

1 IPP Notification New Model Attribute Summary

2 From: Tom Hastings
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5 Updated with the agreements at the IPP WG meeting, 8/18/99 and 8/19/99.

6 ~~Making this table showed some inconsistencies between the Job and Subscription objects. These are~~
7 ~~highlighted like this and a "?" added.~~

8 This document is a one page summary of the new proposal to simplify the IPP Notification Model. The
9 Subscription object is defined only for use as Per-Printer subscriptions. Per-Job subscriptions are done
10 entirely with Job attributes and use an exclude event mask (like SNMPv3 trap subscriptions) in order to
11 allow different recipients to get different events. I've also included conformance requirements for
12 operations and attributes in the summary, so that we can more properly reason about the model, before
13 updating the specification document.

14 The Model document is available at:

15 ftp://ftp.pwg.org/pub/pwg/ipp/new_NOT/ipp-notification-new-model-990811.pd

16 This most recent IPP Notification Specification (July 22, 1999) is at:

17 ftp://ftp.pwg.org/pub/pwg/ipp/new_NOT/ipp-notification-990722.pdf

18 Review of this object model before updating the complete spec will help speed up the production of the
19 spec and will also help with the understanding of the semantics. I suggest that this summary be kept in the
20 final spec in some form similar to this paper.

21 *NOTE - Throughout this model document, the notation [] indicates that the sender (client in a*
22 *request, IPP object in a response, Notification Sender in a notification) MAY omit the attribute*
23 *inside the square brackets if there is not data to send. In addition, IPP Printer conformance*
24 *requirements for operation and attribute support are indicated in this document with the words and*
25 *codes:*

26 **REQUIRED (R) - MUST be supported to support notification at all**

27 ~~**CONDITIONALLY REQUIRED (C) - REQUIRED if Per-Printer subscription is supported**~~

28 ~~**OPTIONAL (O) - not required for either Per-Job or Per-Printer Subscriptions**~~**notification.**

29 *Therefore, the [] do NOT mean OPTIONAL support and should not be confused with support*
30 *requirements.*

31

32 1 New IPP Notification Operations

33 This new proposed IPP object model add the Subscription object (to the ~~Job and~~ Printer objects), but only
34 for the Per-Printer subscriptions.

35 The following operations are defined for Per-Job Subscriptions and Per-Printer Subscriptions:

36 1.1 Per-Job Subscriptions - new model

Job object related:	salient inputs besides printer-uri
job creation operations	1setOf {recipients, [events,] [content-type,] [user-data,] [exclude-event-mask] [charset,] [natural-languages]}
Get-Job-Attributes	job-id, [requested-attributes]
Set-Job- Subscription Attributes	job-id, 1setOf {recipients,} [events,] [content-type,] [user-data,] [exclude-event-mask] [charset,] [natural-language] }

37

38 1.2 Per-Printer Subscriptions - new model

Printer object related:	salient inputs beside printer-uri:
Get-Printer-Attributes	[requested-attributes]
Subscription object related:	salient inputs besides printer-uri:
Create-Printer-Subscription	recipients, [events,] [content-type,] [user-data,] [exclude-event-mask,] [charset,] [natural-languages,] [lease-time-requested,] [persistence-requested]
Get-Printer-Subscription-Attributes	subscription-id, [requested-attributes]
Get-Printer-Subscriptions	[my-printer-subscriptions,] [requested-attributes]
Renew-Printer-Subscription	subscription-id, [lease time-requested]
Cancel-Printer-Subscription	subscription-id

	Objects		Notification content		Job operations		Subscription operations		
Attributes	Job <u>col</u> <u>lecti</u> <u>on</u>	Subscription object	Job Notificat ion Content	Printer Notificat ion Content	Job Creation Validate -Job	Set- Job- Subscri ption	Create- Printer- Subscri ption	Renew - Subscri ption	Cancel - Subscri ption

Attributes	Objects		Notification content		Job operations		Subscription operations		
	Job <u>coll</u> <u>ecti</u> <u>on</u>	Subscr ption object	Job Notificat ion Content	Printer Notificat ion Content	Job Creation Validate -Job	Set- Job- Subscri ption	Create- Printer- Subscri ption	Renew - Subscr ption	Cancel - Subscr ption
<u>1.</u> notify-recipients (1setOf uri)	R	<u>RC</u>			[R]	[R]	[R] <u>C</u>		
<u>2.</u> notify-events (1setOf type2 keyword)	R	<u>RC</u>			[R]	[R]	[<u>RC</u>]		
<u>3.</u> notify-content-type (mimeMediaType)	<u>R</u>	<u>R</u>			[R]	[R]	[R]		
<u>4.</u> notify-user-data (octetString(63))	R	<u>RC</u>	<u>R</u>	<u>R</u>	[R]	[R]	[<u>RC</u>]		
<u>notify-exclude-event-masks</u> (1setOf octetString(8))	<u>R</u>	<u>C</u>			[R]	[R]	[<u>C</u>]		
<u>5.</u> attributes-charset (charset)	<u>R*</u>	<u>?</u>	<u>R</u>	<u>R</u>	R	R	<u>RC</u>	<u>RC</u>	<u>RC</u>
<u>6.</u> notify-attributes-charset (charset)	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	[O]	[O]	[O]		
<u>7.</u> attributes-natural-language (naturalLanguage)	<u>R*</u>	<u>?R</u>	<u>R</u>	<u>R</u>	R	R	<u>RC</u>	<u>RC</u>	<u>RC</u>
<u>8.</u> notify-attributes-natural-languages (1setOf naturalLanguage)	<u>OR</u>	<u>OR</u>	<u>R</u>	<u>R</u>	[O]	[O]	[O]		
<u>6.9.</u> notify-lease-time-requested (integer(0:MAX))							[<u>RC</u>]	[<u>RC</u>]	
<u>7.10.</u> notify-lease-time-granted (integer(0:MAX))							Return	Return	
<u>8.11.</u> notify-lease- <u>expiration</u> -time (integer(0:MAX))		<u>RC</u>					Return	Return	
<u>9.12.</u> notify-persistence- <u>requested</u> (boolean)							[O]		
<u>10.13.</u> notify-persistence- <u>granted</u> (boolean)							<u>Return</u>	<u>Return</u>	
<u>11.14.</u> <u>job</u> -trigger-event (type2 keyword)	<u>R?</u>	<u>?</u>	R (<u>2</u>)	<u>R</u> (<u>2</u>)					
<u>printer-trigger-event</u> (type2 keyword)				<u>R</u>					
<u>12.15.</u> <u>job</u> -trigger-time (integer(MIN:MAX))	<u>R?</u>	<u>?</u>	R	<u>R</u>					
<u>printer-trigger-time</u> (integer(1:MAX))				<u>R</u>					
<u>13.16.</u> <u>job</u> -trigger-date-time (dateTime)	<u>O?</u>	<u>?</u>	[]	[]					
<u>printer-trigger-date-time</u> (dateTime)				[]					
<u>14.17.</u> request-id (integer (1:MAX))	<u>R</u>	<u>R</u>	R	R					
<u>notify-request-ids</u> (1setOf integer(0:MAX))	<u>R</u>	<u>C</u>							
<u>15.18.</u> subscription-id (integer(1:MAX))	<u>**</u>	<u>RC</u>	<u>Per-PrR</u>	<u>Per-PrR</u>			Return	<u>RC</u>	<u>RC</u>
<u>delivery-failure-count</u> (integer(0:MAX))		<u>C</u>							

39 Legend: "R" - REQUIRED for Printer to support; "~~C~~" - ~~CONDITIONAL; Printer MUST support if support Per-Printer subscriptions;~~
 40 "O" - OPTIONAL for Printer to support; "[]" - OPTIONAL for sender to send; Return - Printer MUST return; "Per-Pr" -
 41 REQUIRED if Notification from a Per-Printer subscription; "Per-Job" - REQUIRED if Notification from a Per-Job subscription;
 42 * - in the Job object, not the subscription.
 43 ** - 1setOf collection index is the implicit subscription-id for a Per-Job subscription and is sent in the Notification.

44

Attributes	Objects		Notification		Job operations		Subscription operations		
	Job object	Subscription object	Job Notification	Printer Notification	Job Creation Validate -Job	Set-Job-Subscription	Create-Printer-Subscription	Renew - Subscription	Cancel - Subscription
16.19. version-number (integer (0:32767))			R	R					
17.20. status-code (integer (0:32767))			(600)	(601)					
18.21. job-printer-uri (uri)	R		R (22)						
19.22. printer-uri (uri)		?R		R (21)	R	R	RC	RC	RC
20.23. printer-name (name(127))			R	R					
21.24. job-id (integer(1:MAX))	R		R	Per-Jb					
22.25. job-name (name(MAX)) [SNMP can truncate]	R		R	Per-Jb					
23.26. requesting-user-name (name(MAX))	R								
24.27. subscriber-user-name (name(MAX))		RC	R (26)	R (26)					
25.28. job-state (type1 enum)	R		R						
26.29. printer-state (type1 enum)		R		R					
27.30. job-state-reasons (1setOf type2 keyword)	R		R						
28.31. printer-state-reasons (1setOf type2 keyword)		R		R					
29.32. printer-is-accepting-jobs (boolean)		R		R					
30.33. job-k-octets-processed (integer(0:MAX))	O		[pg/cp]						
31.34. job-impressions-completed (integer(0:MAX))	O		[pg/cp]						
32.35. job-media-sheets-completed (integer(0:MAX))	O		[pg/cp]						
33.36. job-collation-type (type2 enum)	O		[pg/cp]						
34.37. sheet-completed-copy-number (integer(-2:MAX))	O		[pg/cp]						
35.38. sheet-completed-document-number(integer(-	O		[pg/cp]						

	Objects		Notification		Job operations		Subscription operations		
Attributes	Job object	Subsc ription object	Job Notific ation	Printer Notific ation	Job Creation Validate -Job	Set- Job- Subscr iption	Create- Printer- Subscri ption	Renew - Subscr iption	Cancel - Subscr iption
2:MAX))									

45 Legend: "R" - REQUIRED for Printer to support; ~~"C" - CONDITIONAL; Printer MUST support if support Per-Printer subscriptions;~~
46 "O" - OPTIONAL for Printer to support; "[]" - OPTIONAL for sender to send; Return - Printer MUST return; "Per-Pr" -
47 REQUIRED if Notification from a Per-Printer subscription; "Per-Jb" - REQUIRED if Notification from a Per-Job subscription;
48 "[pg/cp]" - OPTIONAL in a 'job-progress' or 'job-completed' notification; (nn) - an alternate source of the data in a Notification.

Attributes	Objects		Notification		Job operations		Subscription operations		
	Job object	<u>Printer object</u>	Job Notification	Printer Notification	Job Creation Validate -Job	Set-Job-Subscription	Create-Printer-Subscription	Renew-Subscription	Cancel-Subscription
36 . 39 . impressions-interpreted (integer(-2:MAX))	<u>O</u>		[pg/cp]						
37 . 40 . impressions-completed-current-copy (integer(-2:MAX))	<u>O</u>		[pg/cp]						
38 . 41 . <u>notify-schemes-supported (1setOf uriScheme)</u>		<u>R</u>							
39 . 42 . <u>notify-content-types-supported (1setOf collection)</u>		<u>R</u>							
39 . 43 . <u>notify-events-default (1setOf type2 keyword)</u>		<u>R</u>							
40 . 44 . <u>notify-events-supported (1setOf type2 keyword)</u>		<u>R</u>							
41 . 45 . <u>max-events-supported (integer(5:MAX))</u>		<u>R</u>							
42 . 46 . <u>max-job-subscriptions-supported (integer(1:MAX))</u>		<u>R</u>							
43 . 47 . <u>max-printer-subscriptions-supported (integer(0:MAX))</u>		<u>R</u>							
44 . 48 . <u>notify-lease-time-supported (rangeOfInteger(0:MAX))</u>		<u>R</u>							
45 . 49 . <u>notify-lease-time-default (integer(0:MAX))</u>		<u>R</u>							
46 . 50 . <u>persistent-jobs-supported (boolean)</u>		<u>R</u>							
47 . 51 . <u>persistent-subscriptions-supported (boolean)</u>		<u>O</u>							
48 . 52 . <u>printer-state-change-time (integer(MIN:MAX))</u>		<u>O</u>							
49 . 53 . <u>printer-state-change-date-time (dateTime)</u>		<u>O</u>							

50 Legend: "R" - REQUIRED for Printer to support; "~~C~~" - ~~CONDITIONAL; Printer MUST support if support Per-Printer subscriptions;~~
51 "O" - OPTIONAL for Printer to support; "[]" - OPTIONAL for sender to send; Return - Printer MUST return; "Per-Pr" -
52 REQUIRED if Notification from a Per-Printer subscription; "Per-Jb" - REQUIRED if Notification from a Per-Job subscription;
53 "[pg/cp]" - OPTIONAL in a 'job-progress' or 'job-completed' notification; (nn) - an alternate source of the data in a Notification.

54 **2 Change History**

55 **2.1 Changed made to the 8/17/99 version to make the 8/19/99 version**

- 56 1. Added "notify-content-type" (mimeMediaType) so that the client can specify whether human
57 consumable versus machine consumable.
- 58 2. Added "notify-content-type-supported" (1setOf collection) Printer Description attribute to represent
59 which notification format types are supported for each supported delivery scheme.
- 60 3. Made Per-Printer Subscriptions and the Subscription object REQUIRED if notification is supported.
61 So both Per-Job and Per-Printer subscriptions are REQUIRED. There is no longer any
62 CONDITIONALLY REQUIRED indication in our spec.
- 63 4. Added "notify-attributes-charset" to represent "attributes-charset" in subscription requests and objects
64 to distinguish it from the request's "attributes-charset" attribute.
- 65 5. Added "notify-attributes-natural-language" to represent "attributes-natural-language" in subscription
66 requests and objects to distinguish it from the request's "attributes-natural-language" attribute.

67 **2.2 Changes made to the 8/11/99 version to make the 8/17/99 version:**

- 68 1. Instead of the "notify-exclude-event-mask" (1setOf octetString(8)) attribute, we agreed to use introduce
69 the new 'collection' attribute syntax that we have been talking about for over a year for use in the Job
70 object to specify multiple subscriptions in a Job creation operation. So the "notify" operation attribute
71 for Job creation operations will have the attribute syntax: '1setOf collection'. The member attributes of
72 each collection value for Per-Job subscriptions are the same as the attributes of a Subscription object
73 instance for Per-Printer subscriptions. For terminology a "subscription" is either a collection value of
74 the "notify" operation attribute in a Job Creation operation or is a Subscription object.
- 75 2. Each subscription will contain only one multi-valued attribute: "notify-events" (1setOf type2 keyword).
76 The remaining attributes will be single valued:
77 "notify-recipients" (uri)
78 "notify-user-info" (octetString(63))
79 "attributes-charset" (charset)
80 "attributes-natural-language" (naturalLanguage)
81 "request-id" (integer(0:MAX))
- 82 3. The client supplies an "attributes-natural-language" in a subscription in order to get a different natural
83 language than for the request that creates the subscription. However, the only time that the natural
84 language has any bearing on the Notification content, is when that content is the Human Consumable
85 form. The Machine Consumable form of the Notification content will have no localization in it.
- 86 4. The minimum number of notification recipients that are required to support is 1. Hence the minimum
87 number of collection values is 1 and the minimum number of Subscription objects is 1, if Per-Printer
88 subscriptions are supported at all.

- 89 5. Instead of inventing a special operation that sets the Job attributes related to notification, we will define
90 a single Set-Job-Attributes operation for changing the values of any Job attribute that is not defined to
91 be READ-ONLY. We will not define the corresponding Set-Printer-Attributes operation at this time,
92 but will lump that operation with the other System Administration operations, since changing Printer
93 attributes is an administrative function. Changing Job attributes is an end-user function for your own
94 jobs, and an operator operation for other's Jobs.
- 95 6. A Printer can grant a larger or smaller lease to that requested, including granting an infinite lease.
- 96 7. Change "persistence (boolean)" operation attribute to "persistence-requested (boolean)" in the Create-
97 Printer-Subscription. Keep it OPTIONAL to support. However, add a REQUIRED "persistence-
98 granted (boolean)" operation attribute that MUST be returned in the response. While implementations
99 are RECOMMENDED to make all Subscriptions persistence, same as for jobs, they MAY have a more
100 limited number that are persistent, including none.
- 101 8. Add two Printer Descriptions attributes: "persistent-job-supported" (boolean) and "persistent-
102 subscriptions-supported" (boolean).
- 103 9. The Get-Printer-Subscriptions and Get-Printer-Subscription-Attributes will return attributes
104 Subscription attributes group, so there will be a new Subscription attribute tag assigned in the Encoding
105 and Transport.
- 106 10. Changed the name of the "notify-lease-time" (integer(0:MAX)) in the Subscription object to "notify-
107 least-expiration-time" (integer(0:MAX)) since it is the time at which the lease expires.
- 108 11. Eliminated storing the trigger-event, trigger-time, and trigger-date-time in the subscription and passed
109 them only in the Notification content.
- 110 12. Add "printer-state-change-time" (integer(MIN:MAX)) and "printer-state-change-date-time" (dateTime)
111 Printer Description attributes to record the time that the Printer last changed state. Then an application
112 that come up after that can tell when the printer got into its current state by querying the Printer when
113 the application starts up. Lesson from the Printer MIB alert table.
- 114 13. Defined the "subscription-id" attribute for use with Per-Job subscriptions as being the index of the
115 1setOf collection, starting at '1'. Then a Notification Recipient can have a unique identification for each
116 subscription whether it be Per-Job or Per-Printer, for use in catching duplicate or skipped notifications
117 using the "request-id".
- 118 14. Deleted the "delivery-failure-count" (integer(0:MAX)) from the Subscription object as not necessary.
- 119 15. Transports that have limited space, like SNMP, can truncate the "job-name" to less than 255 octets, in
120 order to fit.
- 121 16. Added the "subscription-printer-uri" (uri) to the Subscription object to go along with the Job's "job-
122 printer-uri" (uri) attribute.
- 123 17. Added "job-k-octets-processed" (integer(0:MAX)) to the Job Notification content for 'job-progress' and
124 'job-completed' events.

125 18. Added the 'job-progress' attributes to also be in the 'job-completed' Job Notification content.