

# PWG Print Semantics

Its Benefit to Cloud Printing

# PWG Print Semantics

- Open Standard
  - May extract, copy, publish, display, distribute, modify and incorporate into other works
- Implemented in all current printers
- Vendor neutral
- Designed to be scalable (Subsets and extensions)
- Maps cleanly to existing printer protocols, Print Job Tickets and embedded PDL instructions
- Does not contain Driver specific or UI specific complexities
- Semantics reused in other MFD services

# PWG Printer



- Represents a Virtual Printer or Queue
- Well defined state model represented by one attribute with a second attribute providing additional clarification and extensibility
- Each Printer has attributes that represent:
  - Overall status and current conditions (e.g. Printer is Stopped, Jam in media path)
  - Descriptive information (e.g. Name, Location)
  - Default Print Ticket (specifies the processing behavior for aspects not specified in Print Job Print Ticket)
  - Capabilities (i.e. The allowed values of elements in a Print Ticket)
  - Configuration of subunits (e.g. number of trays, media loaded)
- Provides view of queued, processing and completed Jobs

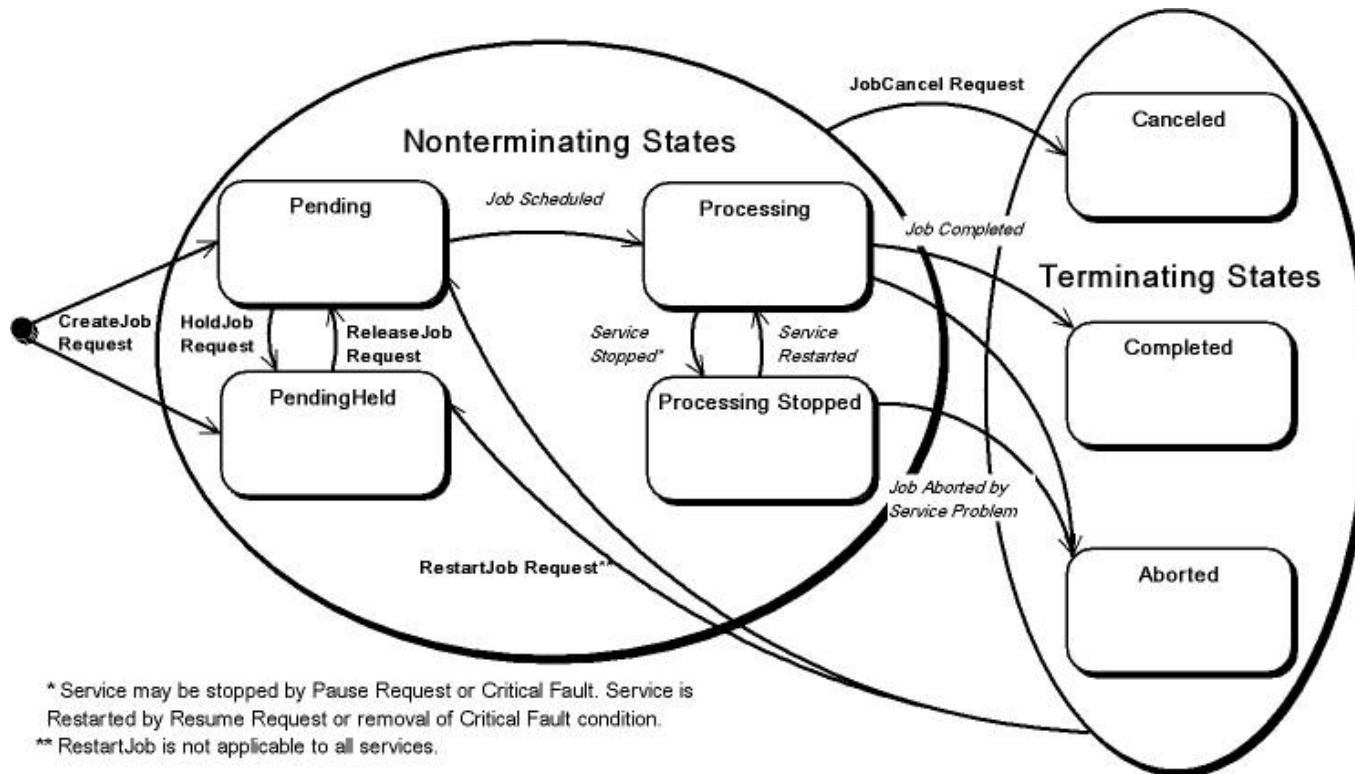
# PWG Print Job



- Represents a single unit of work to be performed by the Printer
- Well defined state model represented by one attribute with a second attribute providing additional clarification and extensibility
- Jobs may contain multiple Documents
- Each Job has attributes that represent:
  - **Status** (e.g. Job is Processing, PDL is being interpreted, impressions completed, timestamps)
  - **Job Ticket**
    - Descriptive information (e.g. Name, owner)
    - Job Processing instructions (e.g., Copies, Covers, Finishings)
    - Document Processing instructions (e.g., Media, Print Quality, Sides)
  - **Documents** (Documents or Document References for this Job)
    - Descriptive information (e.g. Name, owner)
    - Document Processing instructions (e.g., Media, Print Quality, Sides)

# Job State

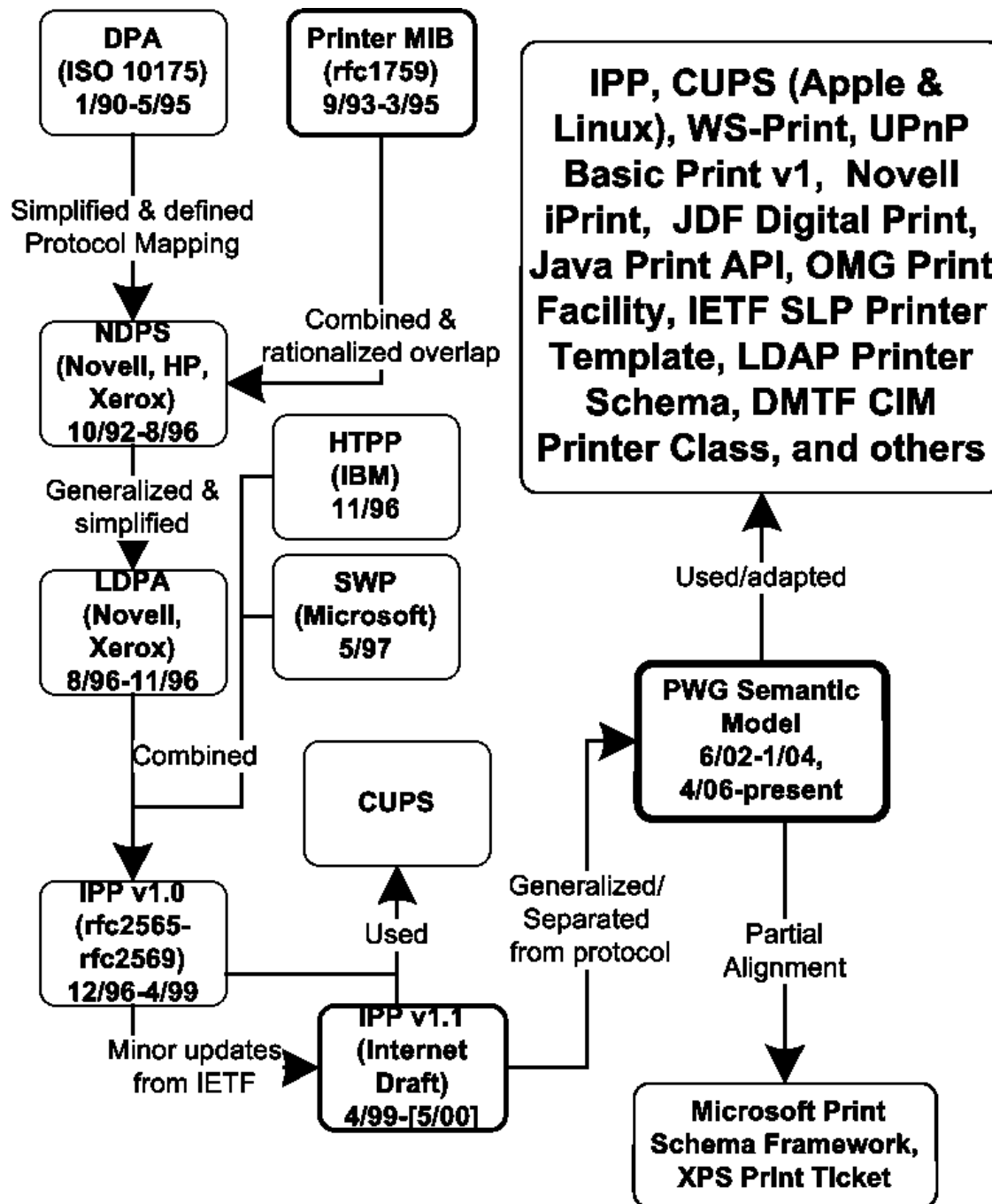
- Fixed well defined states and transitions
- Consistent across job types in an MFD



# Job State Reasons

- Provides additional information on Job State
- Includes well defined values and is extensible
- Existing values include:

Job Incoming	Job Queued	Job Outgoing	Queued In Device
Job Transforming	Job Printing	Job Completed Successfully	Job Completed With Warnings
Job Completed With Errors	Document Access Error	Digital Signature Did Not Verify	Job Canceled At Device
Resources Are Not Ready	Job Timed Out	Job Hold Until Specified	Job Password Wait



# Print Semantic Evolution and the PWG

# Print Job Ticket



- Derived from standards dating back more than 20 years
- The semantics are used in every modern print protocol
- Large set of semantic elements and values are defined
- Elements and values are extensible
- Semantics scale from home printers to production printers
- Existing semantics include:

Copies	Sides	Media	Media Type
Orientation	Staple	Jog Offset	Number Up
Job Priority	Covers	Insert Sheets	Binding
Job Hold	Job Password	Imposition	Proof Printing
Job Name	Job Owner	Accounting ID	



# Simple Job Ticket (XML)



```
<?xml version="1.0" encoding="UTF-8"?>
<pwg:PrintJobTicket xsi:schemaLocation="PrintJobTicket.xsd"
xmlns:pwg="http://www.pwg.org/schemas/2009/8/sm">
  <pwg:PrintDocumentProcessing>
    <pwg:Finishings>
      <pwg:Finishing>Staple</pwg:Finishing>
    </pwg:Finishings>
    <pwg:Media>na_letter_8.5x11in</pwg:Media>
    <pwg:MediaType>stationery</pwg:MediaType>
    <pwg:OrientationRequested>Portrait</pwg:OrientationRequested>
    <pwg:Quality>Normal</pwg:Quality>
    <pwg:Sides>TwoSidedLongEdge</pwg:Sides>
  </pwg:PrintDocumentProcessing>
  <pwg:PrintJobDescription>
    <pwg:JobName>Cloud Print</pwg:JobName>
    <pwg:JobOriginatingUserName>Hastings</pwg:JobOriginatingUserName>
  </pwg:PrintJobDescription>
  <pwg:PrintJobProcessing>
    <pwg:JobCopies>4</pwg:JobCopies>
  </pwg:PrintJobProcessing>
</pwg:PrintJobTicket>
```

# Simple Job Ticket (JSON)



```
{
  "PrintJobTicket": {
    "PrintDocumentProcessing": {
      "Finishings": {
        "Finishing": "Staple"
      },
      "Media": "na_letter_8.5x11in",
      "MediaType": "stationery",
      "OrientationRequested": "Portrait",
      "Quality": "Normal",
      "Sides": "TwoSidedLongEdge"
    },
    "PrintJobDescription": {
      "JobName": "Cloud Print",
      "JobOriginatingUserName": "Hastings"
    },
    "PrintJobProcessing": {
      "JobCopies": 4
    }
  }
}
```

# Simple Document Ticket(XML & JSON)



```
<?xml version="1.0" encoding="UTF-8"?>
<pwg:PrintDocumentTicket xsi:schemaLocation="PrintJobTicket.xsd"
xmlns:pwg="http://www.pwg.org/schemas/2009/8/sm">
  <pwg:PrintDocumentDescription>
    <pwg:DocumentName>PwgAndCloudPrinting.pdf</pwg:DocumentName>
    <pwg:LastDocument>true</pwg:LastDocument>
    <pwg:DocumentFormat>application/pdf</pwg:DocumentFormat>
    <pwg:DocumentUri>ftp://ftp.pwg.org/pub/pwg/mfd/white/PwgAndCloudPrinting.pdf</pwg:DocumentUri>
    <pwg:Impressions>12</pwg:Impressions>
  </pwg:PrintDocumentDescription>
</pwg:PrintDocumentTicket>
```

```
{
  "PrintDocumentTicket": {
    "PrintDocumentDescription": {
      "DocumentName": "PwgAndCloudPrinting.pdf",
      "LastDocument": true,
      "DocumentFormat": "application/pdf",
      "DocumentUri": "ftp://ftp.pwg.org/pub/pwg/mfd/white/PwgAndCloudPrinting.pdf",
      "Impressions": 8
    }
  }
}
```

# Additional Resources

- PWG
  - <http://www.pwg.org/>
  - Workgroups include **Internet Printing Protocol**(Model, Semantics, encoding & Transport), **Semantic Model** (Print Semantics) , **Multifunction Device** (A generalization of the Semantic Model to cover services other than print)
- PWG Print Job Ticket Schema
  - Download: <ftp://ftp.pwg.org/pub/pwg/mfd/schemas/PwgPrintJobTicket060510.zip>
  - Browse: [http://www.pwg.org/mfd/navigate/PwgSmRev1-100\\_PrintJobTicket.html#Link71B](http://www.pwg.org/mfd/navigate/PwgSmRev1-100_PrintJobTicket.html#Link71B)  
[http://http://www.pwg.org/mfd/navigate/PwgSmRev1-100\\_PrintDocumentTicket.html#Link714](http://http://www.pwg.org/mfd/navigate/PwgSmRev1-100_PrintDocumentTicket.html#Link714)
- PWG Semantic Model Specification v1
  - See section 7 for table containing PWG vocabulary
  - <ftp://ftp.pwg.org/pub/pwg/candidates/cs-sm10-20040120-5105.1.pdf>