PWG DRAFT STANDARD
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Internet Printing Protocol: Additional Optional Operations - Requirements

Status of this Memo

This document is a proposed Printer Working Group (PWG) DRAFT STANDARD.

Abstract

This document addresses the requirements for further extensions to the Internet Printing Protocol (RFC2566) set of operations, attributes and status codes. This requirements document is written in response to several spontaneous requests to extend IPP (of which, "Set 1" is already an accepted PWG Draft Standard) and questions concerning the direction and motives behind these extensions.

1 Introduction

The overall design goals for IPP are stated in ftp://ftp.pwg.org/pub/pwg/ipp/published-ipp-rfcs/rfc2567.txt. There, the roles of End-user, Operator and Administrator are clearly outlined. They will not be repeated here except to point out that overlap can occur between what is considered administrator and operator function depending on the environment. We should be careful to distinguish between the "role" and the "responsibility" in our evaluation of the requirements. For example in a mission critical or production environment, functions ranging from supplies monitoring to updating printer firmware may be the responsibility of an operator. However, these may be considered administrative functions in a standard office environment.

2 Elaboration on Design Goals

The Internet Printing Protocol (IPPv1 and IPPv1.1) drafts represent the first steps in the evolution of an new, industry wide, printing protocol. While the design goals are broad, the initial focus of IPP was clearly aimed at the fundamentals of achieving "print". This

constituted a collection of device characteristics and capabilities, the description of job specific behavior, the ability to "push" or "pull" jobs, and monitor job status. The first IPP effort was intentionally directed at the "end-user".

Almost immediately upon creation of IPP came the desire to have asynchronous notification and control over the printer, the print job and the printing process. The "Set – 1" extensions allow holding and releasing print jobs and pausing the printer itself. (ftp://ftp.pwg.org/pub/pwg/ipp/approved-registrations/operations/ipp-ops-set1-981109.pdf) These extensions were readily accepted among vendors and are already shipping in more than one interoperable implementation.

There is also great interest in the IPP community to address asynchronous notifications ranging from e-mail, pager and instant messaging to UDP and SNMP traps. Notifications will pertain to job and device events alike and registration for notifications will occur both "in-band" with the submission of the print job and "out of band" as a separate IPP operation. Thus, notifications will form the basis for a wide array of IPP extensions.

The combination of IPP print submission, job monitoring, device and job notification is far too powerful to limit to the "end-user" or to scope for a specific set of products (cut-sheet, mid-range printers). As IPP extends it's reach into faster devices, multi-function devices and complete, robust printing systems, more function and control should be provided for the end-user, operator and administrator.

3 Protocol Considerations

When considering a protocol for use in print operations and administration one has to evaluate the likelihood of application support for this protocol. The SNMP Printer MIB enjoys excellent success and widespread support among printer vendors, especially in the form of administrative utilities for homogeneous environments. Limiting factors such as the method of addressing "fan out" via the Host Resources MIB may have prevented widespread acceptance of the Printer MIB as basic OS printing, bi-di driver or channel selection infrastructure. Support for the SNMP Printer MIB (beyond MIB-II network behavior implications) does not appear to have been fully integrated into the major NMS applications as originally intended. An attempt to couple SNMP with printing (the Job MIB) has met with less enthusiasm among print vendors and SNMP standards bodies, alike (although several vendors have embraced it). Meanwhile, platform support for IPP appears to be evolving rapidly. IPP is becoming the basis for complete, robust print solutions including print submission, print job monitoring and device operation and control.

4 Proposed and Accepted Extensions

The following table describes the first two sets of extensions, including Operations aimed at both Job and Printer, attributes and status codes. These extensions all derive as straightforward application of the initial IPP design goals.

	End User	Operator	Admin	Job	Printer
(Set-1)					
Hold Job	✓	✓		✓	
Release Job	✓	✓		✓	
Restart Job	✓	✓		✓	
Pause Printer		✓			✓
Resume Printer		✓			✓
Purge Jobs		✓		✓	
(Set-2)					
Set Printer Attributes		✓	✓		✓
Enable Printer		✓			✓
Disable Printer		✓			✓
Reset Printer		✓	✓		✓
Restart Printer		✓			✓
Shutdown Printer		✓			✓
Set Job Attributes	✓	✓		✓	
Reprocess Job	✓	✓		✓	
Cancel Current Job		✓		✓	✓
Pause Current Job		✓		✓	✓
Resume Job		✓		✓	✓
Promote Job		✓		✓	
Space Current Job		✓		✓	✓
(Attributes)					
Printer Message from Operator		✓			✓

Job Message from Operator		✓		✓	
When (to pause etc.)		✓			✓
(Status Code)					
'client-error-attributes-not-settable'	✓	✓	✓	✓	✓
'server-error-printer-is-in-standby-mode'	✓	✓	✓	✓	✓