## 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

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## 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



Data types introduced by the PAPI:

- □ papi\_status\_t
- papi\_service\_t
- □ papi\_printer\_t
- □ papi job t
- □ papi\_attribute\_t
- □ papi stream t
- □ papi\_job\_ticket\_t
- □ papi\_filter\_t

status/error code enumeration

server/service connection

printer object/handle/context

job object/handle/context

object attributes

stream object/handle/context

job ticket

filter for limiting printer lists



#### 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



#### 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

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#### **Details**

- Printer API (cont)
  - papiPrinterPurgeJobs
    - Cancels all jobs on a printer
  - papiPrinterListJobs
    - Lists jobs on a printer
  - □ papiPrinterGetAttributeList
    - Retreive an attribute list from printer object
  - papiPrinterListFree / papiPrinterFree
    - Deallocate resources associated with a printer object or list of printer objects



#### 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

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#### **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



#### Job API (cont)

- papiJobGetAttributeList
  - Retreive the corresponding attribute list from a job object for further lookup or enumeration using the Attribute interface
- papiJobGet\*
  - Retreive 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



#### 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\*
  - Retreive the value associates with an attribute
- papiAttributeListFind
  - Search for an attribute in a list



#### 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



#### 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

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## 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.

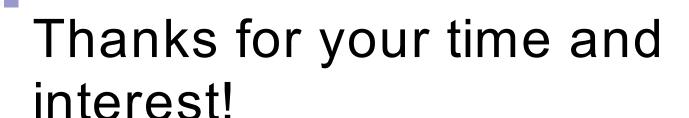


## PAPI Working Group Info

- 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)

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  - □ Archive
    - http://freestandards.org/mailman/listinfo/printing-spool
- IRC:
  - □ irc.gnome.org#openprinting
- Source
  - □ http://sourceforge.net/projects/openprinting



Questions and/or comments

This presentation is located at