1   IPP Notification New Model Attribute Summary
2   From: Tom Hastings
3   Date:   8/18/99
4   File:    ipp-notification-attr-summary-990818.doc

5   Updated with the agreements at the IPP WG meeting, 8/18/99.

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) 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.*

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

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# 1    New IPP Notification Operations

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

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

## *1.1    Per-Job Subscriptions - new model*

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

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## *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 | recipient~~s~~, [events,] [user-data,] ~~[exclude-event-mask,]~~ [charset,][natural-language~~s~~,][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 |

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| Attributes | Objects | | Notification content | | Job operations | | Subscription operations | | |
|---|---|---|---|---|---|---|---|---|---|
| | Job collection | Subscription object | Job Notification Content | Printer Notification Content | Job Creation Validate-Job | Set-Job-Subscription | Create-Printer-Subscription | Renew-Subscription | Cancel-Subscription |
| 1. notify-recipients (1setOf uri) | R | C | | | [R] | [R] | C | | |
| 2. notify-events (1setOf type2 keyword) | R | C | | | [R] | [R] | [C] | | |
| 3. notify-user-data (octetString(63)) | R | C | R | R | [R] | [R] | [C] | | |
| ~~notify-exclude-event-masks (1setOf octetString(8))~~ | ~~R~~ | ~~C~~ | | | ~~[R]~~ | ~~[R]~~ | ~~[C]~~ | | |
| 4. attributes-charset (charset) | R | ~~?~~C | R | R | R | ~~R~~ | C | C | C |
| 5. attributes-natural-language (naturalLanguage) | R | ~~?~~C | R | R | R | R | C | C | C |
| ~~notify-natural-languages (1setOf naturalLanguage)~~ | ~~O~~ | ~~O~~ | | | ~~[O]~~ | ~~[O]~~ | ~~[O]~~ | | |
| 6. notify-lease-time-requested (integer(0:MAX) | | | | | | | [C] | [C] | |
| 7. notify-lease-time-granted (integer(0:MAX)) | | | | | | | Return | Return | |
| 8. notify-lease-expiration-time (integer(0:MAX)) | | C | | | | | Return | Return | |
| 9. notify-persistence-requested (boolean) | | | | | | | [O] | | |
| 10. notify-persistence-granted (boolean) | | | | | | | Return | Return | |
| 11. ~~job-~~trigger-event (type2 keyword) | ~~R~~? | ? | R (2) | | | | | | |
| ~~printer-trigger-event (type2 keyword)~~ | | | | R | | | | | |
| 12. ~~job-~~trigger-time (integer(MIN:MAX)) | ~~R~~? | ? | R | R | | | | | |
| ~~printer-trigger-time (integer(1:MAX))~~ | | | | R | | | | | |
| 13. ~~job-~~trigger-date-time (dateTime) | ~~O~~? | ? | [ ] | [ ] | | | | | |
| ~~printer-trigger-date-time (dateTime)~~ | | | | [ ] | | | | | |
| 14. request-id (integer (1:MAX)) | R | C | R | R | | | | | |
| ~~notify-request-ids (1setOf integer(0:MAX))~~ | ~~R~~ | ~~C~~ | | | | | | | |
| 15. subscription-id (integer(1:MAX)) | * | C | ~~Per-Pr~~R | ~~Per-Pr~~R | | | Return | C | C |
| ~~delivery-failure-count (integer(0:MAX))~~ | | ~~C~~ | | | | | | | |

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   * - 1setOf collection index is the implicit subscription-id for a Per-Job subscription and is sent in the Notification.

| 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. version-number (integer (0:32767)) | | | R | R | | | | | |
| 17. status-code (integer (0:32767)) | | | (600) | (601) | | | | | |
| 18. job-printer-uri (uri) | R | | R (19) | | | | | | |
| 19. printer-uri (uri) | | ?R | | R (18) | R | R | C | C | C |
| 20. printer-name (name(127)) | | | R | R | | | | | |
| 21. job-id (integer(1:MAX)) | R | | R | Per-Jb | | | | | |
| 22. job-name (name(MAX)) [SNMP can truncate] | R | | R | Per-Jb | | | | | |
| 23. requesting-user-name (name(MAX)) | R | | | | | | | | |
| 24. subscriber-user-name (name(MAX)) | | C | R (23) | R (23) | | | | | |
| 25. job-state (type1 enum) | R | | R | | | | | | |
| 26. printer-state (type1 enum) | | R | | R | | | | | |
| 27. job-state-reasons (1setOf type2 keyword) | R | | R | | | | | | |
| 28. printer-state-reasons (1setOf type2 keyword) | | R | | R | | | | | |
| 29. printer-is-accepting-jobs (boolean) | | R | | R | | | | | |
| 30. job-k-octets-processed (integer(0:MAX)) | O | | [pg/cp] | | | | | | |
| 31. job-impressions-completed (integer(0:MAX)) | O | | [pg/cp] | | | | | | |
| 32. job-media-sheets-completed (integer(0:MAX)) | O | | [pg/cp] | | | | | | |
| 33. job-collation-type (type2 enum) | O | | [pg/cp] | | | | | | |
| 34. sheet-completed-copy-number (integer(-2:MAX)) | O | | [pg/cp] | | | | | | |
| 35. sheet-completed-document-number(integer(-2:MAX)) | O | | [pg/cp] | | | | | | |

44    Legend:  "R" - REQUIRED for Printer to support;  "C" - CONDITIONAL; Printer MUST support if support Per-Printer subscriptions;
45    "O" - OPTIONAL for Printer to support;  "[ ]" - OPTIONAL for sender to send; Return - Printer MUST return; "Per-Pr" -
46    REQUIRED if Notification from a Per-Printer subscription; "Per-Jb" - REQUIRED if Notification from a Per-Job subscription;
47    "[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 | Printer object | Job Notification | Printer Notification | Job Creation Validate-Job | Set-Job-Subscription | Create-Printer-Subscription | Renew-Subscription | Cancel-Subscription |
| 36. impressions-interpreted (integer(-2:MAX)) | O | | [pg/cp] | | | | | | |
| 37. impressions-completed-current-copy (integer(-2:MAX)) | O | | [pg/cp] | | | | | | |
| 38. notify-schemes-supported (1setOf uriScheme) | | R | | | | | | | |
| 39. notify-events-default (1setOf type2 keyword) | | R | | | | | | | |
| 40. notify-events-supported (1setOf type2 keyword) | | R | | | | | | | |
| 41. max-events-supported (integer(5:MAX)) | | R | | | | | | | |
| 42. max-job-subscriptions-supported (integer(1:MAX)) | | R | | | | | | | |
| 43. max-printer-subscriptions-supported (integer(0:MAX)) | | C | | | | | | | |
| 44. notify-lease-time-supported (rangeOfInteger(0:MAX)) | | C | | | | | | | |
| 45. notify-lease-time-default (integer(0:MAX)) | | C | | | | | | | |
| 46. persistent-jobs-supported (boolean) | | O | | | | | | | |
| 47. persistent-subscriptions-supported (boolean) | | O | | | | | | | |
| 48. printer-state-change-time (integer(MIN:MAX)) | | O | | | | | | | |
| 49. printer-state-change-date-time (dateTime) | | O | | | | | | | |
| | | | | | | | | | |

49    Legend:  "R" - REQUIRED for Printer to support;  "C" - CONDITIONAL; Printer MUST support if support Per-Printer subscriptions;

50    "O" - OPTIONAL for Printer to support;  "[ ]" - OPTIONAL for sender to send; Return - Printer MUST return; "Per-Pr" -

51    REQUIRED if Notification from a Per-Printer subscription; "Per-Jb" - REQUIRED if Notification from a Per-Job subscription;

52    "[pg/cp]" - OPTIONAL in a 'job-progress' or 'job-completed' notification;  (nn) - an alternate source of the data in a Notification.

# 2   Change History

## 2.1   Changes made to the 8/11/99 version to make the 8/17/99 version:

1.  Instead of the "notify-exclude-event-mask" (1setOf octetString(8)) attribute, we agreed to use introduce the new 'collection' attribute syntax that we have been talking about for over a year for use in the Job object to specify multiple subscriptions in a Job creation operation.  So the "notify" operation attribute for Job creation operations will have the attribute syntax:  '1setOf collection'.  The member attributes of each collection value for Per-Job subscriptions are the same as the attributes of a Subscription object instance for Per-Printer subscriptions.  For terminology a "subscription" is either a collection value of the "notify" operation attribute in a Job Creation operation or is a Subscription object.

2.  Each subscription will contain only one multi-valued attribute: "notify-events" (1setOf type2 keyword). The remaining attributes will be single valued:
    "notify-recipients" (uri)
    "notify-user-info" (octetString(63))
    "attributes-charset" (charset)
    "attributes-natural-language" (naturalLanguage)
    "request-id" (integer(0:MAX))

3.  The client supplies an "attributes-natural-language" in a subscription in order to get a different natural language than for the request that creates the subscription.  However, the only time that the natural language has any bearing on the Notification content, is when that content is the Human Consumable form.  The Machine Consumable form of the Notification content will have no localization in it.

4.  The minimum number of notification recipients that are required to support is 1.  Hence the minimum number of collection values is 1 and the minimum number of Subscription objects is 1, if Per-Printer subscriptions are supported at all.

5.  Instead of inventing a special operation that sets the Job attributes related to notification, we will define a single Set-Job-Attributes operation for changing the values of any Job attribute that is not defined to be READ-ONLY.  We will not define the corresponding Set-Printer-Attributes operation at this time, but will lump that operation with the other System Administration operations, since changing Printer attributes is an administrative function.  Changing Job attributes is an end-user function for your own jobs, and an operator operation for other's Jobs.

6.  A Printer can grant a larger or smaller least to that requested, including granting an infinite lease.

7.  Change "persistence (boolean)" operation attribute to "persistence-requested (boolean)" in the Create-Printer-Subscription.  Keep it OPTIONAL to support.  However, add a REQUIRED "persistence-granted (boolean)" operation attribute that MUST be returned in the response.  While implementations are RECOMMENDED to make all Subscriptions persistence, same as for jobs, they MAY have a more limited number that are persistent, including none.

8.  Add two Printer Descriptions attributes:  "persistent-job-supported" (boolean) and "persistent-subscriptions-supported" (boolean).

9. The Get-Printer-Subscriptions and Get-Printer-Subscription-Attributes will return attributes Subscription attributes group, so there will be a new Subscription attribute tag assigned in the Encoding and Transport.

10. Changed the name of the "notify-lease-time" (integer(0:MAX)) in the Subscription object to "notify-least-expiration-time" (integer(0:MAX)) since it is the time at which the lease expires.

11. Eliminated storing the trigger-event, trigger-time, and trigger-date-time in the subscription and passed them only in the Notification content.

12. Add "printer-state-change-time" (integer(MIN:MAX)) and "printer-state-change-date-time" (dateTime) Printer Description attributes to record the time that the Printer last changed state. Then an application that come up after that can tell when the printer got into its current state by querying the Printer when the application starts up. Lesson from the Printer MIB alert table.

13. Defined the "subscription-id" attribute for use with Per-Job subscriptions as being the index of the 1setOf collection, starting at '1'. Then a Notification Recipient can have a unique identification for each subscription whether it be Per-Job or Per-Printer, for use in catching duplicate or skipped notifications using the "request-id".

14. Deleted the "delivery-failure-count" (integer(0:MAX)) from the Subscription object as not necessary.

15. Transports that have limited space, like SNMP, can truncate the "job-name" to less than 255 octets, in order to fit.

16. Added the "subscription-printer-uri" (uri) to the Subscription object to go along with the Job's "job-printer-uri" (uri) attribute.

17. Added "job-k-octets-processed" (integer(0:MAX)) to the Job Notification content for 'job-progress' and 'job-completed' events.

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