

1
2 Internet Printing Protocol Working Group
3 INTERNET DRAFT
4 <draft-ietf-ipp-url-scheme-05.txt>
5 Updates: RFC 2910
6 [Target Category: Standards Track]
7 Expires 20 November 2002
8
9

Robert Herriot
Consultant
Ira McDonald
High North Inc
20 May 2002

10 Internet Printing Protocol/1.1:
11 IPP URL Scheme
12 <draft-ietf-ipp-url-scheme-05.txt>
13

14 Copyright (C) The Internet Society (2002). All Rights Reserved.
15

16
17 Status of this Memo
18

19 This document is an Internet-Draft and is in full conformance with
20 all provisions of Section 10 of RFC2026. Internet-Drafts are working
21 documents of the Internet Engineering Task Force (IETF), its areas,
22 and its working groups. Note that other groups may also distribute
23 working documents as Internet-Drafts.
24

25 Internet-Drafts are draft documents valid for a maximum of six months
26 and may be updated, replaced, or obsoleted by other documents at any
27 time. It is inappropriate to use Internet-Drafts as reference
28 material or to cite them other than as "work in progress."
29

30 To view the list of Internet-Draft Shadow Directories, see
31 <http://www.ietf.org/shadow.html>.
32
33

34 Abstract
35

36 This memo defines the "ipp" URL (Uniform Resource Locator) scheme.
37 This memo updates IPP/1.1: Encoding and Transport (RFC 2910), by
38 expanding and clarifying Section 5 'IPP URL Scheme' of RFC 2910. An
39 "ipp" URL is used to specify the network location of a print service
40 that supports the IPP Protocol (RFC 2910), or of a network resource
41 (for example, a print job) managed by such a print service.
42
43
44
45
46
47
48
49
50
51
52
53
54

60 Table of Contents

61
62 1. Introduction 3
63 2. Terminology 5
64 2.1. Conformance Terminology 5
65 2.2. Model Terminology 5
66 3. IPP Model for Printers and Jobs 6
67 4. IPP URL Scheme 7
68 4.1. IPP URL Scheme Applicability 7
69 4.2. IPP URL Scheme Associated Port 7
70 4.3. IPP URL Scheme Associated MIME Type 7
71 4.4. IPP URL Scheme Character Encoding 8
72 4.5. IPP URL Scheme Syntax 8
73 4.6. IPP URL Examples 8
74 4.6.1. IPP Printer URL Examples 9
75 4.6.2. IPP Job URL Examples 9
76 4.7. IPP URL Comparisons 10
77 5. Conformance Requirements 11
78 5.1. IPP Client Conformance Requirements 11
79 5.2. IPP Printer Conformance Requirements 11
80 6. IANA Considerations 13
81 7. Internationalization Considerations 13
82 8. Security Considerations 13
83 9. Normative References 15
84 10. Informative References 15
85 11. Acknowledgments 16
86 12. Authors' Addresses 16
87 13. Full Copyright Statement 17
88 14. Appendix A - Registration of "ipp" URL Scheme 17
89 15. Appendix X - Change History 20

117 1. Introduction
118

119 This memo conforms to all of the requirements in Registration
120 Procedures for URL Scheme Names [RFC2717]. This memo also follows
121 all of the recommendations in Guidelines for new URL Schemes
122 [RFC2718].
123

124 See section 1 'Introduction' of [RFC2911] and section 1
125 'Introduction' of [RFC3196] for overview information about IPP. See
126 section 10 'Description of the Base IPP Documents of [RFC3196] for a
127 full description of the IPP document set.
128

129 This memo updates IPP/1.1: Encoding and Transport (RFC 2910), by
130 expanding and clarifying Section 5 'IPP URL Scheme' of RFC 2910, but
131 does not define any new parameters or other new extensions to the
132 syntax of IPP URLs.
133

134 The IPP URL scheme defined in this document is based on the ABNF for
135 the HTTP URL scheme defined in HTTP [RFC2616], which in turn is
136 derived from the URI Generic Syntax [RFC2396] and further updated for
137 IPv6 by [RFC2732]. An IPP URL is transformed into an HTTP URL
138 according to the rules specified in section 5 of IPP Protocol
139 [RFC2910].
140

141 This document defines IPP URL scheme applicability, associated port
142 (631), associated MIME type ("application/ipp"), character encoding,
143 and syntax.
144

145 This document is laid out as follows:

- 146 - Section 2 defines the terminology used throughout the document.
- 147
- 148 - Section 3 supplies references to the IPP Printer and IPP Job object
149 model defined in IPP Model [RFC2911].
- 150
- 151 - Section 4 specifies the IPP URL scheme.
- 152
- 153 - Section 5 specifies the conformance requirements for IPP Clients
154 and IPP Printers that claim conformance to this document.
- 155
- 156 - Sections 6, 7, and 8 specify IANA, internationalization, and
157 security considerations.
- 158
- 159 - Sections 9, 10, 11, 12, and 13 specify normative references,
160 informative references, acknowledgements, authors' addresses, and
161 full IETF copyright statement.
- 162
- 163 - Section 14 (Appendix A) is a completed registration template for
164 the IPP URL Scheme (see section 6.0 of [RFC2717]).
165

168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224

[Ed Note: Section 15, which should be removed before publication as an RFC, contains a complete change history of this IPP URL document.]

230
231 This specification document uses the terminology defined in this
232 section.
233

234
235 2.1. Conformance Terminology
236

237 The uppercase terms "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL
238 NOT" "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in
239 this document are to be interpreted as described in [RFC2119]. These
240 terms are used to specify conformance requirements for all
241 implementations (both print clients and print services) of this
242 specification.
243

244
245 2.2. Model Terminology
246

247 See section 12.2 'Model Terminology' in IPP Model [RFC2911].
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277

280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336

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 the IPP Protocol [RFC2910] to a print spooler, print gateway, or physical 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 the IPP Protocol [RFC2910] 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 instantiated 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]).

336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392

4. IPP URL Scheme

4.1. IPP URL Scheme Applicability

The "ipp" URL scheme MUST only be used to specify absolute URLs (relative IPP URLs are not allowed) for IPP print services and their associated network resources. The "ipp" URL scheme MUST only be used to specify the use of the abstract protocol defined in IPP Model [RFC2911] over an HTTP [RFC2616] transport, as defined in IPP Protocol [RFC2910]. Any other transport binding for the abstract protocol defined in IPP Model [RFC2911] would require a different URL scheme.

The "ipp" URL scheme allows an IPP client to choose an appropriate IPP print service (for example, from a directory). The IPP client can establish an HTTP connection to the specified IPP print service. The IPP client can send IPP protocol requests (for example, a 'Print-Job' request) and receive IPP protocol responses over that HTTP connection.

4.2. IPP URL Scheme Associated Port

All IPP URLs which do NOT explicitly specify a port MUST be resolved to IANA-assigned well-known port 631, as registered in [IANA-PORTREG].

See: IANA Port Numbers Registry [IANA-PORTREG].

See: IPP Protocol [RFC2910].

4.3. IPP URL Scheme Associated MIME Type

All IPP URLs MUST be used to specify network print services which support the "application/ipp" MIME media type as registered in [IANA-MIMEREG] for IPP protocol requests and responses.

See: IANA MIME Media Types Registry [IANA-MIMEREG].

See: IPP Protocol [RFC2910].

392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448

4.4. IPP URL Scheme Character Encoding

IPP URLs MUST use [RFC2396] encoding, as do their equivalent HTTP URLs. Characters other than those in the "reserved" and "unsafe" sets [RFC2396] are equivalent to their "%" HEX HEX" encoding.

4.5. IPP URL Scheme Syntax

The abstract protocol defined in IPP Model [RFC2911] places a limit of 1023 octets (NOT characters) on the length of a URI (see section 4.1.5 'uri' in [RFC2911]).

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 MUST 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", and "query" from [RFC2396], as updated for IPv6 by [RFC2732].

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 print service 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]).

4.6. IPP URL Examples

Note: Literal IPv4 or IPv6 addresses SHOULD NOT be used in IPP URLs.

448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504

4.6.1. IPP Printer URL Examples

The following are examples of well-formed IPP URLs for IPP Printers (for example, to be used as protocol elements in 'printer-uri' operation attributes of 'Print-Job' request messages):

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

Each of the above URLs are well-formed URLs for IPP Printers and each would reference a logically different IPP Printer, even though some of those IPP Printers might share the same host system. The 'bob' or 'ira' last path components might represent two different physical printer devices, while 'tiger' might represent some grouping of IPP Printers (for example, a load-balancing spooler). Or the 'bob' and 'ira' last path components might represent separate human recipients on the same physical printer device (for example, a physical printer supporting two job queues). In either case, both 'bob' and 'ira' would behave as different and independent IPP Printers.

The following are examples of well-formed IPP URLs for IPP Printers 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 4.7 below).

4.6.2. IPP Job URL Examples

The following are examples of well-formed IPP URLs for IPP Jobs (for example, to be used as protocol elements in 'job-uri' attributes of 'Print-Job' response messages):

```
ipp://abc.com/printer/123
ipp://abc.com/printer/tiger/job123
```

IPP Job URLs are valid and meaningful only until Job completion and possibly an implementation defined optional period of persistence after Job completion (see IPP Model [RFC2911]).

504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560

Ambiguously, section 4.3.1 'job-uri' of IPP Model [RFC2911] states that:

"the precise format of a Job URI is implementation dependent."

Thus, the relationship between the value of the "printer-uri" operation attribute used in a 'Print-Job' request and the value of the "job-uri" attribute returned in the corresponding 'Print-Job' response is implementation dependent. Also, section 4.3.3 'job-printer-uri' of IPP Model [RFC2911] states that the 'job-printer-uri' attribute of a Job object:

"permits a client to identify the Printer object that created this Job object when only the Job object's URI is available to the client."

However, the above statement is false, because the transform from an IPP Job URL to the corresponding IPP Printer URL is unspecified in either IPP Model [RFC2911] or IPP Protocol [RFC2910].

IPP Printers that conform to this specification SHOULD only generate IPP Job URLs (for example, in the "job-uri" attribute in a 'Print-Job' response) by appending exactly one path component to the corresponding IPP Printer URL (for interoperability).

4.7. 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].

565 5. Conformance Requirements
566

567
568
569 5.1. IPP Client Conformance Requirements
570

571 IPP Clients that conform to this specification:
572

- 573 a) MUST only send IPP protocol connections to the port specified in
574 each given IPP URL (if present) or otherwise to IANA assigned
575 well-known port 631;
576
- 577 b) MUST only send IPP URLs used as protocol elements in outgoing IPP
578 protocol request messages (for example, in the "printer-uri"
579 operation attribute in a 'Print-Job' request) that conform to the
580 ABNF specified in section 4.5 'IPP URL Scheme Syntax' of this
581 document;
582
- 583 c) MUST only convert IPP URLs to their corresponding HTTP URL forms
584 according to the rules in section 5 'IPP URL Scheme' in [RFC2910].
585
586

587
588 5.2. IPP Printer Conformance Requirements
589

590 IPP Printers that conform to this specification:
591

- 592 a) MUST listen for incoming IPP protocol connections on IANA-assigned
593 well-known port 631, unless explicitly configured by system
594 administrators or site policies;
595
- 596 b) SHOULD NOT listen for incoming IPP protocol connections on any
597 other port, unless explicitly configured by system administrators
598 or site policies;
599
- 600 c) SHOULD only accept IPP URLs used as protocol elements in incoming
601 IPP protocol request messages (for example, in the "printer-uri"
602 operation attribute in a 'Print-Job' request) that conform to the
603 ABNF specified in section 4.5 'IPP URL Scheme Syntax' of this
604 document;
605
- 606 d) SHOULD only send IPP URLs used as protocol elements in outgoing
607 IPP protocol response messages (for example, in the "job-uri"
608 attribute in a 'Print-Job' response) that conform to the ABNF
609 specified in section 4.5 'IPP URL Scheme Syntax' of this document;
610
- 611 e) SHOULD only generate IPP Job URLs (for example, in the "job-uri"
612 attribute in a 'Print-Job' response) by appending exactly one path
613 component to the corresponding IPP Printer URL (for
614

616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672

interoperability);

- f) SHOULD NOT use literal IPv6 or IPv4 addresses in configured or locally generated IPP URLs.

677 6. IANA Considerations
678

679 This IPP URL Scheme specification does not introduce any additional
680 IANA considerations, beyond those described in [RFC2910] and
681 [RFC2911].
682

683 See: Section 6 'IANA Considerations' in [RFC2910]
684 See: Section 6 'IANA Considerations' in [RFC2911].
685
686

687
688 7. Internationalization Considerations
689

690 This IPP URL Scheme specification does not introduce any additional
691 internationalization considerations, beyond those described in
692 [RFC2910] and [RFC2911].
693

694 See: Section 7 'Internationalization Considerations' in [RFC2910].
695 See: Section 7 'Internationalization Considerations' in [RFC2911].
696
697

698
699 8. Security Considerations
700

701 This IPP URL Scheme specification does not introduce any additional
702 security considerations, beyond those described in [RFC2910] and
703 [RFC2911], except the following:
704

705 a) An IPP URL might be faked to point to a rogue IPP print service,
706 thus collecting confidential document contents from IPP clients.
707 Server authentication mechanisms and security mechanisms specified
708 in the IPP Protocol [RFC2910] are sufficient to address this
709 threat.
710

711 b) An IPP URL might be used to access an IPP print service by an
712 unauthorized IPP client. Client authentication mechanisms and
713 security mechanisms specified in the IPP Protocol [RFC2910] are
714 sufficient to address this threat.
715

716 c) An IPP URL might be used to access an IPP print service at a print
717 protocol application layer gateway (for example, an IPP to LPD
718 gateway [RFC2569]) causing silent compromise of IPP security
719 mechanisms. There is no practical defense against this threat by
720 a client system. System administrators should avoid such
721 compromising configurations.
722

723 d) An IPP URL does not have parameters to specify the required client
724 authentication mechanism (for example, 'certificate' as defined in
725 section 4.4.2 'uri-authentication-supported' of IPP Model
726

728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784

[RFC2911]) and required security mechanism (for example, 'tls' as defined in section 4.4.3 'uri-security-supported' of IPP Model [RFC2911]). Service discovery or directory protocols might be used to discover the required client authentication and security mechanisms associated with given IPP URLs.

Historical Note: During the development of this document, consideration was given to the addition of standard IPP URL parameters for the client authentication and security mechanisms. However, based on a strong IETF IPP Working Group consensus, no parameters were added to the "ipp" URL scheme as originally defined in IPP Protocol [RFC2910] in September 2000, for reasons of backwards compatibility with the many currently shipping implementations of IPP/1.1.

See: Section 8 'Security Considerations' in [RFC2910].
See: Section 8 'Security Considerations' in [RFC2911].

789 9. Normative References
790

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

793
794 [RFC2396] T. Berners-Lee, R. Fielding, L. Masinter. Uniform Resource
795 Identifiers (URI): Generic Syntax, RFC 2396, August 1998.

796
797 [RFC2616] R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter,
798 P. Leach, T. Berners-Lee. Hypertext Transfer Protocol -- HTTP/1.1,
799 RFC 2616, June 1999.

800
801 [RFC2732] R. Hinden, B. Carpenter, L. Masinter. Format for Literal
802 IPv6 Addresses in URL's, RFC 2732, December 1999.

803
804 [RFC2910] R. Herriot, S. Butler, P. Moore, R. Turner, J. Wenn.
805 IPP/1.1 Encoding and Transport [IPP Protocol], RFC 2910, September
806 2000.

807
808 [RFC2911] T. Hastings, R. Herriot, R. deBry, S. Isaacson, P. Powell.
809 IPP/1.1 Model and Semantics [IPP Model], RFC 2911, September 2000.

810
811 [US-ASCII] Coded Character Set -- 7-bit American Standard Code for
812 Information Interchange, ANSI X3.4-1986.

813
814
815
816 10. Informative References
817

818 See: Section 10 'References' in [RFC2910].
819

820 [IANA-MIMEREG] IANA MIME Media Types Registry.
821 [ftp://ftp.iana.org/in-notes/iana/assignments/media-types/...](ftp://ftp.iana.org/in-notes/iana/assignments/media-types/)
822

823 [IANA-PORTREG] IANA Port Numbers Registry.
824 <ftp://ftp.iana.org/in-notes/iana/assignments/port-numbers>
825

826 [RFC2569] R. Herriot, T. Hastings, N. Jacobs, J. Martin. Mapping
827 between LPD and IPP Protocols, RFC 2569, April 1999.

828
829 [RFC2717] R. Petke, I. King. Registration Procedures for URL Scheme
830 Names, RFC 2717, November 1999.

831
832 [RFC2718] L. Masinter, H. Alvestrand, D. Zigmond, R. Petke.
833 Guidelines for new URL Schemes, RFC 2718, November 1999.

834
835 [RFC3196] T. Hastings, C. Manros, P. Zehler, C. Kugler, H. Holst.
836 Internet Printing Protocol/1.1: Implementor's Guide, RFC 3196,
837 November 2001.

845
846 11. Acknowledgments
847

848 This document is a product of the Internet Printing Protocol Working
849 Group of the Internet Engineering Task Force (IETF).
850

851 Thanks to Pat Fleming (IBM), Tom Hastings (Xerox), Harry Lewis (IBM),
852 Hugo Parra (Novell), Don Wright (Lexmark), and all the members of the
853 IETF IPP WG.
854

855 Section 5 'IPP URL Scheme' in IPP Protocol [RFC2910] was the primary
856 input to this IPP URL Scheme specification.
857
858
859

860 12. Authors' Addresses
861

862 Robert Herriot
863 Consultant
864 706 Colorado Ave
865 Palo Alto, CA 94303
866

867 Phone: +1 650-327-4466
868 Fax: +1 650-327-4466
869 Email: bob@herriot.com
870

871
872 Ira McDonald
873 High North Inc
874 221 Ridge Ave
875 Grand Marais, MI 49839
876

877 Phone: +1 906-494-2434
878 Email: imcdonald@sharplabs.com
879

880
881 Usage questions and comments on this IPP URL Scheme should be sent
882 directly to the editors at their above addresses (and to the IPP
883 mailing list, if you are a subscriber - see below).
884

885
886 IPP Web Page: <http://www.pwg.org/ipp/>
887 IPP Mailing List: ipp@pwg.org
888

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

- 890 1) send it to majordomo@pwg.org
- 891 2) leave the subject line blank
- 892 3) put the following two lines in the message body:
893 subscribe ipp
894

899 end
900

901 Implementers of this specification are encouraged to join the IPP
902 Mailing List in order to participate in any discussions of
903 clarification issues and comments. In order to reduce spam the
904 mailing list rejects mail from non-subscribers, so you must subscribe
905 to the mailing list in order to send a question or comment to the IPP
906 mailing list.
907

908
909
910 13. Full Copyright Statement

911 Copyright (C) The Internet Society (2002). All Rights Reserved.
912

913 This document and translations of it may be copied and furnished to
914 others, and derivative works that comment on or otherwise explain it
915 or assist in its implementation may be prepared, copied, published
916 and distributed, in whole or in part, without restriction of any
917 kind, provided that the above copyright notice and this paragraph are
918 included on all such copies and derivative works. However, this
919 document itself may not be modified in any way, such as by removing
920 the copyright notice or references to the Internet Society or other
921 Internet organizations, except as needed for the purpose of
922 developing Internet standards in which case the procedures for
923 copyrights defined in the Internet Standards process must be
924 followed, or as required to translate it into languages other than
925 English.
926

927 The limited permissions granted above are perpetual and will not be
928 revoked by the Internet Society or its successors or assigns.
929

930 This document and the information contained herein is provided on an
931 "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING
932 TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING
933 BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION
934 HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF
935 MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
936

937
938
939
940 14. Appendix A - Registration of "ipp" URL Scheme

941 Note: The following registration obsoletes section 5 'IPP URL
942 Scheme' of IPP Protocol [RFC2911].
943

944 URL Scheme Name: ipp
945

946 URL Scheme Syntax:
947

948 ipp-URL = "ipp:" "://" host [":" port] [abs_path ["?" query]]
949
950

956 Character Encoding Considerations:

957
958 IPP URLs MUST use [RFC2396] encoding, as do their equivalent HTTP
959 URLs. Characters other than those in the "reserved" and "unsafe"
960 sets [RFC2396] are equivalent to their "% HEX HEX" encoding.
961

962 Intended Usage:

963
964 The intended usage of the "ipp" URL scheme is COMMON.

965
966 An "ipp" URL is used to specify the network location of a print
967 service that supports the IPP Protocol [RFC2910], or of a network
968 resource (for example, a print job) managed by such a print
969 service. An IPP client can choose to establish an HTTP connection
970 to the specified print service for transmission of IPP protocol
971 requests (for example, IPP print job submission requests).
972

973 Applications or Protocols which use this URL scheme:

974
975 See: Section 5 'IPP URL Scheme' in IPP Protocol [RFC2910].
976

977 Interoperability Considerations:

978
979 See: Section 9 'Interoperability with IPP/1.0 Implementations' in
980 IPP Protocol [RFC2910].
981

982 Security Considerations:

983
984 See: Section 8 'Security Considerations' in IPP Protocol
985 [RFC2910].
986

987 Relevant Publications:

988
989 [RFC2910] R. Herriot, S. Butler, P. Moore, R. Turner, J. Wenn.
990 IPP/1.1 Encoding and Transport [IPP Protocol], RFC 2910, September
991 2000.
992

993 [RFC2616] R. Fielding, J. Gettys, J. Mogul, H. Frystyk,
994 L. Masinter, P. Leach, T. Berners-Lee. Hypertext Transfer
995 Protocol -- HTTP/1.1, RFC 2616, June 1999.
996

997 [RFCnnnn] R. Herriot, I. McDonald. IPP/1.1: IPP URL Scheme, RFC
998 nnnn, mmmmm YYYY.
999

1000 [Ed Note: The above should be replaced with the correct RFC
1001 number and date when this document is published as an RFC.]
1002

1003 Person & email address to contact for further information:
1004
1005
1006

1008
1009 Internet Draft IPP URL Scheme 20 May 2002
1010

1011 Robert Herriot
1012 Consultant
1013 706 Colorado Ave
1014 Palo Alto, CA 94303
1015
1016 Phone: +1 650-327-4466
1017 Fax: +1 650-327-4466
1018 Email: bob@herriot.com
1019

1020 or

1021
1022 Ira McDonald
1023 High North Inc
1024 221 Ridge Ave
1025 Grand Marais, MI 49839
1026
1027 Phone: +1 906-494-2434
1028 Email: imcdonald@sharplabs.com
1029

1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063 Herriot, McDonald Expires 20 November 2002 [Page 19]
1064

1069 15. Appendix X - Change History
1070

1071 [To be deleted before RFC publication]
1072

1073 20 May 2002 - draft-ietf-ipp-url-scheme-05.txt

- 1074 - expanded IPP in title of document, per RFC Editor;
- 1075 - revised 'References' section, separating into 'Normative
- 1076 References' and 'Informative References' sections, per RFC Editor;
- 1077 - revised 'Abstract' section, to emphasize that this document updates
- 1078 RFC 2910, per Ned Freed;
- 1079 - revised several sections, deleting repeated paragraphs and
- 1080 references to RFC 2373 "IPv6 Addressing Architecture", per Ned
- 1081 Freed;
- 1082 - revised 'IPP URL Examples' section, adding examples of IPP URLs
- 1083 used to uniquely identify IPP Jobs, per Ned Freed;
- 1084 - revised 'IPP URL Examples' section, deleting both IPv4 and IPv6
- 1085 literal address examples, per Ned Freed;
- 1086 - revised 'Conformance Requirements' section, to specify requirements
- 1087 both for IPP URLs used for the network location of IPP print
- 1088 services and for IPP URLs used as protocol elements in IPP protocol
- 1089 requests and responses, per Ned Freed;
- 1090 - revised 'Security Considerations' section, to discuss security
- 1091 threats associated with the use of IPP URLs (see section 2.4 of
- 1092 [RFC2718]), per Ned Freed;
- 1093 - added 'Appendix A - Registration of "ipp" URL Scheme' with
- 1094 completed form (see section 6.0 'Registration Template' of
- 1095 [RFC2717]).

1096
1097 10 January 2002 - draft-ietf-ipp-url-scheme-04.txt

- 1098 - final edits after IESG 'last call' comments;
- 1099 - revised all titles in sections 4.x to remove redundant prefix of
- 1100 'IPP URL Scheme', for readability;
- 1101 - revised 'Abstract', section 1 'Introduction', section 4.1
- 1102 'Applicability and Intended Usage', section 4.5 'IPP URL Scheme
- 1103 Syntax', and section 6 'IANA Considerations', to explicitly state
- 1104 that the "ipp" URL scheme is intended for IANA registration in the
- 1105 IETF URL scheme tree;
- 1106 - revised section 4.5 'IPP URL Scheme Syntax', to delete references
- 1107 to unused ABNF components from [RFC2396];
- 1108 - revised section 11 'Authors' Addresses', to update contact info for
- 1109 both editors and to add the IPP Web page and mailing list
- 1110 subscription info;
- 1111 - moved 'Appendix X - Change History' to back of document, to
- 1112 facilitate final edits for RFC publication (including deletion of
- 1113 change history);

1114
1115 2 April 2001 - draft-ietf-ipp-url-scheme-03.txt

- 1116 - final edits after IETF IPP WG 'last call' comments;

- 1123 - revised 'Abstract' and section 1 'Introduction' to remove
- 1124 references to ISSUE's and request for comments to the 'ipp@pwg.org'
- 1125 mailing list, in preparation for publication as an RFC;
- 1126 - revised section 4.5 'IPP URL Scheme Syntax' to delete all
- 1127 references to HTTP proxy behavior (which IPP does NOT specify), per
- 1128 request of Don Wright;
- 1129 - revised section 4.6 'IPP URL Examples' to remove note discouraging
- 1130 the use of literal IP addresses in URLs, to remove dependency on
- 1131 Informational [RFC1900];
- 1132 - revised section 4.7 'IPP URL Comparisons' to specify the use of
- 1133 rules defined in section 3.2.3 'URI Comparison' in [RFC2616], with
- 1134 the sole exception that an empty port MUST be treated as equivalent
- 1135 to the IPP well-known port 631, per request of Don Wright;
- 1136 - revised section 9 'References' to delete all unused references;
- 1137 - revised section 11 'Authors' Addresses' to add the address of the
- 1138 IPP WG mailing list for usage questions and comments;

- 1139
- 1140 13 February 2001 - draft-ietf-ipp-url-scheme-02.txt
- 1141 - revised section 3 'IPP Model for Printers and Jobs' and section 4.5
 - 1142 'IPP URL Scheme Syntax' to add notes stating that "IPP URL" (in
 - 1143 this document) is a synonym for "ipp-URL" in [RFC2910], per request
 - 1144 of Bob Herriot;
 - 1145 - revised section 4.5 'IPP URL Scheme Syntax' to correct typo that
 - 1146 showed "http:" rather than "ipp:" in the one-line ABNF, per request
 - 1147 of Tom Hastings;
 - 1148 - revised section 4.6 'IPP URL Examples' to add a note discouraging
 - 1149 the use of literal IP addresses in URLs, per [RFC2616] and
 - 1150 [RFC1900];

- 1151
- 1152 5 February 2001 - draft-ietf-ipp-url-scheme-01.txt
- 1153 - revised section 4.1 'IPP URL Applicability and Intended Usage' to
 - 1154 clarify that a given IPP URL MAY identify an IPP Printer object or
 - 1155 an IPP Job object, per request of Tom Hastings;
 - 1156 - revised section 4.5 'IPP URL Scheme Syntax' to define IPP URLs
 - 1157 consistently with section 3.2.2 'http URL' of HTTP [RFC2616], per
 - 1158 request of Tom Hastings;
 - 1159 - revised section 4.5 'IPP URL Scheme Syntax' to clarify that IPP
 - 1160 URLs may reference IPP Printer objects, IPP Job objects, or
 - 1161 (possibly other future) IPP objects, per request of Bob Herriot;
 - 1162 - added section 4.6 'IPP URL Examples' to supply meaningful examples
 - 1163 of IPP URLs with host names, IPv4 addresses, and IPv6 addresses,
 - 1164 per request of Tom Hastings;
 - 1165 - added section 4.7 'IPP URL Comparisons' to define IPP URL
 - 1166 comparisons consistently with section 3.3 'URI Comparison' of HTTP
 - 1167 [RFC2616], per request of Tom Hastings;
 - 1168 - revised section 5.1 'Conformance Requirements for IPP Clients' to
 - 1169 clarify that an IPP Client MUST convert IPP URLs to their
 - 1170 corresponding HTTP URL forms according to section 5 'IPP URL
 - 1171 Scheme' in [RFC2910], per request of Tom Hastings and Bob Herriot;
 - 1172 - revised section 5.1 'Conformance Requirements for IPP Clients' and
 - 1173 section 5.2 'Conformance Requirements for IPP Printers' to clarify

1179 that IPP Clients and IPP Printers SHOULD interoperate with IPP/1.0
1180 systems according to section 9 'Interoperability with IPP/1.0
1181 Implementations' in [RFC2910], per request of Carl Kugler;
1182 - revised section 5.2 'Conformance Requirements for IPP Printers' to
1183 clarify that an IPP Printer MUST listen on (IANA assigned
1184 well-known) port 631, unless explicitly configured otherwise, per
1185 request of Michael Sweet;
1186 - revised section 5.2 'Conformance Requirements for IPP Printers' to
1187 clarify that an IPP Printer SHOULD NOT listen on ports other than
1188 (IANA assigned well-known) port 631, unless explicitly configured,
1189 per request of Don Wright;
1190 - revised section 6 'IANA Considerations' to clarify that the sole
1191 purpose of the entire document is IANA registration of the "ipp"
1192 URL scheme;
1193 - deleted Appendix A 'Registration of IPP Port' as unnecessary (port
1194 is already registered);
1195 - deleted Appendix B 'Registration of MIME "application/ipp" as
1196 unnecessary (MIME registry has recently caught up to RFC 2910);

1197
1198 11 January 2001 - draft-ietf-ipp-url-scheme-00.txt
1199 - initial version - simple "ipp" URL scheme without parameters or
1200 query part (consistent with existing and IPP/1.1 implementations);
1201 - added Appendix A 'Registration of IPP Port' (placeholder) for
1202 updated IANA registration of port 631 with references to IPP/1.1;
1203 - added Appendix B 'Registration of MIME "application/ipp"' with
1204 updated IANA registration for IPP MIME type with references to both
1205 IPP/1.0 and IPP/1.1;

1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230

