

1 | **List of Information Objects/~~Attributes~~**
2 | **for the**
3 | **Job Monitoring MIB/~~MIF~~**
4 |

5 | From: Tom Hastings

6 | Date: 01/09/97~~12/30/96~~

7 | Version: 0.~~65~~

8 | File: ftp://ftp.pwg.org/pub/snmpmib/jobs-mib/jmp-list.doc .ps

9 | Status: I've made the changes agreed to at the JMP meeting, 01/08/97 in Albuquerque: a number of
10 | object name changes, deletion of the jmJobDownstreamId, removal of the pairs of 32-bit object in favor of
11 | counting octets in K, and the addition of the jmJobNameId and jmJobNumberId client-assigned objects.
12 | The next step is to take these changes and turn it into a full fledged MIB.

13 | I've made three changes that were suggested at the IETF meeting where I presented all the objects. So
14 | these changes are changes since version 0.4 that I posted after the 11/08/96 meeting: I combined
15 | **jmQueuing** and **jmQueuingAlgorithm** into a single **jmGeneralQueuingAlgorithm** enum that already
16 | includes the "none(3)" value, so we don't need the **jmQueuing** Boolean. I added the **jmDeviceIndex** so
17 | that a management application can determine the hrDeviceIndex for the associated Printer MIB instance
18 | that this job was submitted to or is to be printed on without having to scan the entire **jmResourcesTable**
19 | thereby resolving ISSUE 04. I removed the **jmJobSourceChannelInformation**, since it can now be
20 | obtained easily from the Printer MIB using the **jmDeviceIndex** object. In reviewing the minutes of the
21 | 11/08/96 meeting in New Orleans, I see that I also failed to add the table of MIB instances (see point
22 | number 1 in the minutes under Scott's proposal). So the totals are the same: 36 mandatory objects and 7
23 | conditionally mandatory objects

24 | The suggestion made at the IETF meeting to count jobs in K, instead of octets, would allow us to combine
25 | two 32-bit integer object/~~attributes~~ into a single object/~~attribute~~. I have added this idea as an issue for the
26 | group to decide. See jmp-spec.doc.

27 | This list summarizes the proposed objects/~~attributes~~ for the Job Monitoring MIB/~~MIF~~ as agreed to at the
28 | JMP meeting, 11/08/96 in New Orleans and modified by suggestions at the IETF meeting. It can be used
29 | as a worksheet for further organizing the work. The version number of this list (jmp-list.*) will track the
30 | version number of the specification (jmp-spec.*). I've added the groups and tables as agreed at the
31 | 11/08/96 meeting and copied in the data types. The number of protocols column is the sum of the number
32 | of protocols that use the object/~~attribute~~.

33 | *NOTE - the descriptions of these objects in this list are not the specifications of these*
34 | *objects/~~attributes~~; these descriptions are only helpful short-hand descriptions. The full*
35 | *description is in the specification (see jmp-spec.* files).*

36 **1. Object/**Attribute** totals**

37 There is a one to one relationship between tables and groups as follows:

Group	Table	Description	No. of objects	Conformance
jmJobSetMIBInstance	jmJobSetMIBInstanceTable	A table of indexes to each Job SetMonitoring-MIB instance.	1	Mandatory
jmGeneralGroup	N/A	General attributes that apply to all jobs in the MIB instance.	5	Mandatory
jmQueueGroup	jmQueueTable	Ordered list of jobs that have <i>not</i> finished and job attributes that only matter until the job has finished processing. Mandatory only if queuing (or spooling).	7	Conditionally mandatory
jmCompletedGroup	jmCompletedTable	Ordered list of jobs that have finished processing.	3	Mandatory
jmJobGroup	jmJobTable	Per job objects.	1929	Mandatory
jmResourceGroup	jmResourceTable	Resources requested and/or used by the job. Can have more than one per job.	7	Mandatory
Mandatory Totals:			3536	
Conditionally Mandatory Totals:			7	
Totals:			4243	

38 **2. List of objects/**attributes** for the Job Monitoring MIB/**MIF****

39 The first column contains the MIB name followed by a descriptive name for the object/**attribute** that is
 40 applicable to both MIB and MIF. Names for the MIB have a prefix of "jm" and mixed case with each
 41 word starting with an upper case letter and no intervening spaces or hyphens. For the MIF the
 42 descriptive name will have intervening spaces and *no* hyphens. We will keep the names in this file the
 43 same as the specification file.

44 The **Data Type** column indicates the data type of the object. Enums are given distinct names that start
 45 with a capital letter.

46 The **Conformance** column specifies the conformance:

- M** means **Mandatory** for conformance to this MIB specification
- CM** means **Conditional** Mandatory (for spooling systems, and systems with day and time clocks, etc.).

47 The **Cardinality** columns contains:

- 1** meaning there is only **one** of these objects per job, so that the object can be in a table that is indexed by **jmJobSetMIBInstance** and **hrJobIndexLocalId**.
- n** meaning that there may be **more than one** of these objects per job, so that that the object must be in another table that in indexed by **jmJobSetMIBInstance**, **hrJobIndexLocalId**,

and a running instance index

48 | The **Protocols** column in the number of job submission protocols that this object/~~attribute~~ appears out of
49 | our survey of 9 job submission protocols. The 9 job submission protocols are: **ISO DPA, Apple PAP,**
50 | **IPDS, LPR/LPD, NDPS, P.JL, PSERVER, SMB, and TIPSI.**

51 **2.1 The MIB Instance Group**

52 The ~~JobSetMIBInstanceGroup~~ consists of objects that are for *all* Job ~~SetMonitoring-MIB~~ instances, not
 53 just a single instance. The ~~jmJobSetMIBInstanceGroup~~ consists entirely of the
 54 ~~jmJobSetMIBInstanceEntry~~ which is indexed by:

- 55 1. ~~jmJobSetMIBInstanceIndex~~ - a running index of Job ~~SetMonitoring-MIB~~ instances
 56 supported by this printer or server.

57

jmJobSetMIBInstanceGroup (M)	Data Type	Conformance	Cardinality	Protocols
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoring-MIB instances supported by this printer or server.	Integer3 2(1..2^3 1)Index1 6	M	1	

58 **2.2 The General Group**

59 The ~~jmGeneralGroup~~ consists of objects of a general nature that are *not* per-job. The ~~jmGeneralGroup~~
 60 consists entirely of the ~~jmGeneralEntry~~ which is indexed by:

- 61 1. ~~jmJobSetMIBInstanceIndex~~ - a running index of Job ~~SetMonitoring-MIB~~ instances
 62 supported by this printer or server.

63

jmGeneralGroup (G)	Data Type	Conformance	Cardinality	Protocols
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoring-MIB instances supported by this printer or server.	Integer3 2(1..2^1 5- 1)Index1 6	M	1	
2. jmGeneralJobCompletedRetentionPolicy - the default time in seconds that jobs are kept in the jmJobTable and the jmCompletedTable retained after processingcompletion .	Integer3 2(0..2^3 1-1)	M	1	
3. jmGeneralMaxNumberOfJobs - the maximum number of job; (-1) means no limit.	Integer3 2(0..2^3 1-1)	M	1	
4. jmGeneralCurrentNumberOfJobs - the total number of jobs currently in the Job Table (pending and completed).	Integer3 2(0..2^3 1-1)	M	1	
5. jmGeneralQueuingAlgorithm - the current scheduling algorithm being used or none (no queuing is possible).	JMQueuingAlgorithm	M	1	

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65 **2.3 The Queue Group**

66 The **jmQueueGroup** is made up entirely of the **jmQueueTable** which is an ordered list of jobs that have
 67 not completed processing. The **jmQueueGroup** consists of objects/~~attributes~~ that are not needed after the
 68 job has completed processing. The **jmQueueGroup** is conditionally mandatory and shall be implemented
 69 by a server or print that performs queuing (or spooling). The **jmQueueGroup** shall *not* be implemented if
 70 the value of **jmGeneralQueuingAlgorithm** is **none**. The **jmQueueTable** is indexed by:

- 71 1. **jmJobSetMIBInstanceIndex** - a running index of Job ~~SetMonitoring-MIB~~ instances
 72 supported by this printer or server.
 73 2. **jmQueueIndex** - a running index of the jobs that have *not* finished processing.
 74

jmQueueGroup (Q)	Data Type	Conformance	Cardinality	Protocol
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoring-MIB instances supported by this printer or server.	<u>Integer3</u> <u>2(1..2^15)Index16</u>	CM	1	
2. jmQueueIndex - a running index of the jobs that have <i>not</i> finished processing.	<u>Integer3</u> <u>2Index3</u> <u>2(10..2^31-1)</u>	CM	1	
3. jmQueueIndexLocalId - the job's identifier generated locally by the printer or server implementing this JM MIB	<u>Integer3</u> <u>2(0..2^31-1)</u>	CM	1	6
4. jmQueueNumberOfInterveningJobs - the number of jobs in front of this job	<u>Integer3</u> <u>2(0..2^31-1)</u>	CM	1	1
5. jmJobPriority - Job priority	<u>Integer3</u> <u>2(0..100)</u>	CM	1	3
6. jmJobProcessAfterTime - process-after-time	<u>GeneralizedTime</u>	CM	1	1
7. jmJobMessageToOperator - job-message-to-operator from submitting user or device	<u>OCTET STRING</u> <u>(SIZE(463255))</u>	CM	1	1

75

76 **2.4 The Completed Group**

77 The **jmCompletedGroup** consists entirely of the **jmCompletedTable** which is an ordered list of the job
 78 that have completed processing. The **jmCompletedTable** is indexed by:

- 79 1. ~~jmJobSetMIBInstanceIndex~~ - a running index of Job ~~SetMonitoringMIB~~ instances
 80 supported by this printer or server.
 81 2. **jmCompletedIndex** - a running index of the jobs that have finished processing.

82

jmCompletedGroup (C)	Data Type	Conformance	Cardinality	Protocols
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoringMIB instances supported by this printer or server.	Integer3 2(1..2^15-1)Index16	M	1	
2. jmCompletedIndex - a running index of the jobs that have finished processing.	Integer3 2(1..2^31)Index32	M	1	
3. jmJobIndexLocalId - the job's identifier generated by the printer or server implementing this JM MIB	Integer3 2(10..)A(255)	M	1	6

83 **2.5 The Job Group**

84 The **jmJobGroup** consists of (1) job identification, (2) job parameters, and (3) job status and accounting
 85 objects/~~attributes~~ that have a *single* value per job. The **jmJobGroup** consists entirely of the **jmJobTable**
 86 which is indexed by:

- 87 1. ~~jmJobSetMIBInstanceIndex~~ - an instance index to distinguish separate sets of tables when
 88 a server supports more than one printer.
- 89 2. ~~jmJobIndexLocalId~~ - the job identifier that was generated ~~locally~~ by the server or printer
 90 that accepted the job.

91

jmJobGroup - Identification (I)	Data Type	Conformance	Cardinality	Protocols
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoringMIB instances supported by this printer or server.	Integer32(1..2^15-1)Index16	M	1	
2. jmJobIndexLocalId - the job's identifier generated locally by the server or printer implementing this JM MIB	Integer32(10..2^31-1)	M	1	6
jmJobDownstreamId - Job downstream id (downstream from the server implementing this JM MIB)	Integer32(0..)	CM	1	6
3. jmJobName - Job name (assigned by job owner) <u>which is not necessarily unique.</u>	<u>OCTET STRING (SIZE(63))</u>	M	1	5
4. jmJobNameId - <u>the job's identifier name generated by the job submitting software using the job submission protocol. This name can be anything that helps identify the job to the job submitter, including the name of the queue from which the job was submitted.</u>	<u>OCTET STRING (SIZE(63))</u>	<u>M</u>	<u>1</u>	<u>7</u>
5. jmJobNumberId - <u>the job's identifier number generated by the job submitting software using the job submission protocol. A (-2) value shall indicate that the submitter did not supply a job identifier number.</u>	<u>Integer32(0..2^31-1)</u>	<u>M</u>	<u>1</u>	
6. jmJobTypes - Job types (print, fax, scan, etc.) - bit vector to get multiple values in a single object	JMJobType - enum encoded as bits	M	1	3
7. jmJobOwner - Job owner (User name <u>of the user</u> that originally submitted <u>ing</u> print job)	<u>OCTET STRING (SIZE(63))</u>	M	1	7

jmJobGroup - Identification (I)	Data Type	Conformance	Cardinality	Protocols
8. jmJobDeviceNameRequested - Device name (Device-specific name of device) <u>requested by the submitting user.</u>	<u>OCTET STRING (SIZE(1..63))</u>	M	1	4
9. jmDeviceIndex - the host resources index of the corresponding Printer MIB that the job was submitted to or has been assigned to be printed on by the server. <u>0 indicates if the server has not assigned a printer to the job.</u>	<u>Integer32(0..2^31-1)PrinterDeviceIndex</u>	M	1	
10. jmJobSourceChannel - Source channel on which the job was submitted (index of channel row in the Printer MIB)	<u>PrtnChannelIndex</u>	M	1	3
11. jmJobSubmissionTime - Date/Time of job submission by job owner	<u>DateAndTime</u>	CM	1	4
12. jmJobComment - Job comment	<u>OCTET STRING (SIZE(1..63))</u>	M	1	5

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jmJobGroup - Parameters (J)	Data Type	Conformance	Cardinality	Protocol
12. jmJobTotalKOctetsHigh - total <u>K</u> octets to be processed in the job - <u>rounded up to next higher Khigh-order 31 bits</u>	<u>Integer32(0..2^31-1)</u>	M	1	1
jmJobTotalOctetsLow - total octets to be processed in the job - low order 31 bits; -2 if unknown	Integer32	M	1	1

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jmJobGroup - Status and Accounting (S)	Data Type	Conformance	Cardinality	Protocols
13. jmJobCurrentState - Job state (pending, processing, completed , etc.)	<u>JMJobState</u>	M	1	7
14. jmJobStateReasons - Job state reasons - additional information about the job state: reasons being held, additional completed information such as successful, warnings, or errors.	<u>OCTET STRING (SIZE(0..63))JMJobStateReasons-bit vector</u>	M	1	5
15. jmJobKOctetsCompletedHigh - <u>K</u> Octets completed - <u>should be rounded down to lower K until completed.high-order part</u>	<u>Integer32(0..2^31-1)</u>	M	1	3

Proposed Specification of Information Objects/~~Attributes~~ for Job Monitoring MIB

jmJobGroup - Status and Accounting (S)	Data Type	Conformance	Cardinality	Protocols
jmJobOetetsCompletedLow - Oetets completed low order part	Integer32	M	1	3
16. jmJobStartedProcessingTime - Date/Time of day job started processing on device	DateAndTime	CM	1	3
17. jmJobCompletionTime - Date/Time of day job finished using the device	DateAndTime	CM	1	1
18. jmJobAccountName - Account Name	<u>OCTET STRING</u> 1(SIZE(63))	M	1	3

94 **2.6 The Resource Group**

95 The **jmResourceGroup** consists of requested and used resources objects/~~attributes~~ that can have multiple
 96 values per job. The **jmResourceGroup** consists entirely of the **jmResourceTable** which is indexed by:

- 97 1. **jmJobSetMIBInstanceIndex** - an instance index to distinguish separate sets of tables when
 98 a server supports more than one printer.
- 99 2. **jmJobIndexLocalId** - the job identifier that was generated ~~locally~~ by the server or printer
 100 that accepted the job.
- 101 3. **jmResourceIndex** - a running index of resources for each job
- 102

jmResourceGroup (R)	Data Type	Conformance	Cardinality	Protocol
1. jmJobSetMIBInstanceIndex - a running index of Job SetMonitoring MIB instances supported by this printer or server.	Integer32 Index16	M	1	
2. jmJobIndexLocalId - the job's current identifier generated locally by the server or printer implementing this JM MIB	Integer32(0..)	M	1	6
3. jmResourceIndex - a running index of the resources requested and/or used by the job.	Integer32 Index16	M	1	
4. jmResourceType - Resources required/used (table):	JMResourceType	M	n	
a) documentName(3) - Document name(s) (or file-names)	OCTET STRING T(63)	CM	n	7
b) jobCopiesRequested(4) - Number of job copies requested	Integer32(0..2^31-1)	CM	1	4
c) jobCopiesProduced(5) - Number of job copies produced	Integer32(0..2^31-1)	CM	1	1
d) documentCopiesRequested(6) - Number of document copies requested	Integer32(0..2^31-1)	CM	1	4
e) documentCopiesProduced(7) - Number of document copies produced	Integer32(0..2^31-1)	CM	1	1
f) sides(8) - Number of sides requested/used (one-sided, two-sided)	Integer32(1..2)	CM	1	5
g) interpreters(9) - PDLs requested/used	PrtInterpreterFamily T(63)	M	n	5

Proposed Specification of Information Objects/~~Attributes~~ for Job Monitoring MIB

jmResourceGroup (R)	Data Type	Conformance	Cardinality	Protocol
h) physicalDevices(10) - physical devices requested/used	hrDevice Index	CM	n	6
i) faxPhoneNumbers(10) - FAX phone number s requested/used	<u>OCTET STRING</u> <u>F(25563)</u>	CM	n	
j) impressionsCompleted(11) - Impressions (sides) completed	Counter 32(0..2^31-1)	CM	1	3
k) sheetsCompleted(12) - Sheets completed <u>for the job.</u>	Counter 32(0..2^31-1)	M	1	2
l) <u>pagesSpooled(13)</u> - logical pages spooled for the job.	<u>Counter</u> <u>32(0..2^31-1)</u>	<u>CM</u>	<u>1</u>	
m) <u>pagesInterpreted(14)</u> - logical pages interpreted for the job.	<u>Counter</u> <u>32(0..2^31-1)</u>	<u>CM</u>	<u>1</u>	
n) <u>pagesSentToDevice(15)</u> - logical pages sent to the device for the job.	<u>Counter</u> <u>32(0..2^31-1)</u>	<u>CM</u>	<u>1</u>	
o) <u>pagesCompleted(16)</u> - logical pages completed for the job.	<u>Counter</u> <u>32(0..2^31-1)</u>	<u>CM</u>	<u>1</u>	
p) <u>pagesCompletedCurrentCopy(17)</u> - logical pages completed on the current copy.	<u>Integer3</u> <u>2(0..2^31-1)</u>	<u>CM</u>	<u>1</u>	
q) processingTime(1813) - Processing time so far	Integer3 2(0..2^31-1)	M	1	2
r) processingMessage(1914) - Processing Messages	<u>OCTET STRING</u> <u>F(63)</u>	CM	n	
5. jmResourceName - resource required/usage name	<u>OCTET STRING</u> <u>F(63)</u> or <u>Integer3</u> <u>2</u>	M	n	
6. jmResourceUnits - resource required/used usage-unit	JMResourceUnits	M	n	
7. jmResourceAmount - resource amount requested/used; -2 - unknown	Integer3 2	M	n	