9   Internet Printing Protocol (IPP):
10   **The 'mailto' Delivery Method for Event Notifications**

12   Copyright (C) The Internet Society (2000). All Rights Reserved.
13 Status of this Memo

14   This document is an Internet-Draft and is in full conformance with all provisions of Section 10 of
15   [RFC2026]. Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its
16   areas, and its working groups. Note that other groups may also distribute working documents as
17   Internet-Drafts.

18   Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced,
19   or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference
20   material or to cite them other than as "work in progress".

21   The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt

22   The list of Internet-Draft Shadow Directories can be accessed as http://www.ietf.org/shadow.html.

23 **Abstract**

24   The notification extension document [ipp-ntfy] defines operations that a client can perform in order to
25   create *Subscription Objects* in a Printer and carry out other operations on them. The Subscription
26   Object specifies that when one of the specified *Events* occurs, the Printer sends an asynchronous *Event*
27   *Notification* to the specified *Notification Recipient* via the specified *Delivery Method* (i.e., protocol).

28   This document describes an extension to the Internet Printing Protocol/1.0 (IPP) [RFC2566, RFC2565]
29   and IPP/1.1 [RFC2911, RFC2910]. This document specifies the 'mailto' Delivery Method for use with
30   the "IPP Event Notifications and Subscriptions" specification [ipp-ntfy]. When IPP Notification [ipp-
31   ntfy] is supported, the Delivery Method defined in this document is one of the RECOMMENDED
32   Delivery Methods for Printers to support. The notification extension document [ipp-ntfy] specifies that
33   each Delivery Method is defined in another document. This document is one such document, and it
34   specifies the 'mailto' Delivery Method.

35   For this Delivery Method, when an Event occurs, the Printer immediately sends an Event Notification
36   via an email message to the Notification Recipient specified in the Subscription Object. The message
37   body of the email consists of Human Consumable text that is not intended to be parsed by a machine.
38   The Notification Recipient receives the Event Notification in the same way as it receives any other email

39   message.

40   The basic set of IPP documents includes:

41   Design Goals for an Internet Printing Protocol [RFC2567]
42   Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
43   Internet Printing Protocol/1.1: Model and Semantics [ipp-mod]
44   Internet Printing Protocol/1.1: Encoding and Transport [ipp-pro]
45   Internet Printing Protocol/1.1: Implementer's Guide [ipp-iig]
46   Mapping between LPD and IPP Protocols [RFC2569]
47   Internet Printing Protocol (IPP): IPP Event Notification Specification [ipp-ntfy]
48
49   The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed
50   printing functionality, and it enumerates real-life scenarios that help to clarify the features that need to
51   be included in a printing protocol for the Internet. It identifies requirements for three types of users:
52   end users, operators, and administrators. It calls out a subset of end user requirements that are satisfied
53   in IPP/1.0. A few OPTIONAL operator operations have been added to IPP/1.1.

54   The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document
55   describes IPP from a high level view, defines a roadmap for the various documents that form the suite of
56   IPP specification documents, and gives background and rationale for the IETF working group's major
57   decisions.

58   The "Internet Printing Protocol/1.1: Model and Semantics" document describes a simplified model with
59   abstract objects, their attributes, and their operations that are independent of encoding and transport. It
60   introduces a Printer and a Job object. The Job object optionally supports multiple documents per Job.
61   It also addresses security, internationalization, and directory issues.

62   The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the
63   abstract operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines
64   the encoding rules for a new Internet MIME media type called "application/ipp". This document also
65   defines the rules for transporting over HTTP a message body whose Content-Type is "application/ipp".
66   This document also defines a new scheme named 'ipp' for identifying IPP printers and jobs.

67   The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to
68   implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some
69   of the considerations that may assist them in the design of their client and/or IPP object
70   implementations. For example, a typical order of processing requests is given, including error checking.
71   Motivation for some of the specification decisions is also included.

72   The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of
73   gateways between IPP and LPD (Line Printer Daemon) implementations.

74   The "Event Notification Specification" document describes an extension to the IPP/1.0, IPP/1.1, and
75   future versions. This extension allows a client to subscribe to printing related Events. The Subscription
76   Object specifies that when one of the specified *Event* occurs, the Printer sends an asynchronous *Event*
77   *Notification* to the specified *Notification Recipient* via the specified *Delivery Method* (i.e., protocol). A
78   client associates Subscription Objects with a particular Job by performing the Create-Job-Subscriptions

79   operation or by submitting a Job with subscription information. A client associates Subscription Objects
80   with the Printer by performing a Create-Printer-Subscriptions operation. Four other operations are
81   defined for Subscription Objects: Get-Subscriptions-Attributes, Get-Subscriptions, Renew-Subscription,
82   and Cancel Subscription.

83

83 **Table of Contents**

124   **Table of Tables**

133

1 Introduction

The notification extension "IPP Event Notifications and Subscriptions" document [ipp-ntfy] defines an OPTIONAL extension to Internet Printing Protocol/1.0 (IPP) [RFC2566, RFC2565] and IPP/1.1 [RFC2911, RFC2910] (for a description of the base IPP documents, see section 13). That extension defines operations that a client can perform in order to create *Subscription Objects* in a Printer and carry out other operations on them. A Subscription Object represents a Subscription abstraction. A client associates Subscription Objects with a particular Job by performing the Create-Job-Subscriptions operation or by submitting a Job with subscription information. A client associates Subscription Objects with the Printer by performing a Create-Printer-Subscriptions operation. Four other operations are defined for Subscription Objects: Get-Subscriptions-Attributes, Get-Subscriptions, Renew-Subscription, and Cancel-Subscription. The Subscription Object specifies that when one of the specified *Events* occurs, the Printer sends an asynchronous *Event Notification* to the specified *Notification Recipient* via the specified *Delivery Method* (i.e., protocol).

The "IPP Event Notifications and Subscriptions" notification extension document [ipp-ntfy] specifies that each Delivery Method is defined in another document. This document is one such document, and it specifies the 'mailto' delivery method. When IPP Notification [ipp-ntfy] is supported, the Delivery Method defined in this document is one of the RECOMMENDED Delivery Methods and Printers to support.

For this Delivery Method, when an Event occurs, the Printer immediately sends an Event Notification via an email message to the Notification Recipient specified in the Subscription Object. The message body of the email consists of Human Consumable text that is not intended to be parsed by a machine. The 'mailto' Delivery Method is a 'push' Delivery Method as defined in [ipp-ntfy].

The Notification Recipient receives the Event Notification in the same way as it receives any other email message.

2 Terminology

This section defines the following terms that are used throughout this document:

This document uses the same terminology as [RFC2911], such as "client", "Printer", "attribute", "attribute value", "keyword", "operation", "request", "response", and "support".

Capitalized terms, such as **MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED NOT,** and **OPTIONAL**, have special meaning relating to conformance to this specification. These terms are defined in [ipp-mod section 13.1 on conformance terminology, most of which is taken from as defined in RFC 2119 [RFC2119] and [RFC2911] section 12.1. If an implementation supports the extension defined in this document, then these terms apply; otherwise, they do not. These terms define conformance to *this document only*; they do not affect conformance to other documents, unless explicitly stated otherwise.

168   Capitalized terms, such as Notification Recipient, Event Notification, Compound Event Notification,
169   Printer, etc., are defined in [ipp-ntfy], have the same meanings, and are not reproduced here.For
170   capitalized terms that appear in this document, see [ipp-ntfy].

3 Model and Operation

172   In a Subscription Creation Operation, when the value of the "notify-recipient-uri" attribute contains the
173   URI scheme "mailto", the client is requesting that the Printer use the 'mailto' Delivery Method for
174   Event Notifications generated from the new Subscription Object.

175   For this Delivery Method, the "notify-recipient-uri" attribute value MUST consist of a "mailto" scheme
176   followed by a colon, and then followed by an address part (e.g.. 'mailto:smith@abc.com'). See section
177   5.2.1 for the syntax of the "notify-recipient-uri" attribute value for this Delivery Method.

178   A Printer MUST support SMTP [RFC821], and it MAY support other email protocols. A Printer MAY
179   use additional services, such as SMTP delivery status notification [RFC1891] or S/MIME encryption
180   [RFC2633].

181   If the client wants the Printer to send Event Notifications via the 'mailto' Delivery Method, the client
182   MUST choose a value for "notify-recipient-uri" attribute which conforms to the rules of section 5.2.1.
183   To avoid denial-of-service attacks, a client SHOULD NOT use distribution lists as the Notification
184   Recipient.

185   When an Event occurs, the Printer MUST immediately:

186   1. Find all pertinent Subscription Objects P according to the rules of section 9 of [ipp-ntfy], AND

187   2. Find the subset M of these Subscription Objects P whose "notify-recipient-uri" attribute has a
188   scheme value of 'mailto', AND

189   3. For each Subscription Object in M, the Printer MUST

190   a) generate an email message as specified in section 5.2.2 AND

191   b) send the email message to the Notification Recipient specified by the address part of the "notify-
192   recipient-uri" attribute value (see section 5.2.1).

193   If the Printer supports only SMTP, it MUST send the email message via SMTP. If the Printer supports
194   additional email protocols, it MUST determine the protocol from the address part of the "notify-
195   recipient-uri" attribute value and then send the email message via the appropriate email protocol.

196   When a Subscribing Client is subscribing to the 'job-progress' event (which is a frequently occurring
197   event), it SHOULD supply the "notify-time-interval" attribute (see [ipp-ntfy]) in the Subscription
198   Creation request with a suitable value to limit the time between 'job-progress' Event Notifications sent
199   by the Printer.

200 **4 General Information**

201 If a Printer supports this Delivery Method, the following are its characteristics.

202 **Table 1 – Information about the Delivery Method**

Document Method Conformance Requirement	Delivery Method Realization
1. What is the URL scheme name for the Delivery Method?	mailto
2. Is the Delivery Method REQUIRED, RECOMMENDED, or OPTIONAL for an IPP Printer to support?	RECOMMENDED
3. What transport and delivery protocols does the Printer use to deliver the Event Notification Content, i.e., what is the entire network stack?	A Printer MUST support SMTP. It MAY support other email protocols.
4. Can several Event Notifications be combined into a Compound Event Notification?	A Printer implementation MAY combine several Event Notifications into a single email message (see section 6).
5. Is the Delivery Method initiated by the Notification Recipient (pull), or by the Printer (push)?	This Delivery Method is a push.
6. Is the Event Notification content Machine Consumable or Human Consumable?	Human Consumable
7. What section in this document answers the following question? For a Machine Consumable Event Notification, what is the representation and encoding of values defined in section 9.1 of [ipp-ntfy] and the conformance requirements thereof? For a Human Consumable Event Notification, what is the representation and encoding of pieces of information defined in section 9.2 of [ipp-ntfy] and the conformance requirements thereof?	Section 6
8. What are the latency and reliability of the transport and delivery protocol?	Same as the underlying SMTP (or other optional) email transport
9. What are the security aspects of the transport and delivery protocol, e.g., how it is handled in firewalls?	Same as the underlying SMTP (or other optional) email transport
10. What are the content length restrictions?	None
11. What are the additional values or pieces of information that a Printer sends in an Event Notification content and the conformance requirements thereof?	None
12. What are the additional Subscription Template and/or Subscription Description attributes and the	See section 5.1.1 on "notify-mailto-text-only"

conformance requirements thereof?	
13. What are the additional Printer Description attributes and the conformance requirements thereof?	None

203 5 Subscription Template Attributes

204 5.1 Additional Subscription Template Attributes

205 This Delivery Method introduces one additional Subscription Template Attribute (See Table 2).

206 **Table 2 – Additional Subscription Template Attributes**

Attribute in Subscription Object	Default and Supported Printer Attributes
notify-mailto-text-only (boolean)	N/A

207 5.1.1 notify-mailto-text-only (boolean)

208 When the Printer generates an Event Notification from a Subscription Object, this attribute specifies
209 whether the Printer generates the Event Notification with only plain text (i.e. 'text/plain') or with
210 Content-Types that the Printer chooses.

211 The Printer MUST support this attribute if it supports the 'mailto' Delivery Method.

212 A client MAY supply this attribute. If a client does not supply this attribute, the Printer MUST populate
213 this attribute with the value of 'false' on the Subscription Object. There is no "notify-mailto-text-only-
214 default" attribute.

215 If the value of this attribute is 'true' in a Subscription Object, the message body of each Event
216 Notification that the Printer generates from the Subscription Object MUST contain plain text only (i.e.
217 'text/plain' with the charset specified by the "notify-charset" Subscription Object attribute).

218 If the value of this attribute is 'false' in a Subscription Object, the Content-Type of the message body of
219 each Event Notification that the Printer generates from the Subscription Object MUST be either
220 'text/plain' or 'multipart', depending on implementation. If the Content-Type is 'multipart', one
221 message body of the 'multipart' MUST be the same as the 'text/plain' message body when this attribute
222 has the value of 'true'. Each of the other message bodies of the 'multipart' MAY be any Content-Type
223 (e.g. 'text/html', 'image/gif', 'audio/basic', etc.).

224 A Printer MUST support both values ('true' and 'false') of this attribute. There is no "notify-mailto-
225 text-only-supported" attribute.

226 5.2 Additional Information about Subscription Template Attributes

227 This section describes additional values for attributes defined in [ipp-ntfy].

5.2.1 notify-recipient-uri (uri)

This section describes the syntax of the value of this attribute for the 'mailto' Delivery Method. The syntax for values of this attribute for other Delivery Method is defined in other Delivery Method Documents.

In order to support the 'mailto' Delivery Method, the Printer MUST support the following syntax for the 'mailto' Delivery Method when the Printer uses SMTP. The line below use RFC 822 syntax rules and terms.

"mailto:" mailbox

Note: the above syntax allows 1 occurrence of 'mailbox'. The occurrence of 'mailbox' represents an email address of a Notification Recipient.

For SMTP, the phrase 'address part' of the "notify-recipient-uri" attribute value refers to the 'mailbox' part of the value. Example:

```
mailto:jones@acme.com
```

Unlike other URLs, the mailto scheme MUST NOT use // after the colon (see [RFC2368]).

The Printer MAY support other syntax for the 'address part' if it supports email protocols in addition to SMTP.

As noted in [ipp-ntfy], the uriScheme value of the corresponding "notify-schemes-supported" Printer attribute does not include the ":" character.

5.2.2 notify-user-data (octetString(63))

This attributes has a special use for the 'mailto' Delivery Method. It specifies the email address of the Subscribing Client. It is primarily useful when the Notification Recipient is some person other than the Subscribing Client. Then the Notification Recipient has a way to reply to the Subscribing Client.

If a client specifies this Delivery Method in a Subscription Creation Operation, and the specified Notification Recipient is not associated with the same person as the client, the client SHOULD supply its email address as the value of the "notify-user-data" attribute. If the client does not supply this attribute, the Printer MUST NOT populate the Subscription Object with this attribute.

6 Event Notification Content

This section describes the content of an Event Notification sent via the 'mailto' Delivery Method using the SMTP protocol. This document does not describe the content for other email protocols, but an implementation should use this section as a model.

259 When a Printer sends an email message via SMTP, the content MUST conform to RFC 822. The
260 following sections define the content that a Printer MUST send. A Printer MAY send additional content
261 as long as the resulting content conforms to RFC 822.

262 While the "Event Notification Ordering" in [ipp-ntfy] section 9 specifies ordering requirements for
263 Printers when sending separate Event Notifications, email messages are not guaranteed to arrive in the
264 order sent so that the Notification Recipient may not receive them in the same order.

265 Each subsection below specifies the syntax that pertains to the subsection. The syntax rules and
266 syntactic terms (e.g. 'date-time') in each subsection come from RFC 822, except for the section on
267 "Content-Type" which comes from RFC 1521.

268 The Event Notification content has two parts, the headers and the message body. The headers precede
269 the message body and are separated by a blank line (see [RFC 822]).

270 A Printer implementation MAY combine several Event Notifications into a single email message body.
271 Such an email message is considered a single Compound Event Notification and MUST follow the
272 "Event Notification Ordering" requirements for Event Notifications within a Compound Event
273 Notification specified in [ipp-ntfy] section 9.

6.1 Headers

275 When a Printer sends an Event Notification via SMTP, it MUST include the following headers. RFC
276 822 RECOMMENDS that the headers be in the order that they appear below.

6.1.1 'Date' header

278 **Syntax:**   "Date" ":" date-time

279 This header contains the date and time that the Event occurred.

280 The Printer MUST include a "Date" header if and only if it supports the "printer-current-time" Printer
281 attribute.

6.1.2 'From' header

283 **Syntax:**   "From" ":" mailbox

284 where

285   mailbox = addr-spec / phrase route-addr

286 This header causes a typical email reader to show the email as coming from the Printer that is sending
287 the Event Notification.

288   The Printer MUST include a "From" header whose syntax is specified above.

289   The Printer MUST use the second alternative of the syntax for 'mailbox' defined above (i.e. 'phrase
290   route-addr').   The 'phrase' is the Printer's display name and it MUST be the value of the "printer-
291   name" Printer attribute. The 'route-addr' MUST contain an email address (inside angle brackets)
292   belonging to either an administrator or the output-device. This email address NEED NOT be capable of
293   receiving mail. There is no Printer attribute to hold this email address, so that it cannot be configured
294   using the IPP protocol without an implementation-defined attribute extension.

6.1.3 'Subject' header

296   **Syntax:** "Subject" ":" *text

297   This header specifies the subject of the message and contains a short summary of the Event Notification.

298   The Printer MUST include a "Subject" header whose syntax is specified above.

299   The Printer MUST localize the '*text' using the values of the "notify-charset" and "notify-natural-
300   language" Subscription Object attributes.

301   For Printer Events, the '*text' SHOULD start with the localized word "printer:", followed by the
302   Printer name, and then followed by the localized Event name, e.g., in English: "printer: 'tiger' stopped"
303   or in Danish: "-Printeren 'tiger-' er standset-".

304   For Job Events, the '*text' SHOULD start with the localized phrase "print job:", followed by the Job
305   name, and then followed by the localized Event name, e.g., in English: "print job: 'financials'
306   completed".

307   The wording is implementation dependent. A Notification Recipient MUST NOT expect to be able to
308   parse this text. But an email filter might look for "printer" or "print job".

6.1.4 'Sender' header

310   **Syntax:**   "Sender" ":" mailbox

311   This header causes a typical email reader to show the email as coming on behalf of the person
312   associated with the Subscribing Client.

313   If the Subscription Object contains the "notify-user-data" attribute, and if its value satisfies the RFC 822
314   syntax rules for 'mailbox', the Printer MUST include a "Sender" header whose syntax is specified
315   above. Otherwise, the Printer MUST NOT include a "Sender" header.

316   For the "Sender" header, the 'mailbox' MUST be the value of the "notify-user-data" Subscription
317   Object attribute. See section 5.2.2 for details about the "notify-user-data" attribute.

318 **6.1.5 'Reply-to' header**

319   **Syntax:** "Reply-to" ":" mailbox

320   If the Notification Recipient replies to Event Notification email, this header causes a typical email reader
321   to send email to the person acting as the Subscribing Client. The rules are identical to the "Sender"
322   header.

323   If the Subscription Object contains the "notify-user-data" attribute, and if its value satisfies the RFC 822
324   syntax rules for "mailbox", the Printer MUST include a "Reply-to" header whose syntax is specified
325   above. Otherwise, the Printer MUST NOT include a "Reply-to" header.

326   For the "Reply-to" header, the "mailbox" MUST be the value of the "notify-user-data" Subscription
327   Object attribute. See section 5.2.2 for details about the "notify-user-data" attribute.

328 **6.1.6 'To' header**

329   **Syntax:** "To" ":" 1#mailbox

330   See [RFC 1521] for the syntax.

331   This header specifies the Notification Recipient(s).

332   The Printer MUST include a "To" header whose syntax is specified above.

333   The '1#mailbox' MUST be the '1#mailbox' part of the value of the "notify-recipient-uri" Subscription
334   attribute, i.e. the part after the "mailto:".

335 **6.1.7 'Content-type' header**

336   **Syntax:** "Content-Type" ":" type "/" subtype *(";"parameter)

337   See [RFC 1521] for the syntactic terms (e.g. 'type').

338   This header specifies the format of the message body.

339   The Printer MUST include the "Content-Type" header.

340   The "notify-mailto-text-only" attribute determines the 'type' and 'subtype' values. The possible values
341   are "text/plain" and "multipart" values.

342 **6.2 Message Body**

343   The message body MUST contain Human Consumable content as plain text. It MAY also contain other
344   types of implementation dependent content.

345   For plain text, the Content-Type of Human Consumable content MUST be 'text/plain'. For
346   implementation dependent content, the Content-Type of Human Consumable content MUST be
347   'multipart'. The Content-Type of one body part MUST be 'text/plain' and the Content-Types of the
348   other body parts are implementation dependent. See section 6.3 for a description of plain text content.

349   The following table shows the Content-Type of the message body for the "notify-mailto-text-only"
350   attribute:

"notify-mailto-text-only" attribute	Content-Type of Message Body	Message Body
false	'text/plain'	Human Consumable
true	'text/plain' or*	Human Consumable plain text
	'multipart'	Human Consumable where one body part is plain text

351
352   * The Content-Type depends on the implementation. A Printer MAY send 'text/plain' only or it MAY
353   send several body parts of various Content-Types within a message body whose Content-Type is
354   'multipart'.

6.3 Plain Text Content

356   When a Printer sends a plain text message, it MUST localize the text using the values of the "notify-
357   charset" and "notify-natural-language" Subscription Object attributes.

358   Section 9.2 in [ipp-ntfy] specifies the information that a Delivery Method MUST specify and a Printer
359   SHOULD send.

360   A Printer SHOULD send the following localized information in the message body. The specific wording
361   of this information and its layout are implementation dependent.

362   a) the Printer name (see Table 3)
363   b) omitted (see below).
364   c) for Printer Events only:
365   i)   the Event (see Table 4) and/or Printer state information (see Table 7)
366   d) for Job Events only:
367   i)   the job identity (see Table 5)
368   ii) the Event (see Table 4) and/or Job state information (see Table 6)
369
370   Item b) in the above list is omitted because the Printer sends the time of the Event as an email header
371   (see section 6.1.1 on the 'Date' header).

372   The subsections of this section specify the attributes that a Printer MUST use to obtain this information.

373   The Printer MAY send additional information, depending on implementation.

374   Notification Recipients MUST NOT expect to be able to parse the message.

375   The next three sections define the attributes in Event Notification Contents that are:

376   a) for all Events

377   b) for Job Events only

378   c) for Printer Events only

379 6.3.1 Event Notification Content Common to All Events

380   The Printer MUST send the following information.

381   There is a separate table for each piece of information. Each row in the table represents a source value
382   for the information and the values are listed in order of preference, with the first one being the preferred
383   one. An implementation SHOULD use the source value from the earliest row in each table. It MAY use
384   the source value from another row instead, or it MAY combine the source values from several rows. An
385   implementation is free to determine the best way to present this information.

386   The tables in this section and following sections contain the following columns for each piece of
387   information:

388   a) **Source of Value:** the name of the attribute that supplies the value for the Event Notification

389   b) **Sends:**

390   **MAY:** this is the only value used in the tables. It means that the Printer OPTIONALLY
391   sends this value. However, the Printer SHOULD use at least one value from each table.

392   c) **Source Object:** the object from which the source value comes.

393   Table 3 lists the source of the information for the Printer Name. The "printer-name" is more user-
394   friendly unless the Notification Recipient is in a place where the Printer name is not meaningful. For
395   example, an implementation could have the intelligence to send the value of the "printer-name" attribute
396   to a Notification Recipient that can access the Printer via value of the "printer-name" attribute and
397   otherwise send the value of the "notify-printer-uri" attribute.

398   **Table 3 – Printer Name in Event Notification Content**

Source Value	Sends	Source Object
printer-name (name(127))	MAY	Printer
notify-printer-uri (uri)	MAY	Subscription

399

400   Table 4 lists the source of the information for the Event name. A Printer MAY combine this information
401   with state information described for Jobs in Table 6 or for Printers in Table 7.

402   **Table 4 – Event Name in Event Notification Content**

Source Value	Sends	Source Object
notify-subscribed-event (type2 keyword)	MAY	Subscription

403

404   **6.3.2 Additional Event Notification Content for Job Events**

405   This section lists the source of the additional information that a Printer MUST send for Job Events.

406   Table 5 lists the source of the information for the job name. The "job-name" is likely more meaningful
407   to a user than "job-id".

408   **Table 5 – Job Name in Event Notification Content**

Source Value	Sends	Source Object
job-name (name(MAX))	MAY	Job
job-id (integer(1:MAX))	MAY	Job

409

410   Table 6 lists the source of the information for the job-state. If a Printer supports the "job-state-message"
411   and "job-detailed-state-message" attributes, it SHOULD use those attributes for the job state
412   information, otherwise, it should fabricate such information from the "job-state" and "job-state-
413   reasons". For some Events, a Printer MAY combine this information with Event information.

414   **Table 6 – Job State in Event Notification Content**

Source Value	Sends	Source Object
job-state-message (text(MAX))	MAY	Job
job-detailed-status-messages (1setOf text(MAX))	MAY	Job
job-state (type1 enum)	MAY	Job
job-state-reasons (1setOf type2 keyword)	MAY	Job

415   **6.3.3 Additional Event Notification Content for Printer Events**

416   This section lists the source of the additional information that a Printer MUST send for Printer Events.

417   Table 7 lists the source of the information for the printer-state. If a Printer supports the "printer-state-
418   message", it SHOULD use that attribute for the job state information, otherwise it SHOULD fabricate

419   such information from the "printer-state" and "printer-state-reasons". For some Events, a Printer MAY
420   combine this information with Event information.

421   **Table 7 – Printer State in Event Notification Content**

Source Value	Sends	Source Object
printer-state-message (text(MAX))	MAY	Printer
printer-state (type1 enum)	MAY	Printer
printer-state-reasons (1setOf type2 keyword)	MAY	Printer
printer-is-accepting-jobs (boolean)	MAY	Printer

422   **6.4 Examples**

423   This section contains three examples. One is a Job Event and the other two are Printer Events, the latter
424   in Danish.

425   A Printer implementation NEED NOT generate Event Notification content that is identical or even
426   similar to these examples. In fact it would be unfortunate if every implementation copied these example
427   as is. These examples merely show some possibilities and are not necessarily the best way to convey
428   information about an Event.

429   **6.4.1 Job Event Example**

430   This section contains an example of an Event Notification of a Job Event.

431   A Subscribing Client Mike Jones (who works for xyz Corp.) performs a Subscription Creation
432   Operation as part of the Print-Job operation on Printer "ipp://tiger@abc.com". Mike Jones specifies that
433   the "job-name" is "financials". Mike is printing the Job for Bill Smith at abc Corp. The Subscription
434   Object then has the following attributes:

Attribute Name	Attribute Value
notify-recipient-uri	mailto:bsmith@abc.com
notify-events	job-completed
notify-user-data	mjones@xyz.com
notify-mailto-text-only	true
notify-charset	us-ascii
notify-natural-language	en-us
notify-subscription-id	35692
notify-sequence-number	0
notify-printer-up-time	34593
notify-printer-uri	ipp://tiger@abc.com
notify-job-id	345
notify-subscriber-user-name	mjones

435

436   When the Job completes, the Printer generates and sends the following email message:

```
437     Date: 17 Jul 00 1632 PDT
438     From: tiger <printAdmin@abc.com>
439     Subject: print job: 'financials' completed
440     Sender: mjones@xyz.com
441     Reply-to: mjones@xyz.com
442     To: bsmith@abc.com
443     Content-type: text/plain
444
445     printer: tiger
446     job: financials
447     job-state: completed
448
```

449   The reader should note that the phrases are not identical to IPP keywords. They have been localized to
450   English.

6.4.2 Printer Event Example

452   This section contains an example of an Event Notification of a Printer Event.

453   A Subscribing Client Peter Williams, a Printer admin, performs a Create-Printer-Subscriptions operation
454   on Printer "ipp://tiger@abc.com". The Subscription Object then has the following attributes:

Attribute Name	Attribute Value
notify-recipient-uri	mailto:pwilliams@abc.com
notify-events	printer-state-changed
notify-mailto-text-only	true
notify-charset	us-ascii
notify-natural-language	en-us
notify-subscription-id	4623
notify-sequence-number	0
notify-printer-uptime	23002
notify-printer-uri	ipp://tiger@abc.com
notify-lease-expiration-time	0
notify-subscriber-user-name	pwilliams

455

456   When the Printer jams, the Printer generates and sends the following email message:

```
457    Date: 29 Aug 00 0832 PDT
458    From: tiger <printAdmin@abc.com>
459    Subject: printer: 'tiger' has stopped
460    To: pwilliams@abc.com
461    Content-type: text/plain
462
463    Printer tiger has stopped with a paper jam.
464
```

465   The reader should note that the phrases are not identical to IPP keywords. They have been localized to
466   English.

6.4.3 Printer Event Example (localized to Danish)

468   This section contains an example of an Event Notification of a Printer Event localized to Danish.

469   A Subscribing Client Per Jensen, a Printer admin, performs a a Create-Printer-Subscriptions operation
470   on Printer "ipp://tiger@def.dk". The Subscription Object then has the following attributes:

Attribute Name	Attribute Value
notify-recipient-uri	mailto:pjensen@def.dk
notify-events	printer-state-changed
notify-mailto-text-only	true
notify-charset	utf-8
notify-natural-language	da
notify-subscription-id	50225
notify-sequence-number	0
notify-printer-uptime	53217
notify-printer-uri	ipp://tiger@def.dk
notify-lease-expiration-time	0
notify-subscriber-user-name	pjensen

471

472   When the Printer jams, the Printer generates and sends the following email message:

```
473     Date: 29 Jan 00 0832 CET
474     From: tiger <admin@def.dk>
475     Subject: Printeren 'tiger' er standset
476     To: pjensen@def.dk
477     Content-type: text/plain;charset=utf-8
478
479     Printerens navn er 'tiger'.
480     Printeren er standset.
481     Aarsagen er papir stop.
482
```

7 Conformance Requirements

484   The 'mailto' Delivery Method is RECOMMENDED for a Printer to support.

485   If the Printer supports the 'mailto' Delivery Method, the Printer MUST:

486   1. meet the conformance requirements defined in [ipp-ntfy].

487   2. support the "notify-mailto-text-only"" Subscription Object attribute defined in section 5.1.1.

488   3. support the syntax for the "notify-recipient-uri" Subscription Object attribute defined in section
489   5.2.1

490   4. support the use for the "notify-user-data" Subscription Object attribute defined in section 5.2.2

491   5. support SMTP for sending Event Notifications.

492   6. support the 'text/plain' Content-Type for the message body.

493   7. support sending Event Notification via email with the content specified in section 5.2.

8 IANA Considerations

Because the 'mailto' URL scheme is already defined in a standards track document [RFC 2368] and has been registered with IANA as a URL scheme, this document does not require ~~anything further of IANA~~that the mailto URL scheme be further registered as a protocol scheme.

The rest of this section contains the exact registration information for IANA to add to the various IPP Registries according to the procedures defined in RFC 2911 [RFC2911] section 6 to cover the definitions in this document.

> *Note to RFC Editors: Replace RFC NNNN below with the RFC number for this document, so that it accurately reflects the content of the information for the IANA Registry.*

8.1 Attribute Registration

The following table lists the attribute defined in this document.   This is to be registered according to the procedures in RFC 2911 [RFC2911] section 6.2.

```
Subscription Template attributes:                  Ref.        Section:
notify-mailto-text-only (boolean)                  RFC NNNN       5.1.1
```

The resulting attribute registration will be published in the
ftp://ftp.iana.org/in-notes/iana/assignments/ipp/attributes/
area.

8.2 Additional uriScheme Attribute Value Registration for the "operations-supported" Printer Attribute

The following table lists the uriScheme value defined in this document as an additional uriScheme value for use with the "notify-schemes-supported" Printer attribute defined in [ipp-ntfy]. This is to be registered according to the procedures in RFC 2911 [RFC2911] section 6.1.

```
uriScheme Attribute Values:                        Ref.        Section:
mailto                                             RFC NNNN       5.2.1
```

The resulting uri scheme attribute value registration will be published in the
ftp://ftp.iana.org/in-notes/iana/assignments/ipp/attribute-values/notify-schemes-supported/
area.

9 Internationalization Considerations

This Delivery Method presents no internationalization considerations beyond those covered in the [ipp-ntfy] document, and sections 6.1.3 and 6.2 of this document.

527 The Notification Recipient is expected to present the email as received because the Printer does all
528 necessary localization to the Event Notification contents.

10 Security Considerations

530 The biggest security concern is that a Subscribing Client will cause unsolicited Event Notifications to be
531 sent to third parties, potentially creating denial-of-service problems (i.e., spam). The problem is even
532 worse if the third parties are distribution lists.

533 There exist scenarios where third party notification is required (see Scenario #2 and #3 in [ipp-not-
534 req]). The fully secure solution would require active agreement of all persons before they can become
535 Notification Recipients. However, requirement #9 in [ipp-req] ("There is no requirement for IPP
536 Printer receiving the print request to validate the identity of an event recipient") argues against this. To
537 minimize the risk, a Printer could disallow third party Notification Recipients (a traditional facsimile
538 model).

539 The Delivery Method recommends that the Subscribing Client supply his or her email address as the
540 value of the "notify-user-data" attribute in the Subscription Creation Operation when the Notification
541 Recipient is a third party. To reduce the chance of spamming or identify the spammer, a Printer could
542 disallow third party Notification Recipients if the Subscribing Client doesn't supply the "notify-user-
543 data" attribute with a valid email address.

544 Some firewall administrators prevent mail attachments from being accepted into their organizations
545 because of the problem of the attachments containing computer viruses. The 'mailto' Delivery Method
546 allows the Subscribing Client to request that the Content-Type of a message body be 'text/plain'.

11 References

548 [ipp-iig]
549 Hastings, T., Manros, C., Kugler, K, Holst H., Zehler, P., "Internet Printing Protocol/1.1: draft-ietf-
550 ipp-implementers-guide-v11-031.txt, work in progress, May 9, 2000July 17, 2001.

551 [ipp-mod]
552 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
553 Semantics", <draft-ietf-ipp-model-v11-07.txt>, May 22, 2000.

554 [ipp-ntfy]
555 Herriot, R., Hastings, T., Isaacson, S., Martin, J., deBry, R., Shepherd, M., Bergman, R., "Internet
556 Printing Protocol/1.1: IPP Event Notifications and Subscriptions Specification", <draft-ietf-ipp-not-
557 spec-074.txt>, August 30, 2000July 17, 2001.

558 [ipp-pro]
559 Herriot, R., Butler, S., Moore, P., Tuner, R., "Internet Printing Protocol/1.1: Encoding and
560 Transport", draft-ietf-ipp-protocol-v11-06.txt, May 20, 2000.

561   [RFC821]
562   Jonathan B. Postel, "Simple Mail Transfer Protocol", RFC 821, August, 1982.

563   [RFC822]
564   David H. Crocker, "Standard For The Format Of ARPA Internet Text Messages", RFC 822, August
565   13, 1982.

566   [RFC1341]
567   N. Borenstein, N. Freed, "MIME (Multipurpose Internet Mail Extensions): Mechanisms for
568   Specifying and Describing the Format of Internet Message Bodies", RFC 1341, June, 1992.

569   [RFC1521]

570   N. Borenstein, N. Freed, "MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for
571   Specifying and Describing the Format of Internet Message Bodies", RFC 1521, September 1993.

572   [RFC1891]
573   K. Moore, "SMTP Service Extension for Delivery Status Notifications", RFC 1891, January 1996

574   [RFC2026]
575   S. Bradner, "The Internet Standards Process -- Revision 3", RFC 2026, October 1996.

576   [RFC2046]
577   R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext
578   Transfer Protocol - HTTP/1.1", RFC 2616, June 1999.

579   [RFC2368]
580   P. Hoffman, L. Masinter, J. Zawinski, "The mailto URL scheme", RFC 26162368, July 1998.

581   -[RFC2616]
582   R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext
583   Transfer Protocol - HTTP/1.1", RFC 2616, June 1999.

584   -[RFC2633]
585   B. Ramsdell, "S/MIME Version 3 Message Specification", RFC 2633, June 1999.

586   [RFC2910]
587   Herriot, R., Butler, S., Moore, P., Tuner, R., "Internet Printing Protocol/1.1: Encoding and
588   Transport", RFC 2910, September, 2000.

589   [RFC2911]
590   R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
591   Semantics", RFC 2911, September, 2000.

12 Author's Addresses

Robert Herriot
Xerox Corporation
3400 Hillview Ave., Bldg #1
Palo Alto, CA 94304

Phone: 650-813-7696
Fax: 650-813-6860
Email: robert.herriot@pahv.xerox.com

Henrik Holst
i-data international a/s
Vadstrupvej 35-43
2880 Bagsvaerd, Denmark

Phone: +45 4436-6000
Fax: +45 4436-6111
e-mail: hh@i-data.com

Tom Hastings
Xerox Corporation
737 Hawaii St. ESAE 231
El Segundo, CA 90245

Phone: 310-333-6413
Fax: 310-333-5514
e-mail: hastings@cp10.es.xerox.com

Carl-Uno Manros
Xerox Corporation
737 Hawaii St. ESAE 231
El Segundo, CA 90245

Phone: 310-333-8273
Fax: 310-333-5514
e-mail: manros@cp10.es.xerox.com

IPP Web Page: http://www.pwg.org/ipp/
IPP Mailing List: ipp@pwg.org

To subscribe to the ipp mailing list, send the following email:
    1) send it to majordomo@pwg.org

636   2) leave the subject line blank
637   3) put the following two lines in the message body:
638   subscribe ipp
639   end
640
641   Implementers of this specification document are encouraged to join IPP Mailing List in order to
642   participate in any discussions of clarification issues and review of registration proposals for additional
643   attributes and values. In order to reduce spam the mailing list rejects mail from non-subscribers, so you
644   must subscribe to the mailing list in order to send a question or comment to the mailing list.

645 13 Summary of Base IPP Documents

646   The base set of IPP documents includes:

647   Design Goals for an Internet Printing Protocol [RFC2567]
648   Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
649   Internet Printing Protocol/1.1: Model and Semantics [RFC2911]
650   Internet Printing Protocol/1.1: Encoding and Transport [RFC2910]
651   Internet Printing Protocol/1.1: Implementer's Guide [ipp-iig]
652   Mapping between LPD and IPP Protocols [RFC2569]
653   Internet Printing Protocol (IPP): IPP Event Notifications and Subscriptions [ipp-ntfy]
654
655   The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed
656   printing functionality, and it enumerates real-life scenarios that help to clarify the features that need to
657   be included in a printing protocol for the Internet. It identifies requirements for three types of users:
658   end users, operators, and administrators. It calls out a subset of end user requirements that are satisfied
659   in IPP/1.0. A few OPTIONAL operator operations have been added to IPP/1.1.

660   The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document
661   describes IPP from a high level view, defines a roadmap for the various documents that form the suite of
662   IPP specification documents, and gives background and rationale for the IETF working group's major
663   decisions.

664   The "Internet Printing Protocol/1.1: Model and Semantics" document describes a simplified model with
665   abstract objects, their attributes, and their operations that are independent of encoding and transport. It
666   introduces a Printer and a Job object. The Job object optionally supports multiple documents per Job.
667   It also addresses security, internationalization, and directory issues.

668   The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the
669   abstract operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines
670   the encoding rules for a new Internet MIME media type called "application/ipp". This document also
671   defines the rules for transporting over HTTP a message body whose Content-Type is "application/ipp".
672   This document defines the 'ippget' scheme for identifying IPP printers and jobs.

673 The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to
674 implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some
675 of the considerations that may assist them in the design of their client and/or IPP object
676 implementations. For example, a typical order of processing requests is given, including error checking.
677 Motivation for some of the specification decisions is also included.

678 The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of
679 gateways between IPP and LPD (Line Printer Daemon) implementations.

680 The "IPP Event Notifications and Subscriptions" document defines an extension to IPP/1.0 [RFC2566,
681 RFC2565] and IPP/1.1 [RFC2911, RFC2910]. This extension allows a client to subscribe to printing
682 related Events and defines the semantics for delivering asynchronous *Event Notifications* to the
683 specified *Notification Recipient* via a specified *Delivery Method* (i.e., protocols) defined in (separate)
684 Delivery Method documents.

685 ## 14 Full Copyright Statement

703 **Acknowledgement**
704