

Internet Printing Protocol Working Group  
INTERNET DRAFT  
<[draft-ietf-ipp-url-scheme-04.txt](#)>  
Updates: RFC [2910](#)  
[Target Category: Standards Track]  
Expires 10 July 2002

Bob Herriot  
Consultant  
Ira McDonald  
High North Inc  
10 January 2002

IPP URL Scheme  
<[draft-ietf-ipp-url-scheme-04.txt](#)>

Copyright (C) The Internet Society (2002). All Rights Reserved.

## Status of this Memo

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

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

To view the list of Internet-Draft Shadow Directories, see <http://www.ietf.org/shadow.html>.

## Abstract

This memo defines the "ipp" URL scheme for registration by IANA in the IETF tree. This memo fully conforms to the requirements in [\[RFC2717\]](#). The "ipp" URL (Uniform Resource Locator) scheme is used for specifying the location of an IPP Printer, IPP Job, or other IPP object (defined in any future version of IPP) which implements the IPP/1.1 Model [\[RFC2911\]](#) and the IPP/1.1 Protocol encoding over HTTP [\[RFC2910\]](#) or any later version of IPP. The intended usage of the "ipp" URL scheme is COMMON.

Internet Draft

IPP URL Scheme

10 January 2002

## Table of Contents

<a href="#">1.</a>	<a href="#">Introduction .....</a>	<a href="#">3</a>
<a href="#">2.</a>	<a href="#">Terminology .....</a>	<a href="#">4</a>
<a href="#">2.1.</a>	<a href="#">Conformance Terminology .....</a>	<a href="#">4</a>
<a href="#">2.2.</a>	<a href="#">Model Terminology .....</a>	<a href="#">4</a>
<a href="#">3.</a>	<a href="#">IPP Model for Printers and Jobs .....</a>	<a href="#">5</a>
<a href="#">4.</a>	<a href="#">IPP URL Scheme .....</a>	<a href="#">6</a>
<a href="#">4.1.</a>	<a href="#">Applicability and Intended Usage .....</a>	<a href="#">6</a>
<a href="#">4.2.</a>	<a href="#">Associated IPP Port .....</a>	<a href="#">6</a>
<a href="#">4.3.</a>	<a href="#">Associated IPP MIME Type .....</a>	<a href="#">6</a>
<a href="#">4.4.</a>	<a href="#">Character Encoding .....</a>	<a href="#">6</a>
<a href="#">4.5.</a>	<a href="#">Syntax in ABNF .....</a>	<a href="#">7</a>
<a href="#">4.5.1.</a>	<a href="#">IPP URL Examples .....</a>	<a href="#">8</a>
<a href="#">4.5.2.</a>	<a href="#">IPP URL Comparisons .....</a>	<a href="#">9</a>
<a href="#">5.</a>	<a href="#">Conformance Requirements .....</a>	<a href="#">10</a>
<a href="#">5.1.</a>	<a href="#">Conformance Requirements for IPP Clients .....</a>	<a href="#">10</a>
<a href="#">5.2.</a>	<a href="#">Conformance Requirements for IPP Printers .....</a>	<a href="#">10</a>
<a href="#">6.</a>	<a href="#">IANA Considerations .....</a>	<a href="#">11</a>
<a href="#">7.</a>	<a href="#">Internationalization Considerations .....</a>	<a href="#">11</a>
<a href="#">8.</a>	<a href="#">Security Considerations .....</a>	<a href="#">11</a>
<a href="#">9.</a>	<a href="#">References .....</a>	<a href="#">12</a>
<a href="#">10.</a>	<a href="#">Acknowledgments .....</a>	<a href="#">12</a>
<a href="#">11.</a>	<a href="#">Authors' Addresses .....</a>	<a href="#">13</a>
<a href="#">12.</a>	<a href="#">Full Copyright Statement .....</a>	<a href="#">14</a>
<a href="#">13.</a>	<a href="#">Appendix X - Change History .....</a>	<a href="#">15</a>

Internet Draft

IPP URL Scheme

10 January 2002

## 1. Introduction

See [section 1](#) 'Introduction' in [\[RFC2911\]](#) for a full description of the IPP document set and overview information about IPP.

This memo defines the "ipp" URL scheme for registration by IANA in the IETF tree. This memo fully conforms to the requirements in [\[RFC2717\]](#). The "ipp" URL (Uniform Resource Locator) scheme is used for specifying the location of an IPP Printer, IPP Job, or other IPP object (defined in any future version of IPP) which implements the IPP/1.1 Model [\[RFC2911\]](#) and the IPP/1.1 Protocol encoding over HTTP [\[RFC2910\]](#) or any later version of IPP. The intended usage of the "ipp" URL scheme is COMMON.

The IPP URL scheme defined in this document is based on the ABNF for the HTTP URL scheme defined in HTTP/1.1 [\[RFC2616\]](#), which is derived from the URI Generic Syntax [\[RFC2396\]](#) and further updated by [\[RFC2732\]](#) and [\[RFC2373\]](#) (for IPv6 addresses in URLs). An IPP URL is transformed into an HTTP URL according to the rules specified in [section 5](#) of the IPP/1.1 Encoding and Transport [\[RFC2910\]](#).

This document defines:

- IPP URL scheme applicability and intended usage;
- IPP URL scheme associated port (i.e., well-known port 631);
- IPP URL scheme associated MIME type (i.e., "application/ipp");
- IPP URL scheme character encoding;
- IPP URL scheme syntax in ABNF [\[RFC2234\]](#);
- IPP URL scheme IANA, internationalization, and security considerations.

This document is laid out as follows:

- [Section 2](#) is the terminology used throughout the document.

- [Section 3](#) provides references to the IPP Printer and IPP Job object model.
- [Section 4](#) specifies the IPP URL scheme.
- [Section 5](#) specifies the conformance requirements for IPP Clients and IPP Printers that claim conformance to this document.
- Sections [6](#), [7](#), and [8](#) specify IANA, internationalization, and security considerations.
- Sections [9](#), [10](#), [11](#), and [12](#) list references, acknowledgements, authors' addresses, and full IETF copyright statement.

## [2.](#) Terminology

This specification document uses the terminology defined in this section.

### 2.1. Conformance Terminology

The uppercase terms "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)]. These terms are used to specify conformance requirements for all implementations of this specification.

### 2.2. Model Terminology

See [section 12.2](#) 'Model Terminology' in [[RFC2911](#)].

### 3. IPP Model for Printers and Jobs

See [section 2](#) 'IPP Objects', [section 2.1](#) 'Printer Object', and [section 2.2](#) 'Job Object' in [[RFC2911](#)] for a full description of the IPP object model and terminology.

In this document, "IPP Client" means the software (on some hardware platform) that submits, monitors, and/or manages print jobs via IPP/1.1 [[RFC2910](#)] [[RFC2911](#)], or any later version of IPP to a spooler, gateway, or actual printing device.

In this document, "IPP Printer object" means the software (on some hardware platform) that receives print jobs and/or printer/job operations via IPP/1.1 [[RFC2910](#)] [[RFC2911](#)], or any later version of IPP from an "IPP Client".

In this document, "IPP Printer" is a synonym for "IPP Printer object".

In this document, "IPP Job object" means the set of attributes and documents for one print job on an "IPP Printer".

In this document, "IPP Job" is a synonym for "IPP Job object".

In this document, "IPP URL" means a URL with the "ipp" scheme.

Note: In this document, "IPP URL" is a synonym for "ipp\_URL" (in [section 4](#) 'IPP URL Scheme' of this document) and "ipp-URL" (in [section 5](#) 'IPP URL Scheme' of [[RFC2910](#)]).

## [4.](#) IPP URL Scheme

### 4.1. Applicability and Intended Usage

This memo defines the "ipp" URL scheme for registration by IANA in the IETF tree. This memo fully conforms to the requirements in [[RFC2717](#)]. The "ipp" URL (Uniform Resource Locator) scheme is used for specifying the location of an IPP Printer, IPP Job, or other IPP object (defined in any future version of IPP) which implements the IPP/1.1 Model [[RFC2911](#)] and the IPP/1.1 Protocol encoding over HTTP

[[RFC2910](#)] or any later version of IPP. The intended usage of the "ipp" URL scheme is COMMON.

#### 4.2. Associated IPP Port

All IPP URLs which do NOT explicitly specify a port MUST be used over IANA-assigned well-known port 631, as registered in [[IANA-PORTREG](#)].

See: IANA Port Numbers Registry [[IANA-PORTREG](#)].

See: IPP Encoding and Transport [[RFC2910](#)].

#### 4.3. Associated IPP MIME Type

All IPP protocol operations (requests and responses) MUST be conveyed in an "application/ipp" MIME media type as registered in [[IANA-MIMereg](#)]. IPP URLs MUST refer to IPP Printers which support this "application/ipp" MIME media type.

See: IANA MIME Media Types Registry [[IANA-MIMereg](#)].

See: IPP Encoding and Transport [[RFC2910](#)].

#### 4.4. Character Encoding

The IPP URL scheme defined in this document is based on the ABNF for the HTTP URL scheme defined in HTTP/1.1 [[RFC2616](#)], which is derived from the URI Generic Syntax [[RFC2396](#)] and further updated by [[RFC2732](#)] and [[RFC2373](#)] (for IPv6 addresses in URLs). An IPP URL is transformed into an HTTP URL according to the rules specified in [section 5](#) of the IPP/1.1 Encoding and Transport [[RFC2910](#)].

The IPP URL scheme is case-insensitive in the host name or host

address part; however the path part is case-sensitive, as in [[RFC2396](#)]. Codepoints outside [[US-ASCII](#)] MUST be hex escaped by the mechanism specified in [[RFC2396](#)].

#### 4.5. Syntax in ABNF

Note: In this document, "IPP URL" is a synonym for "ipp\_URL" (in [section 4](#) 'IPP URL Scheme' of this document) and "ipp-URL" (in [section 5](#) 'IPP URL Scheme' of [\[RFC2910\]](#)).

This memo defines the "ipp" URL scheme for registration by IANA in the IETF tree. This memo fully conforms to the requirements in [\[RFC2717\]](#). The "ipp" URL (Uniform Resource Locator) scheme is used for specifying the location of an IPP Printer, IPP Job, or other IPP object (defined in any future version of IPP) which implements the IPP/1.1 Model [\[RFC2911\]](#) and the IPP/1.1 Protocol encoding over HTTP [\[RFC2910\]](#) or any later version of IPP. The intended usage of the "ipp" URL scheme is COMMON.

The IPP protocol places a limit of 1023 octets (NOT characters) on the length of a URI (see [section 4.1.5](#) 'uri' in [\[RFC2911\]](#)). An IPP Printer MUST return 'client-error-request-value-too-long' (see [section 13.1.4.10 in \[RFC2911\]](#)) when a URI received in a request (e.g., in the "printer-uri" attribute) is too long.

Note: IPP Printers ought to be cautious about depending on URI lengths above 255 bytes, because some older client implementations might not properly support these lengths.

IPP URLs MUST be represented in absolute form. Absolute URLs always begin with a scheme name followed by a colon. For definitive information on URL syntax and semantics, see "Uniform Resource Identifiers (URI): Generic Syntax and Semantics" [\[RFC2396\]](#). This specification adopts the definitions of "host", "port", "abs\_path", "rel\_path", and "query" from [\[RFC2396\]](#), as updated by [\[RFC2732\]](#) and [\[RFC2373\]](#) (for IPv6 addresses in URLs).

The IPP URL scheme syntax in ABNF is as follows:

```
ipp_URL = "ipp:" "/" host [ ":" port ] [ abs_path [ "?" query ] ]
```

If the port is empty or not given, port 631 is assumed. The semantics are that the identified resource (see [section 5.1.2 of \[RFC2616\]](#)) is located at the IPP Printer or IPP Job listening for HTTP connections on that port of that host, and the Request-URI for the identified resource is 'abs\_path'.

If the 'abs\_path' is not present in the URL, it MUST be given as "/" when used as a Request-URI for a resource (see [section 5.1.2](#) of



[\[RFC2616\]](#))).

#### 4.5.1. IPP URL Examples

The following are examples of valid IPP URLs for IPP Printers:

```
ipp://abc.com
ipp://abc.com/printer
ipp://abc.com/tiger
ipp://abc.com/printers/tiger
ipp://abc.com/printers/fox
ipp://abc.com/printers/tiger/bob
ipp://abc.com/printers/tiger/ira
ipp://printer.abc.com
ipp://printers.abc.com/tiger
ipp://printers.abc.com/tiger/bob
ipp://printers.abc.com/tiger/ira
```

Each of the above URLs are legitimate URLs for IPP Printers and each references a logically different IPP Printer, even though some of the IPP Printers may share the same hardware. The last part of the path 'bob' or 'ira' may represent two different hardware devices where 'tiger' represents some grouping of IPP Printers (e.g., a load-balancing spooler) or the two names may represent separate human recipients ('bob' and 'ira') on the same hardware device (e.g., a printer supporting two job queues). In either case both 'bob' and 'ira' behave as different IPP Printers.

The following are examples of IPP URLs with (optional) ports and paths:

```
ipp://abc.com
ipp://abc.com/~smith/printer
ipp://abc.com:631/~smith/printer
```

The first and second IPP URLs above MUST be resolved to port 631 (IANA assigned well-known port for IPP). The second and third IPP URLs above are equivalent (see [section 4.5.2](#) below).

The following literal IPv4 addresses:

```
192.9.5.5                ; IPv4 address in IPv4 style
186.7.8.9                ; IPv4 address in IPv4 style
```

are represented in the following example IPP URLs:

```
ipp://192.9.5.5/prt1
ipp://186.7.8.9/printers/tiger/bob
```

Internet Draft

IPP URL Scheme

10 January 2002

The following literal IPv6 addresses (conformant to [[RFC2373](#)]):

::192.9.5.5	; IPv4 address in IPv6 style
::FFFF:129.144.52.38	; IPv4 address in IPv6 style
2010:836B:4179::836B:4179	; IPv6 address per <a href="#">RFC 2373</a>

are represented in the following example IPP URLs:

```
ipp://[::192.9.5.5]/prt1
ipp://[::FFFF:129.144.52.38]:631/printers/tiger
ipp://[2010:836B:4179::836B:4179]/printers/tiger/bob
```

#### 4.5.2. IPP URL Comparisons

When comparing two IPP URLs to decide if they match or not, an IPP Client MUST use the same rules as those defined for HTTP URI comparisons in [[RFC2616](#)], with the sole following exception:

- A port that is empty or not given MUST be treated as equivalent to the well-known port for that IPP URL (port 631);

See: [Section 3.2.3](#) 'URI Comparison' in [[RFC2616](#)].

## 5. Conformance Requirements

### 5.1. Conformance Requirements for IPP Clients

IPP Clients that conform to this specification:

- a) MUST send IPP URLs (e.g., in the "printer-uri" operation attribute in 'Print-Job') that conform to the ABNF specified in [section 4.5](#) of this document;
- b) MUST send IPP operations via the port specified in the IPP URL (if present) or otherwise via IANA assigned well-known port 631;
- c) MUST convert IPP URLs to their corresponding HTTP URL forms according to the rules in [section 5](#) 'IPP URL Scheme' in [[RFC2910](#)];
- d) SHOULD interoperate with IPP/1.0 Printers according to the rules in [section 9](#) 'Interoperability with IPP/1.0 Implementations' and [section 9.2](#) 'Security and URL Schemes' in [[RFC2910](#)].

### 5.2. Conformance Requirements for IPP Printers

IPP Printers that conform to this specification:

- a) SHOULD reject received IPP URLs in "application/ipp" request bodies (e.g., in the "printer-uri" attribute in a 'Print-Job' request) that do not conform to the ABNF for IPP URLs specified in [section 4.5](#) of this document;
- b) SHOULD return IPP URLs in "application/ipp" response bodies (e.g., in the "job-uri" attribute in a 'Print-Job' response) that do

conform to the ABNF for IPP URLs specified in [section 4.5](#) of this document;

- c) MUST listen for IPP operations on IANA-assigned well-known port 631, unless explicitly configured by system administrators or site policies;
- d) SHOULD NOT listen for IPP operations on any other port, unless explicitly configured by system administrators or site policies;
- e) SHOULD interoperate with IPP/1.0 Clients according to the rules in [section 9](#) 'Interoperability with IPP/1.0 Implementations' and [section 9.2](#) 'Security and URL Schemes' in [[RFC2910](#)].

Herriot, McDonald

Expires 10 July 2002

[Page 10]

---

Internet Draft

IPP URL Scheme

10 January 2002

## [6.](#) IANA Considerations

This memo defines the "ipp" URL scheme for registration by IANA in the IETF tree. This memo fully conforms to the requirements in [[RFC2717](#)]. The "ipp" URL (Uniform Resource Locator) scheme is used for specifying the location of an IPP Printer, IPP Job, or other IPP object (defined in any future version of IPP) which implements the IPP/1.1 Model [[RFC2911](#)] and the IPP/1.1 Protocol encoding over HTTP [[RFC2910](#)] or any later version of IPP. The intended usage of the "ipp" URL scheme is COMMON.

This IPP URL Scheme specification does not introduce any additional IANA considerations, beyond those described in [[RFC2910](#)] and [[RFC2911](#)].

See: [Section 6](#) 'IANA Considerations' in [[RFC2910](#)]

See: [Section 6](#) 'IANA Considerations' in [[RFC2911](#)].

## [7.](#) Internationalization Considerations

This IPP URL Scheme specification does not introduce any additional internationalization considerations, beyond those described in [[RFC2910](#)] and [[RFC2911](#)].

See: [Section 7](#) 'Internationalization Considerations' in [[RFC2910](#)].

See: [Section 7](#) 'Internationalization Considerations' in [[RFC2911](#)].

## 8. Security Considerations

This IPP URL Scheme specification does not introduce any additional security considerations, beyond those described in [[RFC2910](#)] and [[RFC2911](#)].

See: [Section 8](#) 'Security Considerations' in [[RFC2910](#)].

See: [Section 8](#) 'Security Considerations' in [[RFC2911](#)].

## 9. References

See: [Section 10](#) 'References' in [[RFC2910](#)].

[IANA-MIMereg] IANA MIME Media Types Registry.  
<ftp://ftp.iana.org/in-notes/iana/assignments/media-types/...>

[IANA-PORTREG] IANA Port Numbers Registry.  
<ftp://ftp.iana.org/in-notes/iana/assignments/port-numbers>

[RFC2234] D. Crocker, P. Overell. Augmented BNF for Syntax Specifications: ABNF, [RFC 2234](#), November 1997.

[RFC2373] R. Hinden, S. Deering. IP Version 6 Addressing Architecture, [RFC 2373](#), July 1998.

[RFC2396] T. Berners-Lee, R. Fielding, L. Masinter. Uniform Resource Identifiers (URI): Generic Syntax, [RFC 2396](#), August 1998.

[RFC2616] R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee. Hypertext Transfer Protocol -- HTTP/1.1,

[RFC 2616](#), June 1999.

[RFC2717] R. Petke, I. King. Registration Procedures for URL Scheme Names, [RFC 2717](#), November 1999.

[RFC2732] R. Hinden, B. Carpenter, L. Masinter. Format for Literal IPv6 Addresses in URL's, [RFC 2732](#), December 1999.

[RFC2910] R. Herriot, S. Butler, P. Moore, R. Turner, J. Wenn. IPP/1.1 Encoding and Transport, [RFC 2910](#), September 2000.

[RFC2911] T. Hastings, R. Herriot, R. deBry, S. Isaacson, P. Powell. IPP/1.1 Model and Semantics, [RFC 2911](#), September 2000.

[US-ASCII] Coded Character Set -- 7-bit American Standard Code for Information Interchange, ANSI X3.4-1986.

## [10.](#) Acknowledgments

This document is a product of the Internet Printing Protocol Working Group of the Internet Engineering Task Force (IETF).

Thanks to Pat Fleming (IBM), Tom Hastings (Xerox), Harry Lewis (IBM), Hugo Parra (Novell), Don Wright (Lexmark), and all the members of the IETF IPP WG.

Herriot, McDonald

Expires 10 July 2002

[Page 12]

---

Internet Draft

IPP URL Scheme

10 January 2002

[Section 5](#) 'IPP URL Scheme' in IPP/1.1 Encoding and Transport [\[RFC2910\]](#) was the primary input to this IPP URL Scheme specification.

## [11.](#) Authors' Addresses

Robert Herriot  
Consultant  
706 Colorado Ave  
Palo Alto, CA 94303

Phone: +1 650-327-4466  
Fax: +1 650-327-4466  
Email: bob@herriot.com

Ira McDonald  
High North Inc  
221 Ridge Ave  
Grand Marais, MI 49839

Phone: +1 906-494-2434 or +1 906-494-2697  
Email: imcdonald@sharplabs.com

Usage questions and comments on this IPP URL Scheme should be sent directly to the editors at their above addresses (and to the IPP mailing list, if you are a subscriber - see below).

IPP Web Page: <http://www.pwg.org/ipp/>  
[IPP](mailto:ipp@pwg.org) Mailing List: ipp@pwg.org

To subscribe to the IPP mailing list, send the following email:

- 1) send it to majordomo@pwg.org
- 2) leave the subject line blank
- 3) put the following two lines in the message body:  
subscribe ipp  
end

Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any discussions of clarification issues and comments. In order to reduce spam the mailing list rejects mail from non-subscribers, so you must subscribe to the mailing list in order to send a question or comment to the IPP mailing list.

## [12.](#) Full Copyright Statement

Copyright (C) The Internet Society (2002). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published

and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.



### 13. Appendix X - Change History

[To be deleted before RFC publication]

10 January 2002 - [draft-ietf-ipp-url-scheme-04.txt](#)

- final edits after IESG 'last call' comments;
- revised all titles in sections 4.x to remove redundant prefix of 'IPP URL Scheme', for readability;
- revised 'Abstract', [section 1](#) 'Introduction', [section 4.1](#) 'Applicability and Intended Usage', [section 4.5](#) 'Syntax in ABNF', and [section 6](#) 'IANA Considerations', to explicitly state that the "ipp" URL scheme is intended for IANA registration in the IETF URL scheme tree;
- revised [section 4.5](#) 'Syntax in ABNF', to delete references to unused ABNF components from [\[RFC2396\]](#);
- revised [section 11](#) 'Authors' Addresses', to update contact info for both editors and to add the IPP Web page and mailing list subscription info;
- moved 'Appendix X - Change History' to back of document, to facilitate final edits for RFC publication (including deletion of change history);

2 April 2001 - [draft-ietf-ipp-url-scheme-03.txt](#)

- final edits after IETF IPP WG 'last call' comments;
- revised 'Abstract' and [section 1](#) 'Introduction' to remove references to ISSUE's and request for comments to the 'ipp@pwg.org' mailing list, in preparation for publication as an RFC;
- revised [section 4.5](#) 'IPP URL Scheme Syntax in ABNF' to delete all references to HTTP proxy behavior (which IPP does NOT specify), per request of Don Wright;
- revised [section 4.5.1](#) 'IPP URL Examples' to remove note discouraging the use of literal IP addresses in URLs, to remove dependency on Informational [\[RFC1900\]](#);
- revised [section 4.5.2](#) 'IPP URL Comparisons' to specify the use of rules defined in [section 3.2.3](#) 'URI Comparison' in [\[RFC2616\]](#), with the sole exception that an empty port MUST be treated as equivalent to the IPP well-known port 631, per request of Don Wright;
- revised [section 9](#) 'References' to delete all unused references;
- revised [section 11](#) 'Authors' Addresses' to add the address of the IPP WG mailing list for usage questions and comments;

13 February 2001 - [draft-ietf-ipp-url-scheme-02.txt](#)

- revised [section 3](#) 'IPP Model for Printers and Jobs' and [section 4.5](#) 'IPP URL Scheme Syntax in ABNF' to add notes stating that "IPP URL" (in this document) is a synonym for "ipp-URL" in [\[RFC2910\]](#), per request of Bob Herriot;
- revised [section 4.5](#) 'IPP URL Scheme Syntax in ABNF' to correct typo that showed "http:" rather than "ipp:" in the one-line ABNF, per request of Tom Hastings;

- revised [section 4.5.1](#) 'IPP URL Examples' to add a note discouraging the use of literal IP addresses in URLs, per [\[RFC2616\]](#) and [\[RFC1900\]](#);

5 February 2001 - [draft-ietf-ipp-url-scheme-01.txt](#)

- revised [section 4.1](#) 'IPP URL Applicability and Intended Usage' to clarify that a given IPP URL MAY identify an IPP Printer object or an IPP Job object, per request of Tom Hastings;
- revised [section 4.5](#) 'IPP URL Scheme Syntax in ABNF' to define IPP URLs consistently with [section 3.2.2](#) 'http URL' of HTTP/1.1 [\[RFC2616\]](#), per request of Tom Hastings;
- revised [section 4.5](#) 'IPP URL Scheme Syntax in ABNF' to clarify that IPP URLs may reference IPP Printer objects, IPP Job objects, or (possibly other future) IPP objects, per request of Bob Herriot;
- added [section 4.5.1](#) 'IPP URL Examples' to supply meaningful examples of IPP URLs with host names, IPv4 addresses, and IPv6 addresses, per request of Tom Hastings;
- added [section 4.5.2](#) 'IPP URL Comparisons' to define IPP URL comparisons consistently with [section 3.3](#) 'URI Comparison' of HTTP/1.1 [\[RFC2616\]](#), per request of Tom Hastings;
- revised [section 5.1](#) 'Conformance Requirements for IPP Clients' to clarify that an IPP Client MUST convert IPP URLs to their corresponding HTTP URL forms according to [section 5](#) 'IPP URL Scheme' in [\[RFC2910\]](#), per request of Tom Hastings and Bob Herriot;
- revised [section 5.1](#) 'Conformance Requirements for IPP Clients' and [section 5.2](#) 'Conformance Requirements for IPP Printers' to clarify that IPP Clients and IPP Printers SHOULD interoperate with IPP/1.0 systems according to [section 9](#) 'Interoperability with IPP/1.0 Implementations' in [\[RFC2910\]](#), per request of Carl Kugler;
- revised [section 5.2](#) 'Conformance Requirements for IPP Printers' to clarify that an IPP Printer MUST listen on (IANA assigned well-known) port 631, unless explicitly configured, per request of Michael Sweet;
- revised [section 5.2](#) 'Conformance Requirements for IPP Printers' to clarify that an IPP Printer SHOULD NOT listen on ports other than (IANA assigned well-known) port 631, unless explicitly configured, per request of Don Wright;
- revised [section 6](#) 'IANA Considerations' to clarify that the sole purpose of the entire document is IANA registration of the "ipp" URL scheme;
- deleted [Appendix A](#) 'Registration of IPP Port' as unnecessary (port is already registered);
- deleted [Appendix B](#) 'Registration of MIME "application/ipp" as unnecessary (MIME registry has recently caught up to [RFC 2910](#));

11 January 2001 - [draft-ietf-ipp-url-scheme-00.txt](#)

- initial version - simple "ipp" URL scheme without parameters or

- query part (consistent with existing and IPP/1.1 implementations);
- added [Appendix A](#) 'Registration of IPP Port' (placeholder) for updated IANA registration of port 631 with references to IPP/1.1;

Herriot, McDonald

Expires 10 July 2002

[Page 16]

---

Internet Draft

IPP URL Scheme

10 January 2002

- added [Appendix B](#) 'Registration of MIME "application/ipp"' with updated IANA registration for IPP MIME type with references to both IPP/1.0 and IPP/1.1;

Herriot, McDonald

Expires 10 July 2002

[Page 17]