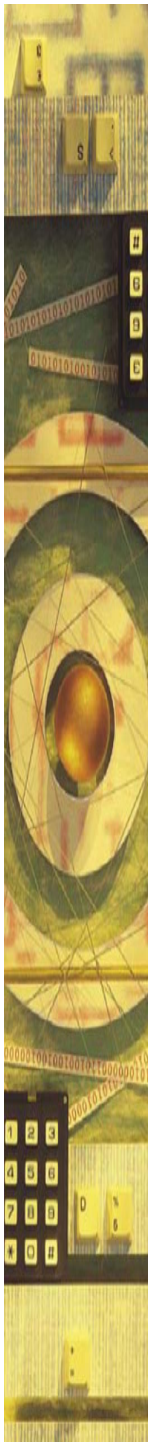

Print Stream Shootout
AFP

Instructor
Don Maxwell
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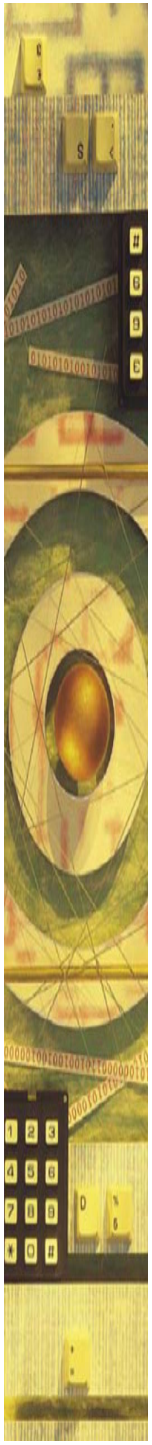
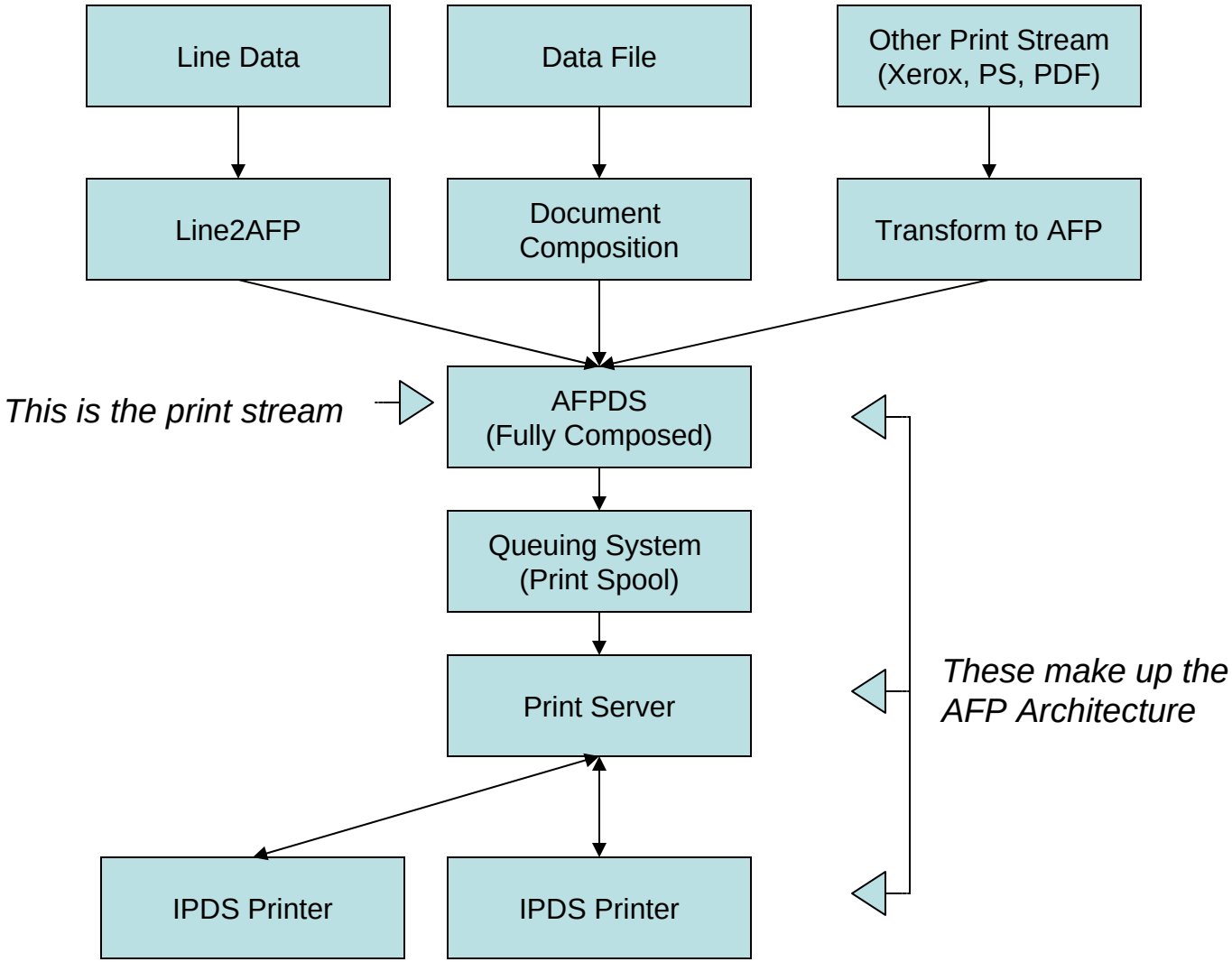
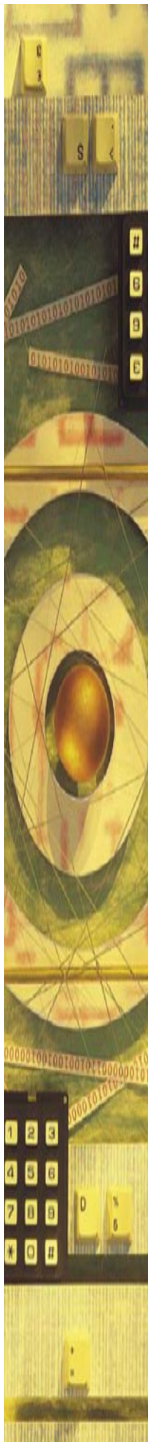
Xplor® International



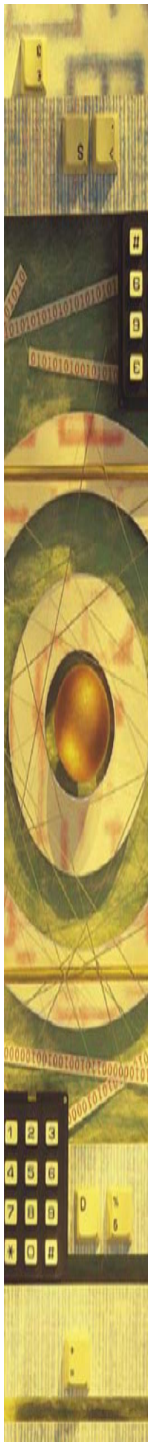
What does an AFP environment look like?





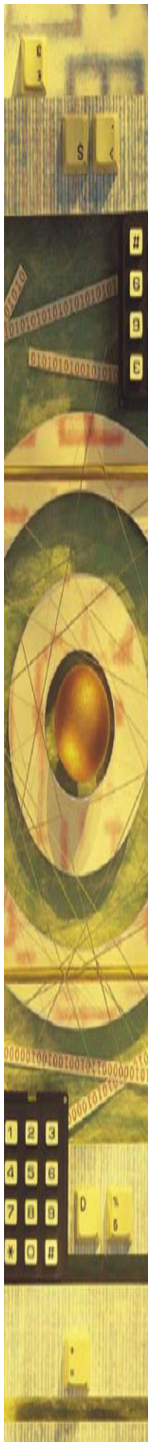
History

- First AFP products came out ~ 1984
- Mainframe (MVS) environments only
- At that time, all products were IBM
  - Printers
    - 3800-3 - @ 229 impressions / minute
    - 3820 @ 20 impressions / minute
  - Software
    - PSF / MVS
      - Print server for IPDS printers
    - PMF for data layout
    - OGL for electronic forms



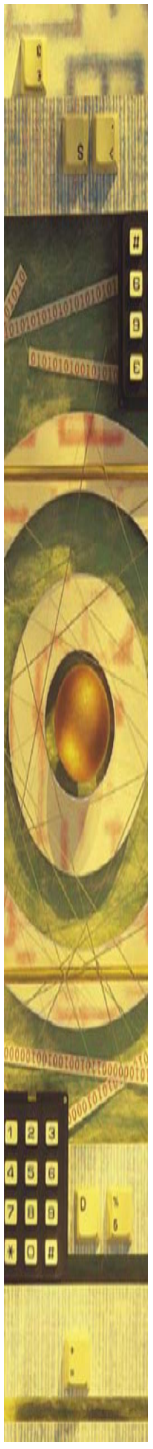
History

- **Remember:**
  - **The "standard" at the time were line printers that used monospaced fonts!**
- **AFP originally supported:**
  - **240 dpi resolution**
  - **Raster fonts – Usually no more than 15 sizes of each typeface**
  - **No automatic rotation of fonts or images**
- **AFP Focus:**
  - **Mainframe Data Centre printing**
    - **All variable**
  - **Performance**
  - **Integrity**
  - **Centralized management of resources**



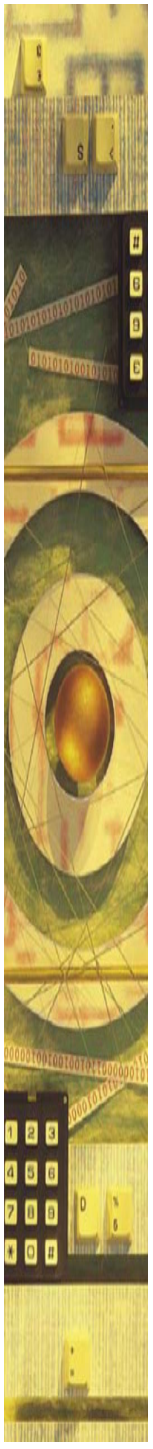
Install Base

- **Transactional / Data Center**
  - **Financial**
    - **Banks, Insurance**
  - **Utilities**
    - **Hydro, Cable, Gas, Water, Telephone**
  - **Government**
- **Types of documents:**
  - **Policies, statements, SYSOUT, and billing applications**



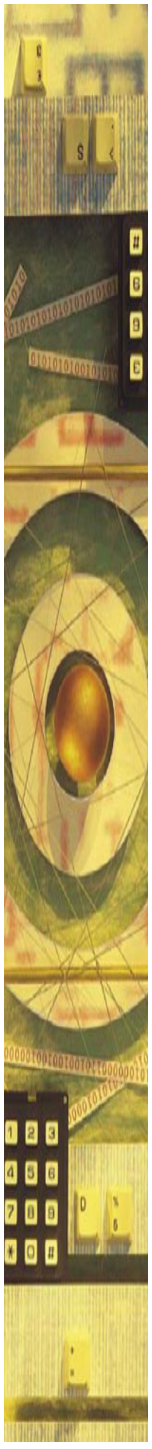
Enhancements to AFP

- **Lots of new printers, both by IBM and others:**
  - **Cut-sheet and continuous forms**
  - **Range from 15 to 2000 impressions per minute**
- **More print server platforms**
  - **Addition of print servers on VM, AS/400, Windows, AIX, Linux**
- **Support for 300, 480 and 600 dpi resolutions**
- **Native Vector Graphics support (GOCA)**
- **Resolution-independent image (IOCA)**
- **Native Bar Code support (BCOCA)**
- **Finishing (stitch / fold)**
- **Adobe Type1 font support (FOCA)**



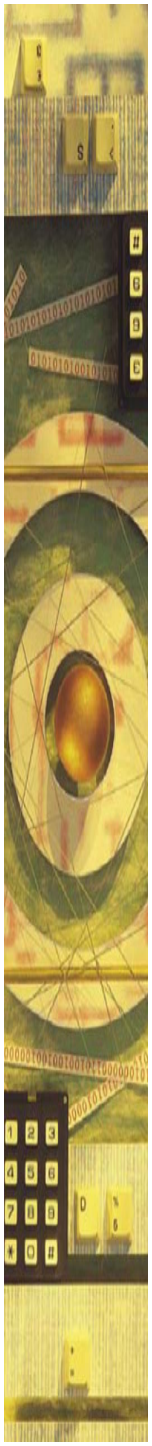
Enhancements to AFP

- **Support for non-AFP image object types**
  - **JPEG/JFIF, TIFF, and even single page PS, PDF**
- **Added 32-bit color image support**
- **Added Truetype / Opentype font support**
- **Added Color Management to the AFP architecture (2006 – CMOCA)**
- **The enhancement continues…**
  - **AFP Consortium meets 3 times annually to continue to enhance/improve the abilities of the AFP architecture**



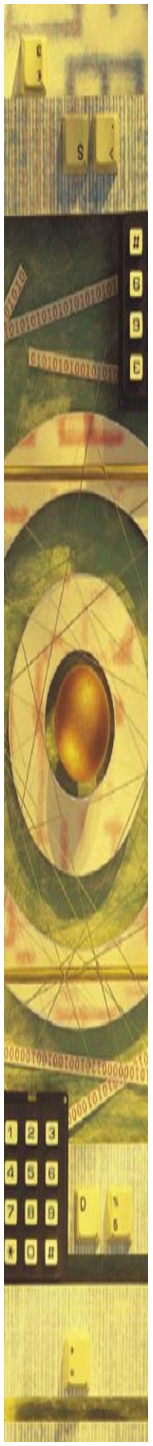
OEM Support

- **Many 3rd party vendors create solutions in the AFP space:**
  - **Forms Design, Document composition**
  - **Font & image creation / Conversion tools**
  - **Print Servers**
  - **IPDS Printers**
  - **AFP Transforms**
  - **You can have an AFP shop, and no IBM software or hardware…**
  - **Moreover, you can mix and match tools from multiple vendors, and it works!**



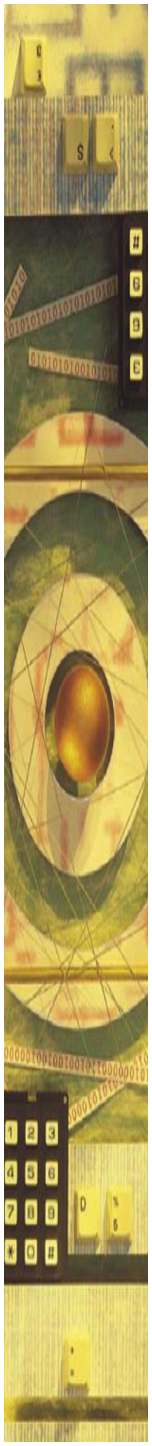
Strengths of AFP

- **IPDS – Intelligent Printer Data Stream**
  - **A bi-directional *conversation* between the print server and the printer**
    - **"Who are you, and what features/options do you support?"**
    - **Resource Management**
      - **Automatic downloading of resources**
      - **Purging at end of job (if required) or when printer memory full**
    - **Printer status**
      - **# of pages sent, # of pages confirmed printed**
    - **Error recovery**
      - **Can detect it if printer goes off the page, and report it back**
      - **Paper jam, can back up**
    - **Co-ordination of pre/post devices via the Universal Pre and Post Processor protocol (UP3I)**



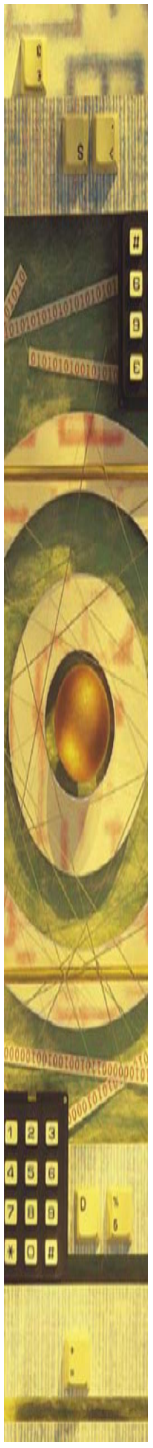
Strengths of AFP

- **Integrity**
  - **The print server knows how many pages have been committed to the output stacker**
  - **If a problem (paper jam, power outage) occurs, the print server can back up to the last page that it knows was committed to the output stacker**
  - **All the dots on all the pages printed as expected.**
  - **One of the largest "sins" is for an AFP printer to drop all or part of a page and not tell you about it!**
    - **Note that you can tell it *not* to tell you, so be careful!**



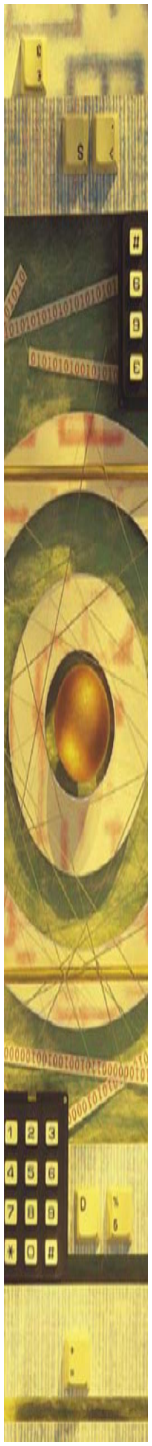
Strengths of AFP

- **Object Based:**
  - **Everything is an object that has a start and end wrapper around it (page, images, overlays, documents, etc)**
    - **improves integrity by being able to detect incomplete print stream or incomplete object**
  - **Even support for PS, PDF objects**
- **Performance:**
  - **Capturing and retaining of objects means they only need to be transmitted to the printer and processed once**
  - **Most AFP applications are <30 Kbytes per page**
    - **Resources are managed independently**
  - **Page independence allows processing of pages in parallel by print controllers that have multiple processors.**



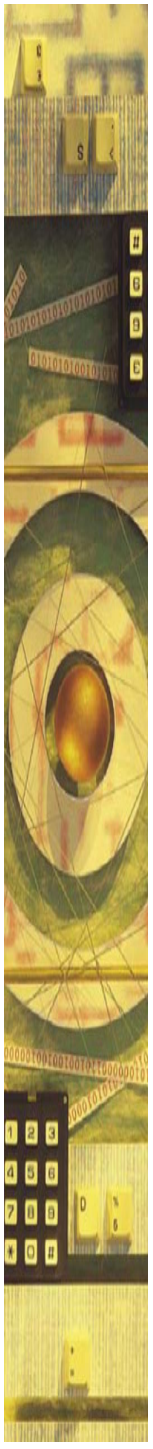
Strengths of AFP

- **Device independence:**
  - **An application that works on one AFP printer should print correctly on an AFP printer from a different vendor (or else it's a bug)**
    - **There is little room for ambiguity**
    - **There are no device specific controls for paper trays, finishing, etc**
  - **Even moving an application from cut sheet to 2-UP continuous can be accomplished simply by using a different FORMDEF; no changes to the document composition step should be required**



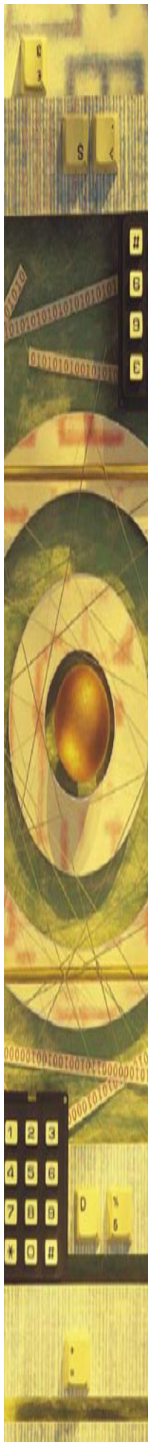
Strengths of AFP

- **Open Architecture (officially!)**
  - **AFP Consortium now steers where AFP architecture goes.**
    - **Lots of OEMs with product out there**
- **Manageability**
  - **Facilitates centralized accounting, capacity planning, resource management**



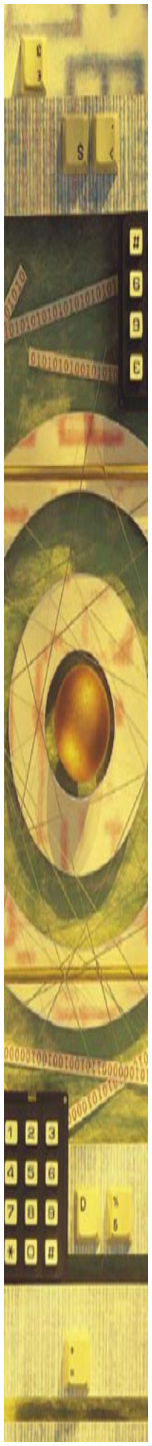
Strengths of AFP

- **Indexing / Archiving Tools**
  - **Tools to retrieve all needed resources for efficient archiving of a print stream**
  - **Supports indexing for fast retrieval of a specific document within a print file**
  - **Supports page grouping, and document metadata on both page and group levels**
- **Mature, Robust**
  - **Has stood the test of 22+ years**



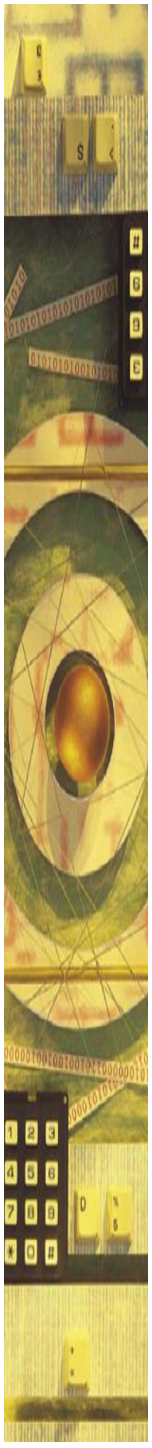
Weaknesses

- **Imaging model compared to PostScript, PDF:**
  - **Supports only 4 directions of text**
  - **Graduated screenings**
  - **Text along arbitrary paths**
  - **Bezier curves**
  - **Trapping**
  - **Color Management**
    - **This has been released as formal architecture by the AFP Consortium. People are free to start building product.**
- **Some comment that AFP is "Proprietary" to IBM**
  - **If an IBM printer didn't support that function, there was no architecture for it**
  - **AFP Consortium has officially opened up the AFP architecture to it's competitors and partners. The AFP consortium now steers where AFP goes.**



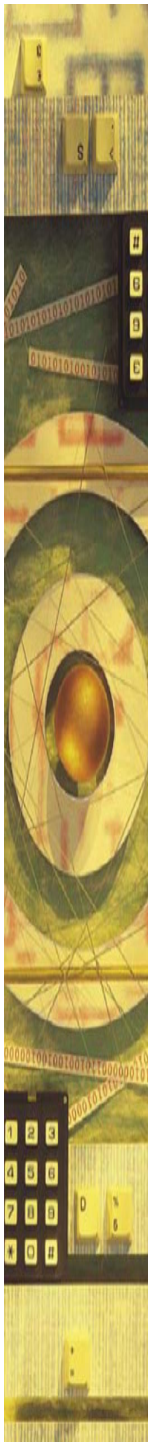
Weaknesses

- **Some complain that it requires a print server**
  - **Can't just "lpr" an AFP file to a printer directly, but need to go through the print server to have the print "managed" for you.**
    - **This is not a weakness if you want managed output!**
- **Some complain that this server is a CPU pig**
  - **CPUs are cheaper than people, and continue to get cheaper every year. Having output with data missing, or having people check the output is expensive!**



Weaknesses

- **Print metadata / job ticket is external to the print file**
  - **This data is usually dependent on the print server and platform, and is sometimes difficult to move around between operating systems**
  - **Most LPRs don't support this extra metadata**
- **No native format that supports compressed resources or pages (for archive purposes) like PDF has**
  - **Archive formats / tools tend to be proprietary although the AFP that they contain is not!**
- **No free, high quality viewers available, unlike PDF**



Opportunities

- **Completely variable, high speed, Full color**
  - ***Don predicts: "AFP will do full color before PDF will go at high speed with integrity"***

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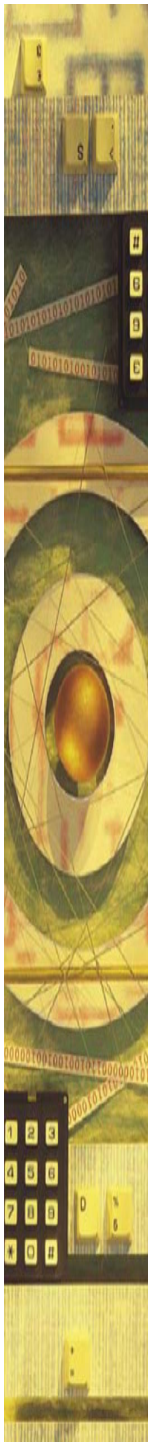
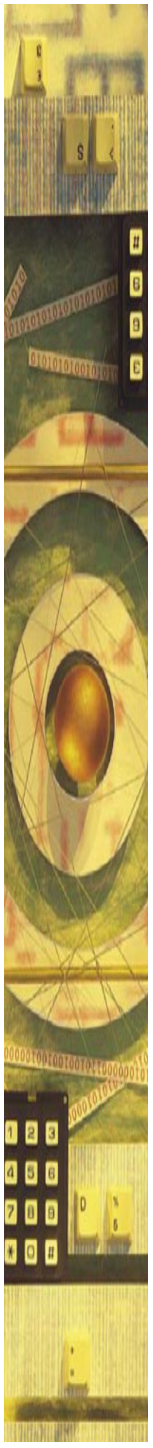


Threats

- **PDF –**
  - **Imaging model is superior, based on PostScript**
  - **Full color, color management**
  - **Page independence**
  - **Ubiquitous**
  - **Good, free, viewers available**
- **However..**
  - **PDF does not natively support paper tray selection, duplex printing, finishing**
  - **RIP speeds tend to be slow**
  - **no guarantee of integrity of the output (font substitution)**
    - **Or that all the dots on all the pages printed as expected**



Closing Thoughts

- **Just having an AFP print stream does not guarantee integrity, performance, device independence**
  - **Much of the integrity comes from IPDS**
  - **The AFP software solution you choose must support these features**
  - **An AFP solution will be garbage if the vendor does an "end run" around the standard implementation**
  - **Some vendors have invented unique ways to accomplish certain tasks that are non-standard, and these may not survive the device independence test.**