



# FSG Open Print

## **PAPI (Open Printing API)**

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# Introduction

- PAPI stands for:
  - Printing Application Programming Interface
  - Pronounced “pappy” or “P.A.P.I.”
- PAPI contains:
  - **Data Structures** for interacting with basic print service objects.
  - **Functions** to perform various operations against a print service or it's objects.
- PAPI is an API for applications to use to perform print service interaction.



# Objectives

- To provide applications a means of interacting with print services without being tied to a particular service or protocol
- To allow a rich, extensible set of information to flow between application and print service
- To support a rich enough set of operations to be useful to most applications with printing needs

# Overview

- Provides abstraction of server, queues (printers and classes), and jobs.
- High-level API focuses on providing a common interface to multiple printing systems and protocols.
- Uses extensible attribute sets based on IPP for representing queue and job information.
  - Multi-valued and typed

# Overview (cont)

- Currently supports
  - Server connection (and authentication were applicable)
  - Basic queue operations:
    - enumerate, query, enable, disable, modify, enumerate/purge jobs
  - Basic job operations:
    - submit, stream, query, cancel, hold, release, modify

# Details

- Data types introduced by the PAPI:
  - `papi_status_t` status/error code enumeration
  - `papi_service_t` server/service connection
  - `papi_printer_t` printer object/handle/context
  - `papi_job_t` job object/handle/context
  - `papi_attribute_t` object attributes
  - `papi_stream_t` stream object/handle/context
  - `papi_job_ticket_t` job ticket
  - `papi_filter_t` filter for limiting printer lists

# Details

## ■ Service API

- papiServiceCreate
  - create a new service object for submitting jobs, listing printers, etc.
- papiServiceDestroy
  - destroys a service object and all associated resources
- papiGet\*() / papiSet\*()
  - Get or set the corresponding service object attributes
    - UserName, Password, Encryption, AuthCB, AppData

# Details

## ■ Printer API

- papiPrintersList
  - Retrieves a list of printer/class queues
- papiPrinterQuery
  - Queries for detailed information about a printer object
- papiPrinterModify
  - Sets printer object attributes
- papiPrinterPause / papiPrinterResume
  - Stop and start job processing on a printer object



# Details

## ■ Printer API (cont)

- papiPrinterPurgeJobs
  - Cancels all jobs on a printer
- papiPrinterListJobs
  - Lists jobs on a printer
- papiPrinterGetAttributeList
  - Retrieve an attribute list from printer object
- papiPrinterListFree / papiPrinterFree
  - Deallocate resources associated with a printer object or list of printer objects

# Details

## ■ Job API

- papiJobSubmit / papiJobSubmitByReference
  - Submit a print job either immediately copying or postponing copy of the job data
- papiJobValidate
  - Verify that the document format and job attributes are valid for and supported by the designated print queue
- papiJobStreamOpen / papiJobStreamWrite / papiJobStreamClose
  - Open/write/close a stream for printing data on-the-fly

# Details

## ■ Job API (cont)

- papiJobQuery
  - Request job information from print service
- papiJobModify
  - Modifies the job attributes
- papiJobCancel
  - Cancels a print job
- papiJobHold / papiJobRelease / papiJobRestart
  - Hold, release, or restart a print job

# Details

## ■ Job API (cont)

### □ papiJobGetAttributeList

- Retrieve the corresponding attribute list from a job object for further lookup or enumeration using the Attribute interface

### □ papiJobGet\*

- Retrieve the corresponding PrinterName, Id or JobTicket from a job object

### □ papiJobListFree / papiJobFree

- Free a job object of list of job objects and their associated resources

# Details

## ■ Attribute API

- papiAttributeListAdd / papiAttributeListAdd\*
  - Adds a single attribute (and value) to an attribute list
  - Supported types include
    - String, integer, boolean, range, resolution, datetime, collection, metadata
- papiAttributeListGet\*
  - Retrieve the value associates with an attribute
- papiAttributeListFind
  - Search for an attribute in a list

# Details

## ■ Attribute API

- papiAttributeListGetNext
  - Walk through an attribute list
- papiAttributeListFromString
  - create/append an attribute list using a text-based format
- PapiAttributeListToString
  - Convert an attribute list to a text base string form
- papiAttributeListFree
  - Deallocate resources associated with an attribute list

# Details

## ■ Miscellaneous API

- PapiStatusString
  - Return a textual representation of a `papi_status_enumeration`
- `papiLibrarySupportedCalls`
  - Enumerate all `papiCalls` that do not simply return `PAPI_OPERATION_NOT_SUPPORTED`
- `PapiLibrarySupportedCall`
  - Determine if a specific function is supported by the implementation

# Accomplishments

- Sep 2002
  - Published template code for v0.5 of specification
- Nov 2002
  - Published v0.9 of specification
- Dec 2002
  - Released implementation of v0.9 on top of CUPS
  - Implemented, but have not released implementation of PAPI on top of System V LP
- Jan 2004
  - Published v0.91 of specification



# Accomplishments (cont)

## ■ Feb 2004

- Released PAPI based code on SourceForge
  - PAPI dynamic library
  - PAPI over CUPS
  - BSD/SYSV print commands implemented on top of the PAPI

## ■ March 2004

- Released PAPI over RFC-1179 support

# What's next - schedule

- Expand functionality in PAPI
  - Administrative operations
  - Document object
- Implement and Release PAPI over IPP support
- Release IPP server implemented over PAPI
- Integrate support for various Open Source projects:
  - GNOME, KDE, OpenOffice, Mozilla, Samba, etc.

# PAPI Working Group Info

## ■ Participants

- Norm Jacobs (Sun) – current editor
- Alan Hlava (IBM)
- Mike Sweet (EasySoftware)
- Ira McDonald (High North Inc)
- Glen Petrie (Epson)

# PAPI Working Group Info (cont)

## ■ Email

- [printing-spool@freestandards.org](mailto:printing-spool@freestandards.org)

- Subscribe

  - <http://freestandards.org/mailman/listinfo/printing-spool>

- Archive


  - <http://freestandards.org/mailman/listinfo/printing-spool>

## ■ IRC:

- [irc.gnome.org#openprinting](irc://irc.gnome.org/#openprinting)

## ■ Source

- <http://sourceforge.net/projects/openprinting>



Thanks for your time and interest!

- Questions and/or comments
- This presentation is located at