

Subj: Proposed set of 33 Attributes for the New Device Object
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Ira and I took on an action item from the 10/3/99 telecon to make a proposal for a small subset of the Printer MIB and Printer object attributes to be Device object attributes. Out of a possible 192 candidate Printer MIB and IPP Printer object attributes, we propose 23 REQUIRED Device object attributes and 10 OPTIONAL Device Object attributes. The intent of the Device object is to model the output device, i.e., the "lump of metal", just as the Printer MIB does. Since the Printer object had both the goal to model the "lump of metal" to a certain degree and to also be able to model a print service or logical printer, we need to find out which Printer object attributes should also be Device object attributes. We also assumed as from the [ipp-set3] document, that the Device object associated with a Printer object is co-located with that Printer object.

1 Criteria for attribute selection

The criteria chosen was that the Device object attributes are of interest to applications and drivers creating PDL data and servers that are controlling devices. Generally, attributes that are of interest to operators, system administrators, or asset managers were left out, primarily because the REQUIRED Printer object already caters to their needs. A second criteria was that if an attribute is already a Printer object attribute and would likely have the same value for the Device object, considering fan-in and fan-out, then we did not include it as a candidate for adding to the Device object. As with the Printer MIB, no policy attributes are included in the Device object, i.e., there are no "xxx-supported" attributes; only attributes that reflect the output devices current state and configuration.

2 Device object attributes taken from the Printer MIB

This section proposes a few Printer MIB objects that should be made attributes of the Device object. The names are taken directly from the Printer MIB by lower casing the object tags and putting hyphen (-) between each word in order to conform to the IPP keyword syntax. Thus it is straightforward for an implementer to make additional attributes available, though submission for registration is always a good idea in order to get complete agreement on the semantics.

The objects that represent attributes of Printer MIB sub-units that can have multiple instances are represented as 1setOf. Thus parallel attributes are used. This seems to be much simpler than introducing 'collection' or separate sub-unit objects, like input-trays and output-bins.

The "Device Object Attribute" column indicates the attribute and its attribute syntax. If the Printer MIB has overlap with a Printer object attribute, the notation "See xxx-yyy" means that there is a corresponding Device Object attribute, but its in the other table. The R column indicates REQUIRED (R) or OPTIONAL (O) for an implementation to support. The R values correspond to REQUIRED objects in the Printer MIB.

Printer MIB object	Data type	Device Object Attribute	R
PrtGeneralEntry	::= SEQUENCE {		
1. prtGeneralConfigChanges	Counter32,	See "charset-configured" and "natural-language-configured"	

2. prtGeneralCurrentLocalization	Integer32,		
3. prtGeneralReset	PrtGeneralResetTC,		
4. prtGeneralCurrentOperator	OCTET STRING,	1. prt-general-current-operator - in SLP template	O
5. prtGeneralServicePerson	OCTET STRING,	2. prt-general-service-person - in SLP template	O
6. prtInputDefaultIndex	Integer32,	3. prt-input-default-index (integer(0:MAX))	R
7. prtOutputDefaultIndex	Integer32,	4. prt-output-default-index (integer(0:MAX))	R
8. prtMarkerDefaultIndex	Integer32,		
9. prtMediaPathDefaultIndex	Integer32,		
10. prtConsoleLocalization	Integer32,		
11. prtConsoleNumberOfDisplayLines	Integer32,		
12. prtConsoleNumberOfDisplayChars	Integer32,		
13. prtConsoleDisable	INTEGER,		
14. prtAuxiliarySheetStartupPage	PresentOnOff,		
15. prtAuxiliarySheetBannerPage	PresentOnOff,		
16. prtGeneralPrinterName	OCTET STRING,	See "device-name"	R
17. prtGeneralSerialNumber	OCTET STRING,	5. prt-general-serial-number	R
18. prtAlertCriticalEvents	Counter32,		
19. prtAlertAllEvents	Counter32		
}			
PrtCoverEntry	::= SEQUENCE {		
20. prtCoverIndex	Integer32,		
21. prtCoverDescription	OCTET STRING,		
22. prtCoverStatus	PrtCoverStatusTC		
}			
PrtLocalizationEntry	::= SEQUENCE {		
23. prtLocalizationIndex	Integer32,		
24. prtLocalizationLanguage	DisplayString,		
25. prtLocalizationCountry	DisplayString,		
26. prtLocalizationCharacterSet	CodedCharSet		
}			
PrtStorageRefEntry	::= SEQUENCE {		
27. prtStorageRefSeqNumber	Integer32,		
28. prtStorageRefIndex	Integer32		
}			
PrtDeviceRefEntry	::= SEQUENCE {		
29. prtDeviceRefSeqNumber	Integer32,		
30. prtDeviceRefIndex	Integer32		
}			
PrtInputEntry	::= SEQUENCE {		
31. prtInputIndex	Integer32,	6. prt-input-index (1setOf integer(1:MAX))	R
32. prtInputType	PrtInputTypeTC,	7. prt-input-type (1setOf type2 keyword)	R
33. prtInputDimUnit	PrtMediaUnitTC,		
34. prtInputMediaDimFeedDirDeclared	Integer32,		
35. prtInputMediaDimXFeedDirDeclared	Integer32,		
36. prtInputMediaDimFeedDirChosen	Integer32,		
37. prtInputMediaDimXFeedDirChosen	Integer32,		
38. prtInputCapacityUnit	PrtCapacityUnitTC,	ISSUE - can we fix at sheet? Roll fed computes in sheets? or do we need to have capacity units enum?	R

39. prtInputMaxCapacity	Integer32,		
40. prtInputCurrentLevel	Integer32,	8. prt-input-current-level (1setOf integer(0:MAX))	R
41. prtInputStatus	PrtSubUnitStatusTC,		
42. prtInputMediaName	OCTET STRING,	9. prt-input-media-name (1setOf name(0:63))	R
43. prtInputName	OCTET STRING,	10. prt-input-name (1setOf name(0:63))	O
44. prtInputVendorName	OCTET STRING,		
45. prtInputModel	OCTET STRING,		
46. prtInputVersion	OCTET STRING,		
47. prtInputSerialNumber	OCTET STRING,		
48. prtInputDescription	OCTET STRING,	11. prt-input-description (1setOf text(0:255))	O
49. prtInputSecurity	PresentOnOff,		
50. prtInputMediaWeight	Integer32,		
51. prtInputMediaType	OCTET STRING,	12. prt-input-media-type (1setOf type2 keyword)	O
52. prtInputMediaColor	OCTET STRING,		
53. prtInputMediaFormParts	Integer32,		
54. prtInputMediaLoadTimeout	Integer32,		
55. prtInputNextIndex	Integer32		
}			
PrtOutputEntry	::= SEQUENCE {		
56. prtOutputIndex	Integer32,	13. prt-output-index (1setOf integer(1:MAX))	R
57. prtOutputType	PrtOutputTypeTC,	14. prt-output-type (1setOf type2 keyword)	R
58. prtOutputCapacityUnit	PrtCapacityUnitTC,		
59. prtOutputMaxCapacity	Integer32,		
60. prtOutputRemainingCapacity	Integer32,		
61. prtOutputStatus	PrtSubUnitStatusTC,		
62. prtOutputName	OCTET STRING,	15. prt-output-name (1setOf name(0:63))	R
63. prtOutputVendorName	OCTET STRING,		
64. prtOutputModel	OCTET STRING,		
65. prtOutputVersion	OCTET STRING,		
66. prtOutputSerialNumber	OCTET STRING,		
67. prtOutputDescription	OCTET STRING,	16. prt-output-description (1setOf text(0:255))	O
68. prtOutputSecurity	PresentOnOff,		
69. prtOutputDimUnit	PrtMediaUnitTC,		
70. prtOutputMaxDimFeedDir	Integer32,		
71. prtOutputMaxDimXFeedDir	Integer32,		
72. prtOutputMinDimFeedDir	Integer32,		
73. prtOutputMinDimXFeedDir	Integer32,		
74. prtOutputStackingOrder	PrtOutputStackingOrderTC,	17. prt-output-stacking-order (1setOf type2 keyword)	O
prtOutputPageDeliveryOrientation	PrtOutputPageDeliveryOrientationTC,	prt-output-stacking-order (1setOf type2 keyword)	O
75. prtOutputBursting	PresentOnOff,		
76. prtOutputDecollating	PresentOnOff,		
77. prtOutputPageCollated	PresentOnOff,		
78. prtOutputOffsetStacking	PresentOnOff		
}			
PrtMarkerEntry	::= SEQUENCE {		
79. prtMarkerIndex	Integer32,	18. prt-marker-index (1setOf integer(1:MAX))	R
80. prtMarkerMarkTech	PrtMarkerMarkTechTC	19. prt-marker-mark-tech (1setOf type2	R

	,	keyword)	
81. prtMarkerCounterUnit	PrtMarkerCounterUnit TC,		
82. prtMarkerLifeCount	Counter32,		
83. prtMarkerPowerOnCount	Counter32,		
84. prtMarkerProcessColorants	Integer32,	20. prt-marker-process-colorants (integer(0:MAX))	R
85. prtMarkerSpotColorants	Integer32,	21. prt-marker-spot-colorants (integer(0:MAX))	R
86. prtMarkerAddressabilityUnit	INTEGER,	22. prt-marker-addressability (1setOf resolution) - can be less or greater than the interpreter's "resolution-supported" Printer attribute.	R
87. prtMarkerAddressabilityFeedDir	Integer32,	combined into prt-marker-addressability	R
88. prtMarkerAddressabilityXFeedDir	Integer32,	combined into prt-marker-addressability	R
89. prtMarkerNorthMargin	Integer32,		
90. prtMarkerSouthMargin	Integer32,		
91. prtMarkerWestMargin	Integer32,		
92. prtMarkerEastMargin	Integer32,		
93. prtMarkerStatus	PrtSubUnitStatusTC		
}			
PrtMarkerSuppliesEntry	::= SEQUENCE {		
94. prtMarkerSuppliesIndex	Integer32,		
95. prtMarkerSuppliesMarkerIndex	Integer32,		
96. prtMarkerSuppliesColorantIndex	Integer32,		
97. prtMarkerSuppliesClass	PrtMarkerSuppliesClas sTC,		
98. prtMarkerSuppliesType	PrtMarkerSuppliesType TC,		
99. prtMarkerSuppliesDescription	OCTET STRING,		
100.prtMarkerSuppliesSupplyUnit	PrtMarkerSuppliesSupp lyUnitTC,		
101.prtMarkerSuppliesMaxCapacity	Integer32,		
102.prtMarkerSuppliesLevel	Integer32		
}			
PrtMarkerColorantEntry	::= SEQUENCE {		
103.prtMarkerColorantIndex	Integer32,		
104.prtMarkerColorantMarkerIndex	Integer32,		
105.prtMarkerColorantRole	PrtMarkerColorantRole TC,		
106.prtMarkerColorantValue	OCTET STRING,		
107.prtMarkerColorantTonality	Integer32		
}			
PrtMediaPathEntry	::= SEQUENCE {		
108.prtMediaPathIndex	Integer32,		
109.prtMediaPathMaxSpeedPrintUnit	PrtMediaPathMaxSpee dPrintUnitTC,		
110.prtMediaPathMediaSizeUnit	PrtMediaUnitTC,		
111.prtMediaPathMaxSpeed	Integer32,		
112.prtMediaPathMaxMediaFeedDir	Integer32,		
113.prtMediaPathMaxMediaXFeedDir	Integer32,		
114.prtMediaPathMinMediaFeedDir	Integer32,		

115.prtMediaPathMinMediaXFeedDir	Integer32,		
116.prtMediaPathType	PrtMediaPathTypeTC,		
117.prtMediaPathDescription	OCTET STRING,		
118.prtMediaPathStatus	PrtSubUnitStatusTC		
}			
PrtChannelEntry	::= SEQUENCE {		
119.prtChannelIndex	Integer32,	23. prt-channel-index (1setOf integer(1:MAX))	O
120.prtChannelType	PrtChannelTypeTC,	24. prt-channel-type (1setOf type2 keyword)	O
121.prtChannelProtocolVersion	OCTET STRING,		
122.prtChannelCurrentJobCntLangIndex	Integer32,		
123.prtChannelDefaultPageDescLangIndex	Integer32,		
124.prtChannelState	PrtChannelStateTC,	See "prt-channel-is-accepting-jobs" set by Disable-Device and Enable-Device	O
125.prtChannelIfIndex	Integer32,		
126.prtChannelStatus	PrtSubUnitStatusTC,		
127.prtChannelInformation	OCTET STRING		
}			
PrtInterpreterEntry	::= SEQUENCE {		
128.prtInterpreterIndex	Integer32,		
129.prtInterpreterLangFamily	PrtInterpreterLangFamilyTC,		
130.prtInterpreterLangLevel	OCTET STRING,	Need to do complete job with QUALDOCS	
131.prtInterpreterLangVersion	OCTET STRING,	Need to do complete job with QUALDOCS	
132.prtInterpreterDescription	OCTET STRING,		
133.prtInterpreterVersion	OCTET STRING,		
134.prtInterpreterDefaultOrientation	PrtPrintOrientationTC,		
135.prtInterpreterFeedAddressability	Integer32,	Already handled by "resolution-supported" with "document-format" supplied in Get-Printer-Attributes	
136.prtInterpreterXFeedAddressability	Integer32,	same	
137.prtInterpreterDefaultCharSetIn	CodedCharSet,		
138.prtInterpreterDefaultCharSetOut	CodedCharSet,		
139.prtInterpreterTwoWay	PrtInterpreterTwoWayTC		
}			
PrtConsoleDisplayBufferEntry	::= SEQUENCE {		
140.prtConsoleDisplayBufferIndex	Integer32,		
141.prtConsoleDisplayBufferText	OCTET STRING		
}			
PrtConsoleLightEntry	::= SEQUENCE {		
142.prtConsoleLightIndex	Integer32,		
143.prtConsoleOnTime	Integer32,		
144.prtConsoleOffTime	Integer32,		
145.prtConsoleColor	PrtConsoleColorTC,		
146.prtConsoleDescription	OCTET STRING		
}			
PrtAlertEntry	::= SEQUENCE {		
147.prtAlertIndex	Integer32,		
148.prtAlertSeverityLevel	PrtAlertSeverityLevelTC,		
149.prtAlertTrainingLevel	PrtAlertTrainingLevelTC		

	C,		
150.prtAlertGroup	PrtAlertGroupTC,		
151.prtAlertGroupIndex	Integer32,		
152.prtAlertLocation	Integer32,		
153.prtAlertCode	PrtAlertCodeTC,		
154.prtAlertDescription	OCTET STRING,		
155.prtAlertTime	TimeTicks		
}			

3 Device object attributes equivalents from the Printer object

This section lists the few Printer object attributes that should also be Device object attributes. Since the Printer object is REQUIRED and the Device object is OPTIONAL, there are a number of Printer object attributes that would make sense for the Device object instead of the Printer object. However, we don't want to change the Printer object and those attributes should be available even when the Device object isn't supported at all. So we only added Device object attributes if it makes sense for the corresponding Printer attribute to have different values from the corresponding Device attribute.

Another criteria that was used was not to add any Device object attributes that dealt with the location of the Device object, since it is co-located with the Printer object. So there are no URL for accessing the device object.

The name of the device attribute is formed by changing the "printer-" to "device-". The attribute syntax is the same for the Device object attribute as for the corresponding Printer object attribute and so is not shown.

The R column indicates REQUIRED (R) or OPTIONAL (O) for an implementation to support. The R values correspond to REQUIRED objects in the Printer MIB or the IPP Printer object.

IPP/1.1 Printer Object Attributes	Device Object Attribute	Comment or corresponding Printer MIB object	R
156.printer-uri-supported (1setOf uri)			
157.uri-authentication-supported (1setOf type2 keyword)			
158.uri-security-supported (1setOf type2 keyword)			
159.printer-name (name(127))	25. device-name	same value as prtmibv2 prtGeneralPrinterName	R
160.printer-location (text(127))			
161.printer-info (text(127))	26. device-info		O
162.printer-more-info (uri)			
163.printer-driver-installer (uri)			
164.printer-make-and-model (text(127))			
165.printer-more-info-manufacturer (uri)			
166.printer-state (type1 enum)	27. device-state	same values as "printer-state"	R
167.printer-state-reasons (1setOf type2 keyword)	28. device-state-	same values as "printer-state-reasons"	R

	reasons		
168.printer-state-message (text(MAX))			
169.ipp-versions-supported (1setOf type2 keyword)			
170.operations-supported (1setOf type2 enum)	29. operations-supported		R
171.multiple-document-jobs-supported (boolean)			
172.charset-configured (charset)	30. charset-configured	corresponds to prtGeneralCurrentLocalization	R
173.charset-supported (1setOf charset)			
174.natural-language-configured (naturalLanguage)	31. natural-language-configured	corresponds to prtGeneralCurrentLocalization	R
175.generated-natural-language-supported (1setOf naturalLanguage)			
176.document-format-default (mimeMediaType)			
177.document-format-supported (1setOf mimeMediaType)			
178.printer-is-accepting-jobs (boolean)	32. prt-channel-is-accepting-jobs	same values as prtChannelState	R
179.queued-job-count (integer(0:MAX))			
180.printer-message-from-operator (text(127))			
181.color-supported (boolean)			
182.reference-uri-schemes-supported (1setOf uriScheme)			
183.pdl-override-supported (type2 keyword)			
184.printer-up-time (integer(1:MAX))	33. device-up-time		R
185.printer-current-time (dateTime)			
186.multiple-operation-time-out (integer(1:MAX))			
187.compression-supported (1setOf type3 keyword)			
188.job-k-octets-supported (rangeOfInteger(0:MAX))			
189.job-impressions-supported (rangeOfInteger(0:MAX))			
190.job-media-sheets-supported (rangeOfInteger(0:MAX))			
191.pages-per-minute (integer(0:MAX))			
192.pages-per-minute-color (integer(0:MAX))			