute
	char *	attribute	Attribute to set
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Sets the provided attribute of the provided object.		
Constraints, Limitation, Restrictions			
Also See:			

6.4 fsgjtSetIntegerAttribute

Syntax:	fsgjt_return_code_t fsgjtSet(object, attribute, value);		
Parameters:	fsgjt_object_t	object	Set the attribute for this object.
	char*	attribute	Name of the attribute to set.
	fsgjt_int32_t	value	New value for the integer-attribute.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Convenience function for setting an attribute to the provided value. This function creates a fsgjt_attribute_t, calls the set() function and then destroys the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

6.5 fsgjtSetObjectAttribute

Syntax:	fsgjt_return_code_t fsgjtSetObjectAttribute(object, attribute, value);		
Parameters:	fsgjt_object_t	object	Set the attribute of this object.
	char *	attribute	Name of attribute to set.
	fsgjt_object_t	value	New value for the attribute.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Convenience function for setting an object attribute to the provided value. This function creates a fsgjt_attribute_t, calls the set() function and then destroys the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

6.6 fsgjtSetObjectAttributeList

Syntax:	fsgjt_return_code_t fsgjtObjectAttributeList(object, attribute, list);		
Parameters:	fsgjt_object_t	object	Set the attribute for this object
	char*	attribute	Name of the attribute to set
	fsgjt_object_t*	list	List of values for the attribute.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Convenience function for setting an object attribute to the provided list of values. This function creates a fsgjt_attribute_t, adds the values, calls the set() function and then destroys the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

6.7 fsgjtSetStringAttribute

Syntax:	fsgjt_return_code_t fsgjtSetStringAttribute(object, attribute, value);		
Parameters:	fsgjt_object_t	object	Set the attribute of this object
	char*	attribute	Name of attribute to set
	char*	value	New value for the attribute.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Convenience function for setting a string attribute to the provided value. This function creates a fsgjt_attribute_t, calls the set() function and then destroys the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

6.8 fsgjtSetStringAttributeList

Syntax:	fsgjt_return_code_t fsgjtSetStringAttributeList(object, attribute, list);		
Parameters:	fsgjt_object_t	object	Set the attribute for this object
	char*	attribute	Name of attribute to set
	char**	list	List of new values for the attribute.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Convenience function for setting a string attribute list to the provided value. This function creates a fsgjt_attribute_t, calls the set() function and then destroys the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

7. Attribute Level Application Programming Interfaces

Attribute level JTAPI calls for used to create, manipulate and store object attributes.

7.1 fsgjtNewAttribute

Syntax:	fsgjt_return_code_t fsgjtNewAttribute(attribute, name, type, value);		
Parameters:	fsgjt_attribute_t	Attribute	Pointer to the new attribute to return
	char*	name	Name for the new attribute to create
	char*	type	Type for the new attribute
	void*	value	Pointer to the value for this attribute
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Creates a new object attribute have the provided attribute name, value type, and value. The value must not be an extension value.		
Constraints, Limitation, Restrictions	Multiple values should be added with the add() function.		
Also See:			

7.2 fsgjtDestoryAttribute

Syntax:	fsgjt_return_code_t fsgjtDestory(attribute);		
Parameters:	char*	attribute	Attribute to free.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Free the memory used by the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

7.3 fsgjtAddValue

Syntax:	fsgjt_return_code_t fsgjtAddValue(attribute, value);		
Parameters:	char*	attribute	Attribute to add attribute value to.
	void*	value	Pointer to value to add.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_OBJECT FSGJT_NOT_SUPPPORTED		
Impact Level:	Attibute		
Description:	Add an additional value, that is not an extension, to this attribute		
Constraints, Limitation, Restrictions			
Also See:			

7.4 fsgjtGetName

Syntax:	fsgjt_return_code_t fsgjtGetName(attribute, name);		
Parameters:	char*	attribute	Attribute whose name to get.
	char**	name	Name of the attribute to return
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Get the name of the attribute.		
Constraints, Limitation, Restrictions			
Also See:			

7.5 fsgjtGetNextValue

Syntax:	fsgjt_return_code_t fsgjtGetNextValue(attribute, nextValue, moreValues)		
Parameters:	char*	attribute	Attribute whose next value is to be returned.
	char**	nextValue	Pointer to the next value.
	fsgjt_present_t	moreValues	“On” if there are more values for the attribute other than the value being returned.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_REQUEST FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Return the attribute’s next value.		
Constraints, Limitation, Restrictions			
Also See:			

7.6 fsgjtGetNumValues

Syntax:	fsgjt_return_code_t fsgjtNumValues(attribute, numValues);		
Parameters:	char*	attribute	Attribute whose number of values to get.
	fsgjt_int32_t*	numValues	Number of values to return
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Get the number of values that the attribute contains.		
Constraints, Limitation, Restrictions			
Also See:			

7.7 fsgjtGetValueType

Syntax:	fsgjt_return_code_t fsgjtGetValueType(attribute, type);		
Parameters:	char*	attribute	Attribute whose value type to get.
	char**	type	Type of the attribute values to return.
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Attribute		
Description:	Returns the type of the attribute's value.		
Constraints, Limitation, Restrictions			
Also See:			

7.8 fsgjtReplaceValue

Syntax:	fsgjt_return_code_t fsgjtReplaceValue (attribute, value);		
Parameters:	char*	attribute	Attribute to replace the provided value(s)
	char*	value	Pointer to replacement value
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Object		
Description:	Replaces the existing non-extension value(s) for the attribute with the provided value.		
Constraints, Limitation, Restrictions			
Also See:			

7.9 fsgjtResetToFirstValue

Syntax:	fsgjt_return_code_t fsgjtResetToFirstValue(attribute);		
Parameters:	char*	attribute	Attribute to reset
Return Status:	FSGJT_OK FSGJT_INTERNAL_ERROR FSGJT_INVALID_PARAM FSGJT_MISSING_PARAM		
Impact Level:	Object		
Description:	Reset the iterators to point to the first value.		
Constraints, Limitation, Restrictions			
Also See:			

8. Object Level Application Programming Interfaces Conformance Summary

Based on the characteristics, resource limitations and print capabilities of the separate print environments the level of support for individual JTAPI objects is outlined in Table 5.0. The print environment type and the specific conformance version will be identified as part of the JTAPI initialization process.

JTAPI Object Conformance for Print Environments

Object	***Conformance – 1.0 Release*** *(Must, May)*			
	Embedded/Mobile	***Desktop/Home***	***Office/Network***	***Production***
ContactInfo	May	May	May	**Must**
Destination	May	May	May	**Must**
Document	**Must**	**Must**	**Must**	**Must**
Folding	May	May	May	**Must**
ForcePage	May	May	May	**Must**
HoleMaking	May	May	May	**Must**
InsertSheet	May	May	May	**Must**
Job	**Must**	**Must**	**Must**	**Must**
JobDocument Page	**Must**	**Must**	**Must**	**Must**
JobTicketInfo	**Must**	**Must**	**Must**	**Must**
Media	**Must**	**Must**	**Must**	**Must**
SeparatorSheet	May	May	May	**Must**
Stitching	May	May	May	**Must**
Subscription	May	May	May	**Must**

9. ContactInfo

A ContactInfo object contains information about a person who is to be contacted regarding the job. A ContactInfo object contains attributes that specify the name, address, company, URIs, and role of the person who is to be contacted. The role of the person identifies why the person is interested in the job. Some typical roles are Administrator, Customer, Delivery, and Approver.

9.1 ContactInfo Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
ContactInfo	May	May	May	**Must**
contact-info-address	May	May	May	**Must**
contact-info-company	May	May	May	**Must**
contact-info-contact-uri	May	May	May	**Must** <Mail-To Scheme>
contact-info-detail	May	May	May	May
contact-info-name	**Must**	**Must**	**Must**	**Must**
contact-info-types	**Must** {SENDER}	**Must** {SENDER}	**Must** {SENDER}	**Must** {SENDER, CUSTOMER, DELIVERY, PICKUP, ACCOUNTING }

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

10. Destination

A Destination object contains information about the target URI. A Destination object contains an attribute that specifies the target URI.

10.1 Document Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
Destination	May	May	May	**Must**
destination-target-uri	May	May	May	**Must**

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported

11. Document

Each Document object in a job references one or more files to be processed. A Document object contains attributes that describe the document and how it is to be processed.

Only one file per Document object is required to be supported.

11.1 Document Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
Document	**Must**	**Must**	**Must**	**Must**
document-data-uri	**Must**	**Must**	**Must**	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

12. Folding

A Folding object contains information that specifies how a job, document, or range of pages in a job or document is to be folded. A Folding object contains attributes that specify the type of folding (such as, z-fold and saddle fold) and the reference edge from which to perform the folding operation.

12.1 Folding Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
Folding	May	May	May	**Must**
folding-reference-edge	May	May	May	May
folding-type	May	May	May	**Must** {SADDLE}

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported.

13. ForcePage

A ForcePage object is used to specify that a single page, identified by an input page number, is imaged on a specific side (front or back) and/or specific cell of the sheet. Forcing a page is typically performed when the first page of each chapter is to be imaged on the front side of a sheet, also known as "chapter starts". A ForcePage object can also be used to only image on the back side of a back cover. ForcePage is only valid when two-sided printing is specified.

ForcePage will force a page to be imaged on the specified side even if the page would normally fall on the other side. For example, if the second page would normally be imaged on the back side of the sheet and it is to be forced to the front side, then the back side of the current sheet is left blank and the second page is imaged on the next sheet.

13.1 ForcePage Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
ForcePage	May	May	May	**Must**

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported.

14. HoleMaking

A HoleMaking object specifies how a job, document, or range of pages in a job or document is to be punched or drilled. A HoleMaking object contains attributes that specify the number of holes to punch and the edge of the sheet to punch.

14.1 HoleMaking Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
HoleMaking	May	May	May	**Must**
hole-making-reference-edge	May	May	May	**Must** {LEFT, RIGHT}
hole-making-count	May	May	May	May

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported.

15. InsertSheet

An InsertSheet object specifies information that describes an insert sheet that is to be inserted in the job or document. An insert sheet will not be imaged/printed with content from the document data stream.

An InsertSheet object contains attributes that specify where the insert sheet is to be placed in the job or a document (before or after specific page numbers), the media that is to be used for the insert sheet, the number of insert sheets to insert, and other insert sheet information.

15.1 InsertSheet Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
InsertSheet	May	May	May	**Must**
insert-sheet-content	May	May	May	**Must**
insert-sheet-count	May	May	May	May
insert-sheet-media	May	May	May	**Must**
insert-sheet-pages	**Must**	**Must**	**Must**	**Must**
insert-sheet-position	**Must**	**Must**	**Must**	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

16. Job

A Job object specifies a description of a job and how it is to be processed. A Job object contains attributes that specify job-name (description) and job-copies (processing).

16.1 Job Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
Job	**Must**	**Must**	**Must**	**Must**
job-billing-code	May	May	May	**Must**
job-binding	May	May	May	**Must**
job-client-id	May	May	**Must**	**Must**
job-collate	May	**Must**	**Must**	**Must**
job-comment	May	May	**Must**	**Must**
job-compression	**Must** {NONE}	**Must** {NONE}	**Must** {NONE}	**Must** {NONE}
job-contact-info	May	May	May	**Must**
job-copies	May	May	**Must**	**Must**
job-create-user-name	**Must**	**Must**	**Must**	**Must**
job-destinations-uri	**Must** {Single-Valued}	**Must** {Single - Valued}	**Must** {Single-Valued}	**Must** {Single-Valued}
job-document-format	**Must** {application/octet-stream}	**Must** {application/octet-stream}	**Must** {application/octet-stream}	**Must** {application/octet-stream}
job-document-natural-language	May	**Must**	**Must**	**Must**
job-documents	**Must**	**Must**	**Must**	**Must**
job-feed-orientation	May	May	May	**Must**
job-fit-policy	**Must** {FIT_TO_PAGE}	**Must** {FIT_TO_PAGE}	**Must** {FIT_TO_PAGE}	**Must** {FIT_TO_PAGE}
job-folding	May	May	May	**Must**
job-force-pages	May	May	May	**Must**
job-hold	May	May	May	**Must**
job-hole-making	May	May	May	**Must**
job-image-alignment-x	May	May	May	**Must**
job-image-alignment-y	May	May	May	**Must**
job-image-shift-back-x	May	May	May	**Must**
job-image-shift-back-y	May	May	May	**Must**

Attribute	*E/M*	*D/H*	*O/N*	*Prod*
job-image-shift-front-x	May	May	May	**Must**
job-image-shift-front-y	May	May	May	**Must**
job-include-pages	May	May	May	**Must**
job-insert-sheets	May	May	May	**Must**
job-jog-offset	May	May	May	**Must**
job-margin-bottom	**Must**	**Must**	**Must**	**Must**
job-margin-left	**Must**	**Must**	**Must**	**Must**
job-margin-top	**Must**	**Must**	**Must**	**Must**
job-margin-right	**Must**	**Must**	**Must**	**Must**
job-media	**Must**	**Must**	**Must**	**Must**
job-message-to-operator	May	May	May	**Must**
job-name	May	May	**Must**	**Must**
job-number-up-x	May	**Must**	**Must**	**Must**
job-number-up-y	May	**Must**	**Must**	**Must**
job-output-bin-name	May	**Must**	**Must**	**Must**
job-output-pages	**Must**	**Must**	**Must**	**Must**
job-page-delivery	May	May	May	**Must**
job-rotation	May	**Must**	**Must**	**Must**
job-presentation-direction	May	May	May	**Must**
job-priority	**Must**	**Must**	**Must**	**Must**
job-print-quality	**Must**	**Must**	**Must**	**Must**
job-resolution-x	**Must**	**Must**	**Must**	**Must**
job-resolution-y	**Must**	**Must**	**Must**	**Must**
job-scaling-factor-x	**Must**	**Must**	**Must**	**Must**
job-scaling-factor-y	May	May	May	**Must**
job-separator-sheets	May	May	**Must**	**Must**
job-sides	May	**Must**	**Must**	**Must**
job-stitching	May	May	**Must** {(CORNER,TOP-LEFT)}	**Must**
job-subscriptions	May	May	May	**Must**
job-trimming	May	May	May	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

17. JobDocumentPage

JobDocumentPage is an abstract object that contains attributes that can be specified for the Job or Document objects. For example, one media can be specified for the entire job, which can be overridden by another media for a specific document in the job, which can be overridden by another media for specific pages in the job or document.

17.1 JobDocumentPage Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
JobDocument Page	**Must**	**Must**	**Must**	**Must**

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported.

18. JobTicketInfo

A JobTicketInfo object specifies job ticket information, such as a comment describing the job ticket, the version of the JTAPI, the type or syntax (JDF, PWG, etc.) of job ticket, and other job ticket information. A JobTicketInfo object does not contain job processing information.

18.1 JobTicketInfo Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
JobTicketInfo	**Must**	**Must**	**Must**	**Must**
jt-api-charset	**Must** {“UTF8”}	**Must** {“UTF8:}	**Must** {“UTF8”}	**Must** {“UTF8”}
jt-api-version	**Must**	**Must**	**Must**	**Must**
jt-author-name	May	May	**Must**	**Must**
jt-charset	**Must**	**Must**	**Must**	**Must**
jt-comment	May	**Must**	**Must**	**Must**
jt-job	**Must**	**Must**	**Must**	**Must**
jt-mandatory-attributes	**Must**	**Must**	**Must**	**Must**
jt-type-and-version	**Must**	**Must**	**Must**	**Must**
jt-length-units	**Must** {MICRO}	**Must** {MICRO}	**Must** {MICRO}	**Must** {MICRO}
jt-version	May	May	May	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

19. Media

A Media object specifies a media that is to be used when printing the job, document, or a range of pages in the job or document. A Media object contains attributes that specify a name that describes the media dimensions (for example, na_letter_8.5x11in), the color of the media, the actual media dimensions, and other media information.

19.1 Media Attributes & Conformance

Attribute	*E/M*	*D/H*	*O/N*	*Prod*
Media	**Must**	**Must**	**Must**	**Must**
media-back-coating	May	May	May	**Must**
media-color	May	May	**Must**	**Must**
media-color-name	May	May	**Must**	**Must**
media-description	May	May	May	**Must**
media-front-coating	**Must**	**Must**	**Must**	**Must**
media-hole-count	May	May	May	**Must**
media-input-tray-name	May	May	**Must**	**Must**
media-manual-feed	**Must**	**Must**	**Must**	**Must**
media-name	May	May	May	**Must**
media-preprinted	May	May	May	**Must**
media-recycled	May	May	May	**Must**
media-recycled-percentage	May	May	May	**Must**
media-set-count	May	May	May	**Must**
media-size-name	**Must**	**Must**	**Must**	**Must**
media-type	**Must**	**Must**	**Must**	**Must**
media-weight	May	May	May	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

20. SeparatorSheet

A SeparatorSheet object specifies information that describes separator sheets. A separator sheet will not be imaged and/or printed with content from the document data stream.

A SeparatorSheet object contains attributes that specify where the separator sheets are to be placed (before or after the job or document, between copies, etc.), the media that is to be used for the separator sheet, and a message that is to be imaged/printed on the separator sheet.

20.1 SeparatorSheet Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
SeparatorSheet	May	May	May	**Must**
separator-sheet-media	May	May	May	**Must**
separator-sheet-message	May	May	May	**Must**
separator-sheet-type	**Must** {BEFORE_JOB}	**Must** {BEFORE_JOB}	**Must** {BEFORE_JOB}	**Must**

Not-Set is required for all attribute implemented. "{-}" indicates value the must be supported.

21. Stitching

A Stitching object specifies how a job, document, or range of pages in a job or document is to be stapled and/or stitched. A Stitching object contains attributes that specify the number of stitches, the type of stitch (for example, corner, edge, or saddle), the edge of the sheet to stitch, and other stitching information.

21.1 Stitching Attributes & Conformance

Attribute	*E/M*	*D/H*	*O/N*	*Prod*
Stitching	May	May	May	**Must**
stitching-angle	May {tbd}	May {tbd}	May {tbd}	**Must** {tbd}
stitching-count	May	May	May	**Must** {1, 2}
stitching-reference-edge	May	May	May	**Must** {LEFT, RIGHT}
stitching-type	**Must** {CORNER, NONE}	**Must** {CORNER, NONE}	**Must** {CORNER, NONE}	**Must**

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

22. Subscription

A Subscription object specifies subscription for notification of events that are to be sent to a specific destination. A Subscription object contains attributes that specify the events to be sent, the character set, the language, the comment text to be included in the notification, delivery method (for example, email), and other subscription information.

22.1 Subscription Attributes & Conformance

Attribute	***E/M***	***D/H***	***O/N***	***Prod***
Subscription	May	May	May	**Must**
subscription-charset	**Must** {UTF-8}	**Must** {UTF-8}	**Must** {UTF-8}	**Must** {UTF-8}
subscription-comment	May	May	May	**Must**
subscription-events	**Must** {tbd}	**Must** {tbd}	**Must** {tbd}	**Must** {tbd}
subscription-job-attributes	May	May	May	May
subscription-natural-language	May	May	May	May
subscription-send-to-uri	**Must** {tbd}	**Must** {tbd}	**Must** {tbd}	**Must** {tbd}

Not-Set is required for all attribute implemented. “{-}“ indicates value the must be supported.

23. Static Library Configuration of JTAPI

24. Dynamic Link Library Configuration of JTAPI

25. RPC Configuration of JTAPI

APPENDIX: A - Normative References

[ISO639] multi-part International Standard, presently consisting of [ISO639-1] and [ISO639-2].

[ISO639-1] Codes for the Representation of Names of Languages -- Part 1: Alpha-2 Code, ISO/IEC 639-1, 2000.

[ISO639-2] Codes for the Representation of Names of Languages -- Part 2: Alpha-3 Code, ISO/IEC 639-2, 1998.

[ISO3166] multi-part International Standard, presently consisting of [ISO3166-1] and [ISO3166-2].

[ISO3166-1] Codes for the Representation of Names of Countries and their Subdivisions, Part 1: Country Codes, ISO/IEC 3166-1, 1997.

[ISO3166-2] Codes for the Representation of Names of Countries and their Subdivisions, Part 2: Country Subdivision Codes, ISO/IEC 3166-2, 1998.

[ISO10646] multi-part International Standard, presently consisting of [ISO10646-1] and [ISO10646-2].

[ISO10646-1] Information Technology - Universal Multiple-Octet Code Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane, ISO/IEC 10646-1, September 2000.

[ISO10646-2] Information Technology - Universal Multiple-Octet Code Character Set (UCS) - Part 2: Supplemental Planes, ISO/IEC 10646-2, January 2001.

[RFC2119] Bradner. Key words for use in RFCs to Indicate Requirement Levels, RFC 2119, March 1997.

[RFC2396] Berners-Lee, Fielding, Masinter. URI Generic Syntax, RFC 2396, August 1998.

[RFC2910] Herriot, R., Butler, S., Moore, P., Turner, R., “Internet Printing Protocol/1.1: Encoding and Transport”, RFC 2910, September 2000.

[RFC2911] R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, “ Internet Printing Protocol/1.10: Model and Semantics”, RFC 2911, September 2000.

[RFC2978] Freed, Postel. IANA Charset Registration Procedures, RFC 2978, October 2000.

[RFC3066] Alvestrand. Tags for the Identification of Languages, RFC 3066, January 2001.

APPENDIX: B - Informative References

[cip4] The International Cooperation for the Integration of Processes in Prepress, Press and Postpress (CIP4) located at http://www.cip4.org/

[jdf] The Job Definition Format (JDF), version 1.1, August 2002. Sett the Document tab at: http://www.cip4.org

[pwg] The Printer Working Group located at http://www.pwg.org/

[pwg-sm] Zehler, P., Hastings, T., and Albright, S., Printer Working Group (PWG): Semantic Model, work in progress at ftp://ftp.pwg.org/pub/Semantic-Model/

[IANA-CHAR] IANA Registry of Character Sets ftp://ftp.iana.org/assignments/charset-reg/...

[IANA-MIME] IANA Registry of MIME Media Types ftp://ftp.iana.org/assignments/media-types/...

[RFC2277] Alvestrand. IETF Policy on Character Sets and Languages, RFC 2277, January 1998.

[RFC2279] Yergeau. UTF-8, a Transformation Format of ISO 10646, RFC 2279, January 1998.

APPENDIX: C - Terminology and Acronyms

Conformance Terminology

In this document, the uppercase terms "MUST", "MUST NOT" and "MAY" are intended to be interpreted as described in [RFC2119]

In this document, each conformance statement uses one of the terms:

Table 1 Conformance Statement Terms

Term	*Meaning*
MUST	Implementation support is required for conformance to this specification.
MAY	Implementation support is optional for conformance to this specification.

In this document, the term "support" is defined as:

Table 2 Conformance Support Terms

Term	*Meaning*
"support an operation"	An implementation MUST accept a syntactically correct instance of the operation (includes all required parameters) and MUST return one of the defined results for the invoked operation.
"support an object"	An implementation MUST accept a syntactically correct instance of the object (includes all required attributes), MUST locally instantiate the object and MUST return one of the defined results for the invoked operation.
"support an attribute"	An implementation MUST accept a syntactically correct instance of the attribute (includes a valid value) and MUST locally instantiate the attribute. Further, an implementation MUST accept at least one value (other than the empty value NOT_SET) defined for the given attribute.
Element	Object operation or attribute.

Other Terminology

Table 3 Miscellaneous Terms

Term	*Meaning*
Job Ticket	A set of one or more job processing activities (e.g. stapling, binding, number of copies, insert sheet), contained within a file or stream, serialized into some file format (for example, the XML instance textual encoding of a CIP4 JDF Job Ticket).
Job	A set of one or more processing activities, contained within a "Job Ticket", described by "Job Description" attributes, and processed according to "Job Processing" attributes.
Document	A single document to be processed, contained within a "Job", described by "Document Description" attributes, and processed according to "Document Processing" attributes.
Document Processing	
Page	A single logical page in a source document. Multiple source pages may be included in a single "Impression" on a "Side" of a "Sheet".
Sheet	A single physical piece of media.
Side	A single side (front or back) of "Sheet" of media.
Impression	A single image marked (by some means) on a "Side" of a "Sheet".

Acronyms

Table 4 Acronyms

Acronyms	*Meaning*	*Source*
CIP4	International **C**ooperation for the **I**ntegration of **P**rocesses in **P**repress, **P**ress and **P**ostpress	http://www.cip4.org/
JDF	**J**ob **D**efinition **F**ormat	Version 1.1, August 2002. See documentation tab at http://www.cip4.org/
PWG	**P**rinter **W**orking **G**roup	http://www.pwg.org/

Acronyms	***Meaning***	***Source***
FSG	Free Standards Group	http://www.freestandards.org
FSG/OP	Free Standards Group – Open Printing	http://www.openprinting.org/
JTAPI	**J**ob **T**icket **A**pplication **P**rogramming **I**nterface	

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Changes

Date	***Affected Version***	***Author***	***Change***
08.12.03	0.30	G. Petrie	Added comments from T. Hastings in the introduction and reference sections.
08.12.03	0.30	G. Petrie	Added comments from I. McDonald in the reference section. Added comments and changes based on discussion from 08.12.03 weekly job-ticket meeting. Many section affected.
08.15.03	0.40	G. Petrie	Added comments and changes based on discussion from 08.12.03 weekly job-ticket meeting. Many section affected.
08.19.03	0.50	G. Petrie	Updated minor change to headings.
08.26.03	0.50 Claudia	G. Petrie	Added Sections 4.0, 4.1 and 4.2 from Claudia's version of 0.50, dated 08.19.03
08.28.03	0.55	G. Petrie	Edits and changes based on 08.28.03 weekly job-ticket meeting for Section 4.0, 4.1, 4.2. The addition table/figure labels and a table/figure table-of-content
10/15/03	0.77	G. Petrie	Updates to attribute compliance table based on 10.14.03 meeting. The addition of attribute #define/string-names to C language header section.
11.04.03	0.81	C. Alimpich	Added attributes/values to compliance table for SeparatorSheet, Stitching, Subscription, and Trimming objects. Removed header file contents (section 5.4).
11.11.03	0.82	G. Petrie	Re-arranged section 4.2. Added discussion table at end of file.
08.09.04	0.84	G. Petrie	Major rewrite of format
09.22.04	0.91	G. Petrie	Removed range, units, type, related columns from attribute tables. Fixed return code for top level api's. Added / deleted object and/or attributes based on group discussion.