INTERNET-DRAFT   Ron Bergman
                                                     Dataproducts Corp.
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Job Submission Protocol Mapping Recommendations
for the Job Monitoring MIB

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Abstract

This Internet-Draft defines the recommended mapping for many
currently popular Job submission protocols to objects and
attributes in the Job Monitoring MIB.

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1.0 INTRODUCTION

The Job Monitoring MIB [JobMIB] is intended to be implemented in a
device or server that supports any job submission protocol. However,
the information available and the method of presentation varies
significantly by job submission protocol. A common method of mapping
job submission information to the Job Monitoring MIB is essential for
interoperability of Job MIB agents and monitoring applications. This
document defines recommended mappings for most popular job submission
protocols to insure this compatibility.

All mappings are unidirectional from the job submission protocol to the
MIB. It is assumed that support of the job submission protocol in the
printer implies that the reverse information flow is presently defined
and does not require interaction from the MIB. This mapping is not
defined in this document as it should be obvious.

This document refers to system configurations that are defined in the
Job Monitoring MIB [JobMIB]. For those readers that are familiar with
the configuration descriptions, a short summary appears here. Please
see the Job MIB document for further details.

    Configuration 1: This is a simple peer-to-peer system which contains
        only a client and a printer. The Job MIB agent is resident in
        the printer.

    Configuration 2: This system contains a client, server, and a
        printer. The Jib MIB agent is resident in the server.

    Configuration 3: This system, as in configuration 2, contains a
        client, server, and a printer. In this case the Job MIB agent is
        implemented within the printer.

The most important object to be mapped is jmJobSubmissionID, since this
is a method for the user or client to determine the jmJobIndex for a
submitted job. Therefore, jmJobSubmissionID is specified for all job
submission protocols defined in this document. The remaining objects
mapped include only those items that have the equivalent information
presented to the printer by the job submission protocol.

While this document places a strong emphasis on jmJobSubmissionID
mapping to obtain jmJobIndex, the preferred method is through the use of
a bi-directional protocol that returns the value of jmJobIndex to the
client, such as IPP. When a bi-directional protocol that returns
jmJobIndex is in use, the jmJobSubmissionID object has no value to the
client. When the jmJobIndex cannot be returned, the use of a client
defined jmJobSubmissionID is preferred over an agent derived value.
The client defined version allows for retrieval of jmJobIndex using a
single SNMP Get operation, since jmJobSubmissionID is the index into
the jmJobIDTable. An agent derived value will require a search
through multiple entries in the jmJobIDTable.

The majority of the protocols mapped in this document are oriented
towards network job submission. However, the Job Monitoring MIB is also
intended to monitor print jobs received from other than network ports,
such as parallel and serial ports. Some of the job submission protocols
included that are used with non-networked ports are PJL, PostScript, and
TIP/SI. In addition, the Job Monitoring MIB can be used with print jobs
that are internally generated, such as self test pages. In this latter
case, no mapping is required since all job submission protocols are
bypassed.

2.0   LINE PRINTER DAEMON (LPR/LPD) PROTOCOL

The LPR/LPD printing protocol [LPD] is used with BSD UNIXUnix systems in |
the client-server-printer configuration. Usage of the Job Monitoring
MIB with LPR/LPD will most likely conform to Configuration 3, where the
monitor application or the server uses SNMP to obtain job information
from the printer. The client communicates with the UNIXUnix server |
using the existing LPD protocol to obtain job information.

The LPR/LPD protocol is also used in the Windows environment to
implement peer-to-peer printing, as shown in configuration 1. In this
case, SNMP is used by the client and/or the monitor application to
obtain the job information.

One of the major problems of LPR/LPD is the large number of vendor
unique extensions currently used with the protocol and the resulting
compatibility issues between available implementations. To avoid these
issues, this mapping of LPR/LPD is restricted to the protocol as defined
by RFC 1179.

The LPR/LPD protocol transfers print job data and control information in
separate files, known as the Data File and Control File, respectively.
Most of the information concerning the print job is contained in the
Control File. In many LPD implementations, the Control File is
transferred following the Data File. Thus much of the information
concerning the job may not be available until the completion of the data
transmission.

2.1   jmJobSubmissionIDd Mapped to LPR/LPD |

The LPR/LPD Receive Data File command contains a parameter which defines
the name of the data file. This name field is structured as follows:

        dfaXXX<host-name>   or   daXXXX<host-name>

Where XXX or XXXX is the numeric job number assigned by the LPR/LPD
client submitting the print job. The recommended mapping of this name
field to jmJobSubmissionIDd is: |

        octet 1:   '9'

      octets 2-40: Contains the <host-name> portion of the name field. If
                    the <host-name> portion is less than 40 octets, the
                    left-most character in the string shall appear in octet
                    position 2. Any unused portion of this field shall be
                    filled with spaces. Otherwise, only the last 39 bytes
                    shall be included.

      octets 41-48: '00000XXX' or '0000XXXX', where XXX or XXXX is the
                     decimal (ASCII coded) representation of the LPR/LPD
                     job number.

   2.2   jmJobIndex Mapped to LPR/LPD

   The job index (jmJobIndex) is assigned by the SNMP job monitoring agent
   and is independent of the XXX (or XXXX) index assigned by the LPR/LPD
   client. This will allow the SNMP agent to track jobs received from
   multiple sources.

   2.3   Other MIB Objects Mapped to LPR/LPD

MIB Object	LPR/LPD Parameter
jmJobKOctetsPerCopyRequested	Number of bytes as defined in the Data File
jmJobOwner	Control file command code = P (User Id)

   2.4   The Attribute Group Mapped to LPD

   Other attributes that are applicable, but not defined in this section
   such as attributes that map to a vendor unique extension, may also be
   included.

MIB attribute	LPR/LPD information	Data type
jobName	Name of the data file (note 1)	Octet String
queueNameRequested	Queue name from the Data File	Octet String
fileName	Source File Name (notes 2, 3)	Octet String
documentName	Document title (notes 2, 4)	Octet String

    Notes:
    ------
    1. See section 2.1 (jmJobSubmissionID).
    2. The information is optional in the Control File. The attribute
       should be included if present in the Control File.
    3. Control file command code = N.
    4. Control file command code = J.

3.0 APPLETALK PROTOCOL

AppleTalk was originally developed as a peer-to-peer network protocol,
as described in configuration 1, for use with Apple Macintosh computers.
Today, print spoolers are also available for use with Macintosh computer
networks that conform to configurations 2/3. In addition, printing with
the AppleTalk protocol is supported from both Windows NT servers and
Novell servers also per configurations 2/3.

The AppleTalk protocol provides very little information that can be used
with the Job Monitoring MIB. The Macintosh print drivers are able to
provide information concerning the user and document name but imbed this
information in the PDL, which is typically PostScript. The preferred
jmJobSubmissionIDd is constructed from the information in the PostScript |
file, as defined in section 9.0.

3.1 jmJobSubmissionIDd Mapped to AppleTalk |

An alternative jmJobSubmissionIDd may be constructed from the Connection |
Identifier contained in the AppleTalk Printer Access Protocol (PAP)
header. Since the Connection Id is not readily available in any of the
defined AppleTalk implementations, this approach may be of little
utility.

    octet 1:   'A'

    octets 2-40: Contains the AppleTalk printer name, with the first
                  character of the name in octet 2. AppleTalk printer
                  names are a maximum of 31 characters. Any unused
                  portion of this field shall be filled with spaces.

    octets 41-48: '00000XXX', where 'XXX' is the decimal (ASCII coded)
                   representation of the Connection Id.

3.2 Other AppleTalk Mappings

No other Job MIB objects or parameters can be derived from information
available in the AppleTalk headers

4.0 INTERNET PRINTING PROTOCOL (IPP)

The Internet Printing Protocol [IPP] supports printing using any one of
the three possible configurations. For configuration 2, the mapping
defined herein is performed on an agent within the server. Otherwise,
the mapping is performed on an agent within the printer.

| 4.1   jmJobSubmissionIDd Mapped to IPP

IPP contains a rich set of parameters which allow several methods of
| creating the jmJobSubmissionIDd object. To prevent interoperability
problems, the preferred method is to use the IPP job-uri attribute as
follows:

   octet 1:   '4'

   octets 2-40: Contains the IPP job-uri job description attribute
                   generated by the printer. (The job-uri is returned to
                   the client by IPP.) If the job-uri is less than 40
                   octets, the left-most character in the string shall
                   appear in octet position 2. Any unused portion of this
                   field shall be filled with spaces. Otherwise, only the
                   last 39 bytes shall be included.

   octets 41-48: Contains the decimal (ASCII coded) representation of
| the job-id job descriptiontemplate attribute. Leading
zeros
                  shall be inserted to fill the entire 8 octet field.

4.2   jmJobIndex Mapped to IPP

The job index (jmJobIndex) assigned by the SNMP job monitoring agent is
returned to the client by IPP as the job-id job description attribute.
(Since IPP does not require consecutively generated job-ids, the agent
may receive jobs from multiple clients and can assign jmJobIndex in an
ascending sequence independent of the submitting job client.) The IPP
job-id must be restricted to the range of 1 to 99,999,999 (decimal) to
| allow the value to be properly represented in jmJobSubmissionIDd.

4.3   Other MIB Objects Mapped to IPP

| MIB Object | IPP Job attribute
| --------------------------------------+----------------------------------
| jmJobState | job-state
| jmJobStateReasons1 | job-state-reasons (note 1)
| jmNumberOfInterveningJobs | number-of-intervening-jobs
| jmJobKOctetsPerCopyRequested | job-k-octets
| jmJobKOctetsProcessed | job-k-octets-processed
| jmJobImpressionsPerCopyRequested | job-impressions
| jmJobImpressionsCompletedProcessed | job-impressions-completed
| jmJobOwner | job-originating-user-name

  Notes:

| 1. jmJobStateReasons1 is a bit map described in one object and three
     attributes. The IPP condition may change one or more of the bits
     in one or more of these Job MIB items.

4.4   The Attribute Group Mapped to IPP

The following mappings are required if the listed IPP job template
attribute is provided.

```
MIB attribute                 | IPP job attribute             | Data type
------------------------------+-------------------------------+--------------
jobStateReasonsN              | job-state-reasons (note 3)    | Integer
jobCodedCharSet               | attributes-charset (note 1)   | Octet String
jobNaturalLanguageTag         | attributes-natural-language   | Octet String   |
jobURI                        | job-uri                       | Octet String
jobName                       | job-name                      | Octet String
physicalDevice                | output-device-assigned        | Octet String
numberOfDocuments             | number-of-documents           | Integer        |
documentFormat                | document-format               | Octet String   |
jobPriority                   | job-priority                  | Integer
jobHoldUntil                  | job-hold-until                | Octet String
sides                         | sides (note 2)                | Integer
finishing                     | finishings                    | Integer
printQualityRequested         | print-quality                 | Integer
printerResolutionRequested    | printer-resolution            | Integer
jobCopiesRequested            | copies (note 4)               | Integer        |
documentCopiesRequested       | copies (note 4)               | Integer
jobCollationType              | multiple-document-handling    | Integer
sheetsRequested               | job-media-sheets              | Integer
sheetsCompleted               | job-media-sheets-completed    | Integer
mediumRequested               | media                         | Octet String
jobSubmissionTime             | time-at-submission            | Integer
jobStartedProcessingTime      | time-at-processing            | Integer
jobCompletionTime             | time-at-completed             | Integer
```

 Notes:
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  1. jobCodedCharSet is an enum from the IANA registry which is also
     used in the Printer MIB. The IPP attributes-charset is the name
     (MIME preferred name) of the character set. |
  2. The Job MIB sides attribute uses the integer values "1" and "2".
     The IPP sides attribute uses three keywords.
  3. jobStateReasonsN is a bit map described in one object and three |
     attributes. The IPP condition may change one or more of the bits
     in one or more of these Job MIB items.
  4. The IPP "copies" attribute maps to the Job MIB: |
     (1) jobCopiesRequested when the job has only one document OR |
         IPP "multiple-document-handling" is 'single-valued'
     (2) documentCopiesRequested, in which case the MIB value is the |
         total number of document copies that the job will produce as a |
         whole. |

5.0   INTELLIGENT PRINTER DATA STREAM (IPDS)

6.0   DOCUMENT PRINTING APPLICATION (DPA)

The ISO 10175 Document Printing Application (DPA) [DPA] supports
printing using any one of the three possible configurations. For
configuration 2, the mapping defined herein is performed on a server.
Otherwise, the mapping is performed on an agent within the printer.

6.1   jmJobSubmissionID Mapped to DPA

DPA contains a rich set of parameters which allow several methods of
creating the jmJobSubmissionID object. To prevent interoperability
problems, the preferred method is to use the DPA job-originating-user
attribute as follows:

    octet 1:   '0'

    octets 2-40: Contains the DPA job-owner attribute
                  supplied by the submitter. If the job-owner
                  is less than 40 octets, the left-most character in the
                  string shall appear in octet position 2. Any unused
                  portion of this field shall be filled with spaces.
                  Otherwise, only the last 39 bytes shall be included.

    octets 41-48: Contains an 8-digit sequential decimal number.

6.2   jmJobIndex Mapped to DPA

The job index (jmJobIndex) assigned by the SNMP job monitoring agent is
returned to the client by DPA as a decimal digit string as the value of
the DPA job-identifier attribute. (Since DPA does not require
consecutively generated job-identifiers, the agent may receive jobs from
multiple clients and can assign the jmJobIndex in an ascending sequence
independent of the submitting job client.) The DPA job-identifier must
be restricted to the range of 1 to 99,999,999 (decimal) to allow the
value to be properly represented in jmJobSubmissionID.

6.3   Other MIB Objects Mapped to DPA

MIB Object	DPA Job attribute
jmJobState	job-state
jmJobStateReasons1	job-state-reasons (note 2)
jmNumberOfInterveningJobs	intervening-jobs
jmJobKOctetsPerCopyRequested	total-job-octets (notes 1, 3)
jmJobKOctetsProcessed	job-octets-completed (note 1)
jmJobImpressionsPerCopyRequested	job-impression-count (note 3)
jmJobImpressionsCompleted	impressions-completed

jmJobOwner | job-owner

 Notes:
 ------
  1. jmJobKOctetsPerCopyRequested and jmJobKOctetsProcessed is in K |
     octets while the DPA job-total-octets and job-octets-completed is
     in octets and is 63-bits of significance.
  2. jJobStateReasonsN is a bit map described in one object and three |
     attributes. The DPA condition may change one or more of the bits
     in one or more of these Job MIB items. Also the DPA
     job-state-reasons is a multi-valued attribute with each value being
     an OBJECT IDENTIFIER (OID).
  3. DPA octets include the multiplication factor due to job and |
     document copies, while the MIB values do not. |

6.4 The Attribute Group Mapped to DPA

The following mappings are required if the listed DPA job attribute is
provided.

MIB attribute	DPA job attribute	IPP Data type
jobStateReasonsN	job-state-reasons (note 2)	Integer
jobCodedCharSet	(note 1)	Octet String
jobNaturalLanguage	document-natural-language	Octet String
jobURI	job-uri	Octet String
jobAccountName	accounting-information	Octet String
jobName	job-name	Octet String
deviceNameRequested	printer-name-requested	Octet String
physicalDevice	printers-assigned	Octet String
numberOfDocuments	number-of-documents	Integer
fileName	file-name	Octet String
documentName	document-name	Octet String
jobComment	job-comment	Octet String
documentFormat	document-format	Octet String
jobPriority	job-priority	Integer
jobProcessAfterDateAndTime	job-print-after	Octet String
outputBin	results-profile.output-bin	Octet String
sides	sides (note 3)	Integer
finishing	job-finishing, finishing	Integer
printQualityRequested	print-quality	Integer
printerResolutionRequested	default-printer-resolution (note 4)	Integer
jobCopiesRequested	results-profile.job-copies	Integer
jobCopiesCompleted	job-copies-completed	Integer
documentCopiesRequested	copy-count (note 5)	Integer
documentCopiesCompleted	copies-completed (note 6)	Integer
sheetsRequested	job-media-sheet-count	Integer
sheetsCompleted	job-media-sheets-completed	Integer
pagesRequested	job-page-count	Integer
pagesCompleted	pages-completed	Integer

mediumRequested	page-media-select, default-medium	Octet String
jobSubmissionTime	submission-time (note 7)	Octet String
jobStartedProcessingTime	started-printing-time (note 7)	Octet String
jobCompletionTime	completion-time (note 7)	Octet String

Notes:
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1. Every DPA attribute is tagged indicating the coded character set
   to be used for that attribute.
2. jJobStateReasonsN is a bit map described in one object and three
   attributes. The DPA condition may change one or more of the bits
   in one or more of these Job MIB items. Also the DPA
   job-state-reasons is a multi-valued attribute with each value being
   an OBJECT IDENTIFIER (OID).
3. The Job MIB sides attribute is an integer '1' or '2' while the DPA
   sides attribute has one of six OID values that includes plex.
4. printerResolutionRequested has x and y resolution and is intended
   to override the resolution instruction in the document, if any,
   while the DPA default-printer-resolution is the same in x and y and
   only takes effect if the document does not contain a resolution
   instruction
5. The DPA "copy-count" attribute is a per-document attribute, so the
   MIB value is the sum of the documents' "copy-count" values times
   the job's "results-profile.job-copies" value.
6. The DPA "copies-completed" attribute is a per-document attribute,
   so the MIB value is the sum of the documents' "copies-completed"
   values times the job's "results-profile.job-copies" value.
75. The DPA GeneratlizedTime data type is defined by ISO 8824
   (ISO-8824) while the MIB DateAndTime is defined by SNMPv2-TC. IPP
   times are the number of seconds since boot time, while DPA
   times are a date/time.

7.0   NOVELL DISTRIBUTED PRINT SERVICE (NDPS)

Novell Distributed Print Services is a DPA based job submission protocol
that conforms to configuration 3.

7.1   jmJobSubmissionIDd Mapped to NDPS

NDPS supports the generation of a properly formatted jmJobSubmissionIDd
for use in the Job MIB, via the attribute ndps-att-job-identifier.

ISSUE: Is this the proper NDPS attributeatrribute or should the
attrrribute ndps-att-identifier-on-client or ndps-att-new-job-identifier
to be used?

7.2   jmJobIndex Mapped to NDPS

NDPS defines the attribute ndps-att-job-identifier-on-printer that can
be used to return the value of jmJobIndex to the NDPS client.

7.3   Other MIB Objects Mapped to NDPS

MIB Object	NDPS Parameter
jmJobState	ndps-att-current-job-state (note 1)
jmJobStateReasons1	ndps-att-job-state-reasons (note 2)
jmNumberOfInterveningJobs	ndps-att-intervening-jobs
jmJobKOctetsPerCopyRequested	ndps-att-total-job-octets (notes 3, 4)
jmJobKOctetsProcessed	ndps-att-octets-completed (note 3)
jmJobImpressionsPerCopyRequested	ndps-att-job-impressions-count
jmJobImpressionsCompleted	ndps-att-impressions-completed
jmJobOwner	ndps-att-job-owner (note 53)

 Notes:
 ------
   1. Some of the NDPS job states must be represented by both a
      jmJobState and a jmJobStateReasons1 object or a jobStateReasonsN
      attribute.
   2. The NDPS job state reasons may be mapped to either the object
      jmJobStateReasons1 or the attribute jobStateReasonsN.
   3. jmJobKOctetsPerCopyRequested and jmJobKOctetsProcessed is in K
      octets while the NDPS ndps-att-job-total-octets and
      ndps-att-job-octets-completed is in octets and is 63-bits of
      significance.
   4. NDPS octets include the multiplication factor due to job and
      document copies, while the MIB values do not.
   53. The Job MIB object must be multiplied by the attribute
      jobCopiesRequested to obtain the NDPS attribute value, if multiple
      copies have been requested.

7.4   The Attribute Group Mapped to NDPS

The following mappings are required if the listed PJL attribute or
command option is provided.

MIB attribute	NDPS parameter	Data type
jobAccountName	ndps-att-job-owner	Octet String
jobName	ndps-att-job-name	Octet String
jobOriginatingHost	ndps-att-job-originator	Octet String
deviceNameRequested	ndps-att-printer-name-- requested	Octet String
numberOfDocuments	ndps-att-number-of-documents	Integer
fileName	ndps-att-document-file-name	Octet String
documentName	ndps-att-document-name	Octet String
jobComment	ndps-att-job-comment	Octet String

documentFormatIndex	ndps-att-prtInterpreterIndex	Integer
documentFormat	ndps-att-document-format	Integer
jobPriority	ndps-att-job-priority	Integer
jobProcessAfterDateAndTime	ndps-att-job-print-after	Octet String
outputBin	ndps-att-results-profile (note 1)	Integer
sides	ndps-att-sides (note 2)	Integer
finishing	ndps-att-job-finishing	Integer
printQualityRequested	ndps-att-print-quality	Integer
printerResolutionRequested	ndps-att-default-printer-- resolution (note 3)	Integer
printerResolutionUsed	ndps-att-default-resolutions-- used	Integer
jobCopiesRequested	ndps-att-results-profile (note 4)	Integer
jobCopiesCompleted	ndps-att-job-copies-completed	Integer
documentCopiesRequested	ndps-att-copy-count	Integer
documentCopiesCompleted	ndps-att-copies-completed (note 3)	Integer
sheetsRequested	ndps-att-job-media-- sheet-count	Integer
sheetsCompleted	ndps-att-media-sheets-- completed	Integer
mediumConsumed	ndps-att-media-used	Integer
jobSubmissionToServerTime	ndps-att-submission-time	Octet String
jobSubmissionTime	ndps-att-started-printing-time	Octet String
jobCompletionTime	ndps-att-completion-time	Octet String

Notes:
------
  1. The output-bin field in ndps-att-results-profile is to be used.
  2. The Job MIB sides attribute is an integer '1' or '2' while the NDPS
     sides attribute has one of six OID values that includes plex.
  3. printerResolutionRequested has x and y resolution and is intended
     to override the resolution instruction in the document, if any,
     while the ndps-att-default-printer-resolution is the same in x and
     y and only takes effect if the document does not contain a
     resolution instruction
  4. The job-copies field in ndps-att-results-profile is to be used.

8.0 PRINTER JOB LANGUAGE (PJL)

PJL [PJL] has been developed by Hewlett-Packard to provide job control
information to the printer and status information to applications,
independent of the PDL.

8.1 jmJobSubmissionID Mapped to PJL

PJL has defined the SUBMISSIONID option for the JOB command which
indicates a properly formatted jmJobSubmissionID for use in the Job
MIB. The PJL JOB command is presented at the start of a print job with

options that apply only the attached job. The syntax for this command
option is:

        @PJL JOB SUBMISSIONID = "id string"

Driver software that implements this PJL command option must provide the
"id string" in one of the client version formats specified in the Job
MIB for jmJobSubmissionIDd. |

For drivers that are not able to create the SUBMISSIONID option, it is
recommended that jmJobSubmissionIDd format 0 be created by the agent |
using the PJL attribute DocOwner or DocOwnerId.

   octet 1:   '0'

   octets 2-40: Contains the string associated with DocOwner or
                 DocOwnerId. If the string is less than 40 octets, the
                 left-most character in the string shall appear in octet
                 position 2. Otherwise, only the last 39 bytes shall be
                 included. Any unused portion of this field shall be
                 filled with spaces. If DocOwner or DocOwnerId cannot be
                 obtained, this field shall be blank.

   octets 41-48: Contains the value of jmJobIndex associated with the
                  job. Leading zeros shall be inserted to fill the
                  entire 8 octet field.

8.2 jmJobIndex Mapped to PJL

PJL does not provide a value that can be mapped to jmJobIndex.

8.3 Other MIB Objects Mapped to PJL

MIB Object | PJL Job attribute
----------------------+------------------------------------
jobOwner | DocOwner or DocOwnerId attribute

8.43 The Attribute Group Mapped to PJL

The following mappings are required if the listed PJL attribute or
command option is provided.

MIB attribute	PJL attribute or command option	Data type
jobOwner	DocOwner or DocOwnerId attribute	Octet String
serverAssignedJobName	DocName attribute or the command	Octet String
	@PJL JOB Name = "string"	Octet String
submittingServerName	SrcServerName attribute	Octet String
jobOriginatingHost	SrcPort attribute	Octet String

```
queueNameRequested   │ SrcQ attribute         │ Octet String
fileName             │ JobFName attribute     │ Octet String
jobComment           │ JobDesc attribute      │ Octet String
jobSubmissionTime    │ TimeSubmit attribute   │ Octet String
```

9.0   POSTSCRIPT

The PostScript PDL permits comment fields which can be used by
application drivers to include job information. Although there are no
restrictions or requirements as to what information may be included,
many drivers include job owner and/or document name.

9.1   jmJobSubmissionID Mapped to PostScript

The use of a standard format job submission id comment string will allow
interoperability of printers and drivers from multiple vendors. The
following comment string format is recommended for use with PostScript
level 1 and level 2 data streams.

        %%JMPJobSubmissionId:(id-string)

where "id string" can be any jmJobSubmissionID format reserved for
clients.

9.2   Other MIB Objects and Attributes Mapped to PostScript

No Other mappings from PostScript comment strings are recommended, but
many Job MIB objects and attributes can be defined using vendor unique
comment strings.

10.0   NETWARE PSERVER

The NetWare PServer job submission protocol is implemented in a client-
server-printer system on the server to printer link as defined in
configuration 3.

10.1   jmJobSubmissionID Mapped to PServer

   octet 1:   'B'

   octets 2-40: Contains the Directory Path Name of the agent as
                 recorded by the Novell File Server in the queue
                 directory. If the string is less than 40 octets, the
                 left-most character in the string shall appear in octet
                 position 2. Otherwise, only the last 39 bytes shall be
                 included. Any unused portion of this field shall be

filled with spaces.

octets 41-48: '000XXXXX' The decimal (ASCII coded) representation of
               the Job Number as per the NetWare File Server Queue
               Management Services.

10.2   jmJobIndex Mapped to PServer

The job index (jmJobIndex) is assigned by the SNMP job monitoring agent
and is independent of the Job Number assigned by the NetWare File Server
Queue Management Services. This will allow the SNMP agent to track jobs
received from multiple sources.

10.3   Other MIB Objects Mapped to PJL

MIB Object	PServer Job attribute	
jobOwner	Client Id Number	Octet String

10.43   The Attribute Group Mapped to PServer

The following mappings are required if the listed PServer parameter is
provided in the Novell File Server queue directory.

MIB attribute	PServer parameter	Data type
jobOwner	Client Id Number	Integer
serverAssignedJobName	Job File Name	Octet String
queueNameRequested	Queue Id	Integer
physicalDevice	Server Id Number	Integer
jobComment	Job Description	Octet String
jobPriority	(note 1)	Integer
jobProcessAfterDateAndTime	Target Execution Time	Octet String
jobCopiesRequested	Number of Copies	Integer
mediumRequested	Form Name	Octet String
jobSubmissionToServerTime	Job Entry Time	Octet String

Notes:
------
 1. The job priority is determined by the priority assigned to the queue
    that contains the job. Each queue can be assigned a unique priority
    and the priority of the job is inherited from the queue.

11.0   NETWARE NPRINTER or RPRINTER

The NetWare NPrinter/RPrinter protocol was designed to transfer print
data from a Novell File Server to a printer attached directly to a local
port (e.g. parallel or serial) on a PC. NPrinter/RPrinter is an

extremely lightweight printing protocol. Consequently, no information
required by the Job Monitoring MIB is provided and a meaningful
jmJobSubmissionIDd cannot be generated.

It is recommended that an additional job submission layer, such as PJL
or another vendor private protocol, be included on top of
NPrinter/RPrinter to provide the required information. The mapping
should then be performed according to the recommendations of the higher
layer submission protocol.

12.0   SERVER MESSAGE BLOCK (SMB) PROTOCOL

The Server Message Block protocol is used with several PC Network
operating systems, such as Microsoft Windows for Workgroups, IBM LAN
Server, and Artisoft Lantastic. SMB systems supporting the Job
Monitoring MIB will conform to either configuration 1 or 3.

12.1   jmJobSubmissionIDd Mapped to SMB

   octet 1:   'C'

   octets 2-40: Contains a decimal (ASCII coded) representation of the
                 16 bit SMB Tree Id field, which uniquely identifies the
                 connection that submitted the job to the printer. The
                 most significant digit of the numeric string shall be
                 placed in octet position 2. All unused portions of this
                 field shall be filled with spaces. The SMB Tree Id has
                 a maximum value of 65,535.

   octets 41-48: Contains a decimal (ASCII coded) representation of the
                  File Handle returned from the printer agent to the
                  client in response to a Create Print File command.
                  Leading zeros shall be inserted to fill the entire 8
                  octet field.

12.2   jmJobIndex Mapped to SMB

It is strongly recommended that the File Handle returned from the
printer agent be identical to jmJobIndex. If these items are identical,
there is no need for the client application to perform a search on
jmJobSubmissionIDd. To be compatible with the 16 bit field allocated to
this value by SMB, the maximum jmJobIndex is 65,535.

12.3   Other MIB objects Mapped to SMB

MIB Object | SMB Parameter
-----------------+---
jmJobOwner | SMB User Id field (note 1)

Notes:
------
  1. A decimal (ASCII coded) representation of the SMB User Id numeric
     shall be presented as jmJobOwner.

13.0 TRANSPORT INDEPENDENT PRINTER/SYSTEM INTERFACE (TIP/SI)

The TIP/SI protocol, although currently specified as a part of the IEEE
1284 parallel port standards [TIP/SI], was originally developed as a
network protocol. TIP/SI thus has the potential of being integrated
into any network or non-network configuration.

13.1 jmJobSubmissionIDd Mapped to TIP/SI |

  octet 1:   'D'

  octets 2-40: Contains the Job Name from the Job Control-Start Job
                (JC-SJ) command. If the Job Name portion is less than
                40 octets, the left-most character in the string shall
                appear in octet position 2. Any unused portion of this
                field shall be filled with spaces. Otherwise, only the
                last 39 bytes shall be included.

  octets 41-48: Contains a decimal (ASCII coded) representation of the
                 jmJobIndex assigned by the agent. Leading zeros shall
                 be inserted to fill the entire 8 octet field.

13.2 jmJobIndex Mapped to TIP/SI

jmJobIndex is returned to the client as the Printer Assigned Job Id in a
Job Control-Start Job (JC-SJ) response packet. To be compatible with
the 16 bit field allocated to this value by TIP/SI, the maximum
jmJobIndex is 65,535.

13.3 Other MIB Objects Mapped to TIP/SI

MIB Object | TIP/SI Parameter
------------------------+--
jmJobOwner | User string

13.4 The Attribute Group Mapped to TIP/SI

MIB attribute | TIP/SI information | Data type
------------------------+----------------------------------+--------------
jobName | Job Name string | Octet String
jobComment | Additional Information string | Octet String

14.0   REFERENCES

[DPA]   ISO/IEC 10175-1:1996(E), "Information technology - Text and office systems - Document Printing Application (DPA) - Part 1: Abstract service definition and procedures", JTC1/SC18.

[IPP]   The Internet Printing Protocol RFC XXXX, Model RFC XXXX

[ISO-8824]   ISO/IEC 8824:1990, "Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation (ASN.1)".

[JobMIB]   The Job Monitoring MIB, work in progress, <draft-ietf-printmib-job-monitoring-07.txt>, to be published as an Informational RFC as a Printer Working Group (PWG) standardRFC XXXX, IETF informational document.

[LPD]   Line Printer Daemon Protocol, RFC 1179, IETF informational document.

[PJL]   Printer Job Language Technical Reference Manual, Hewlett-Packard part number 5021-0328.

[PrtMIB]   The Printer MIB, RFC 1759, IETF standards track document.

[TIP/SI]   IEEE Standard 1284.1, Transport Independent Printer/System Interface.

15.0   AUTHORS

This document was created with significant contributions from the following individuals.

    Ron Bergman (Editor)
    Dataproducts Corp.
    1757 Tapo Canyon Road
    Simi Valley, CA 93063-3394

    Phone: 805-578-4421
    Fax: 805-578-4001
    Email: rbergman@dpc.com

    Tom Hastings
    Xerox Corporation, ESAE-231
    701 S. Aviation Blvd.
    El Segundo, CA   90245

    Phone: 310-333-6413
    Fax: 310-333-5514
    EMail: hastings@cp10.es.xerox.com

Scott A. Isaacson
Novell, Inc.
122 E 1700 S
Provo, UT   84606

Phone: 801-861-7366
Fax: 801-861-4025
EMail: scott_isaacson@novell.com

Harry Lewis
IBM Corporation
6300 Diagonal Hwy
Boulder, CO 80301

Phone: (303) 924-5337
Fax: (303) 924-4662
Email: harryl@us.ibm.com

Bob Pentecost
Hewlett-Packard Corporation
11311 Chinden Boulevard
Boise, ID 83714

Phone: (208) 396-3312
Fax: (208) 396-4122
Email: bpenteco@boi.hp.com

Send comments to the printmib WG using the Job Monitoring Project
(JMP) Mailing List: jmp@pwg.org

For further information, access the PWG web page under "JMP":
http://www.pwg.org/

Other Participants:

    Chuck Adams - Tektronix
    Keith Carter - IBM Corporation
    Angelo Caruso - Xerox
    Jeff Copeland - QMS
    Andy Davidson - Tektronix
    Mabry Dozier - QMS
    Lee Ferrel - Canon
    David Kellerman - Northlake Software
    Rick Landau - Digital
    Jay Martin - Underscore
    Ira McDonald - Xerox

         Stuart Rowley - Kyocera
         Bob Setterbo - Adobe
         Gail Songer - EFI
         Mike Timperman - Lexmark
         William Wagner - DPI/Osicom
         Chris Wellens - Interworking Labs
         Rob Whittle - Novell
         Don Wright - Lexmark
         Lloyd Young - Lexmark