IBM Print Software:

Hints, Tips and Short Subjects

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Useful Gems for Infoprint Server, Transforms, PSF and ACIF

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Infoprint Server

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Back Up that Printer Inventory!

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- The Infoprint Server Printer Inventory keeps all of the printer definitions
- If there is a problem with Infoprint Server or it's communication with JES, the Inventory can be corrupted
  - The effect of the corrupted Inventory may not be immediately obvious
- Even if you back up the Unix file system that contains the Inventory (/var/Printsrv), you may have saved a bad inventory
  - When Support suggests restoring the Inventory you may be restoring a corrupted version
  - A separate backup of the Inventory will allow you to get Infoprint Server up quickly and painlessly.

Back Up that Printer Inventory!

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- You can back up the Inventory using the Infoprint Server PIDU command
  - PIDU (Printer Inventory Definition Utility) is the inventory maintenance utility
  - PIDU will create a text version of the Inventory
  - The PIDU command can be run daily as a scheduled job
    - in batch from JCL (recommended)
    - or as a cron job in Unix
  - See *Chapter 19. Using the PIDU program to manage the Printer Inventory* in the Infoprint Server Operation and Administration book, S544-5745

Back Up that Printer Inventory!

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- From Batch:

```
//AOPPIDU  JOB ...
//PIDU     EXEC PGM=AOPBATCH,PARM='pidu'
//STDIN    DD  *
   export "//'HOWARDT.PIDU.GDG(+1)'";
//STDOUT DD SYSOUT=*
//STDERR DD SYSOUT=*
//STDENV DD *
PATH=/usr/mylib/Printsrv/bin
LIBPATH=/usr/mylib/Printsrv/lib
NLSPATH=/usr/mylib/Printsrv/%L/%N:/usr/mylib/
Printsrv/En_US/%N
/*
```

- From Unix command line;

```
pidu -c " export inventory.export ; "
```

- Do it…Level 2 will thank you!

Infoprint Server 1.13 Enhanced e-mail support

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- You can now use Printway extended mode to:
  - Include text and line-data documents inline in the body of an e-mail, so that they can be read without opening an e-mail attachment.
  - Specify the e-mail recipients in an e-mail header in line-data documents without modifying JCL or printer definitions, using a subset of RFC 2822-compliant email headers.
  - Include a standard message in the beginning of each e-mail to specific recipients, such as a standard greeting and introductory paragraph.
  - Send different documents from a single print job to different e-mail recipients using e-mail headers, job attributes, or JCL.

Text with Email Header

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- Email addresses included in the message:

Email Job JCL

```
//EMAIL13A EXEC PGM=IEBGENER,REGION=1M
//SYSPRINT DD   SYSOUT=A
//SYSIN    DD   DUMMY
//OUTEM OUTPUT  CLASS=E,DEST=MAIL13A
//SYSUT2   DD   SYSOUT=(,),OUTPUT=*.OUTEM
//SYSUT1   DD   *
To: howard.turetzky@ricoh-usa.com
CC: howard.turetzky@infoprint.com
From: howardt@bldpdevn.bldev.infoprint.com
Subject: Testing email with embedded address

Dear Sir or Madam:
 Blah, blah, blah…
/*
```

Printer Definition Source

```
create printer em13a
  printer-codepage = IBM-1047
  print-page-header = no
  filters = {
    text -> aopfiltr.so
            }
  printer-type = ip-printway
  protocol-type = email
  description = "inline message
                 with addrs + inline
                 text"
  destination = MAIL13A
  output-class = E
  document-formats-supported ={
                                 line}

            …
  mail-embedded-headers = yes
  mail-inline-text = yes
  mail-to-addresses = {
    "howard.turetzky@ricoh-usa.com"
            }
  automatic-dataset-grouping = yes
  dcf-routing = yes
```

The Results

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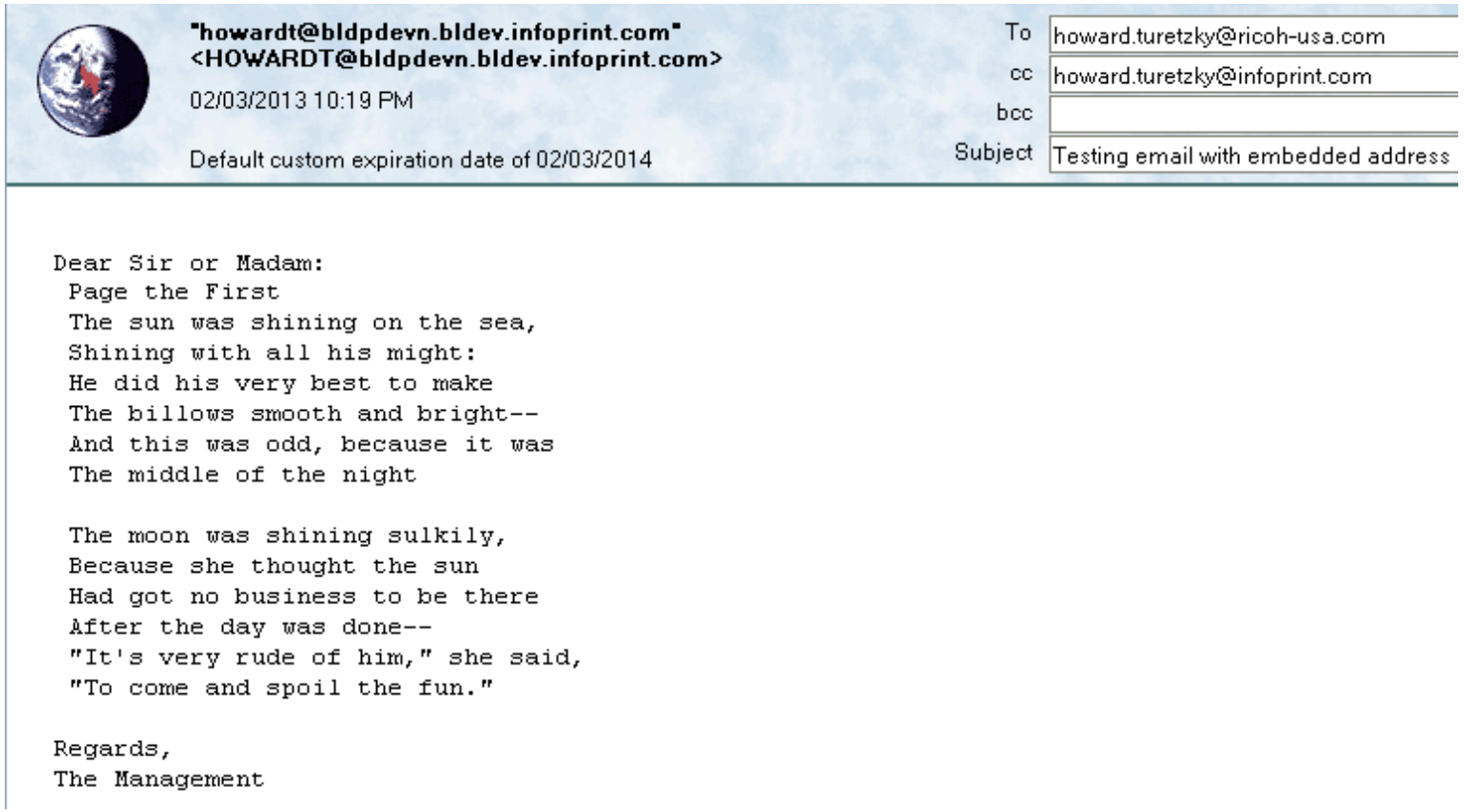
- Text in Email



"howardt@bldpdevn.bldev.infoprint.com"
<HOWARDT@bldpdevn.bldev.infoprint.com>
02/03/2013 10:19 PM
Default custom expiration date of 02/03/2014

To: howard.turetzky@ricoh-usa.com
cc: howard.turetzky@infoprint.com
bcc:
Subject: Testing email with embedded address

```
Dear Sir or Madam:
 Page the First
 The sun was shining on the sea,
 Shining with all his might:
 He did his very best to make
 The billows smooth and bright--
 And this was odd, because it was
 The middle of the night

 The moon was shining sulkily,
 Because she thought the sun
 Had got no business to be there
 After the day was done--
 "It's very rude of him," she said,
 "To come and spoil the fun."

Regards,
The Management
```

Address, Text and PDF

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- Email address in first file, PDF in second

Email Job JCL

```
//EMAIL13B EXEC PGM=IEBGENER,REGION=1M
//SYSPRINT DD   SYSOUT=A
//SYSIN    DD   DUMMY
//OUTEM OUTPUT  CLASS=E,DEST=MAIL13C
//SYSUT2   DD   SYSOUT=(,),OUTPUT=*.OUTEM
//SYSUT1   DD   *
To: howard.turetzky@ricoh-usa.com
CC: hydjm@earthlink.net
From: BigCo Mail Department
Subject: Testing email with embedded
address

Dear Sir or Madam:
Blah, blah, blah...
/*
//EMAIL13B EXEC PGM=IEBGENER,REGION=1M
//SYSPRINT DD   SYSOUT=A
//SYSIN    DD   DUMMY
//OUTEM OUTPUT  CLASS=E,DEST=MAIL13C
//SYSUT2   DD   SYSOUT=(,),OUTPUT=*.OUTEM
//SYSUT1   DD
//         DSN=HOWARDT.EMAIL.PDF,DISP=SHR
```

Printer Definition Source

```
create printer em13c
  printer-codepage = IBM-1047
  print-page-header = no
  filters = {
    modca ->
      "afp2pdf.dll %filter-options"
      text -> aopfiltr.so
   }
  printer-type = ip-printway
  protocol-type = email
  …
  document-formats-supported = {
      line
      modca
      pdf
   }
  …
  mail-embedded-headers = yes
  dcf-routing = yes
  mail-reply-address = "me@ricoh-usa.com"
  mail-to-addresses = {
      "bitbucket@ricoh-usa.com"
   }
  automatic-dataset-grouping = yes
  mail-from-name = "The Mail Department"
  mail-inline-text = yes
```

The Results


```
Dear Sir or Madam:
 Page the First
 The sun was shining on the sea,
 Shining with all his might:
 He did his very best to make
 The billows smooth and bright--
 And this was odd, because it was
 The middle of the night

 The moon was shining sulkily,
 Because she thought the sun
 Had got no business to be there
 After the day was done--
 "It's very rude of him," she said,
 "To come and spoil the fun."

Regards,
The Management
```

Transforms

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Migrating to the New Transforms

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- The new AFP to PDF/PCL/PostScript™ transforms have new names to avoid confusion with the previous from AFP transforms
- Transforms naming scheme has changed, from AFP2P* to AFPXP*
  - Transform command: afp**2**pdf -> afp**x**pdf
  - Transform DLL: afp**2**ps.dll -> afp**x**ps.dll
  - Transform classes: afp**2**pcl_us -> afp**x**pcl_us
  - Transform daemon names: afp**2**pdfd -> afp**x**pdfd
- Name change needs to be reflected in:
  - aopxfd.conf
  - Infoprint Server printer definitions that reference the transforms in their Processing section

```
/ MO:DCA-P afpxpdf.dll -c encrypt %filter-options
(extend)
```

  - AOPBATCH and AOPPRINT JCL
  - Unix shell scripts

Migrating to the New Transforms

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Easing migration of printer definitions

- To save time for installations with many printer definitions, new shell script tool /usr/lpp/Printsrv/samples/ **aokmodfilter.sh** can be used to modify their filter section.
- Steps:
  - 1. Run aokmodfilter.sh

```
>aokmodfilter.sh
Migrating afp2 filters to afpx
AOP065I 137 definitions were exported
to /tmp/inventory.dump.
modify statements written to /tmp/
filter.defs removing file /tmp/
inventory.dump
```

Migrating to the New Transforms

RICOH imagine. change.

Easing migration of printer definitions

- 2. Examine output in **/tmp/filter.defs** to verify that the modify commands are correct, and remove any you do not want changed.

```
modify printer DUP0010_AFP2PCL filters={line ->
"afpxpcl.dll -c us %filter-options" modca ->
"afpxpcl.dll -c us %filter-options" text ->
aopfiltr.so };
```

- 3. Use the **pidu** tool to modify the original printer definitions.

```
>pidu < /tmp/filter.defs
AOP063I printer DUP0010_AFP2PCL was replaced.
```

Using symbolic links to manage name change

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- The transform command names are used by the AOPBATCH and AOPPRINT JCL and any Unix shell scripts that execute the transform, so these also need to change to point to the new transforms.

- Instead of editing each JCL file and Unix script that references the transform commands, you can use symbolic links.

Using symbolic links to manage name change

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- To create a symbolic link from afp2pdf to afpxpdf, using the directory /usr/bin:
  - Create a symbolic link from **afp2pdf** to **/usr/lpp/Printsrv/bin/afpxpdf** in **/usr/bin**.

```
>ln -s /usr/lpp/Printsrv/bin/afpxpdf /usr/bin/afp2pdf
```

  - Modify the PATH environment variable:
    - For JCL, in the **aopstart EXEC**

```
>n=n+1; env.n='PATH=/usr/bin:'install_path'/bin:/bin'
```

    - For Unix scripts, in the shell running the script.

```
>export PATH=.:/usr/bin:$PATH
```

- Stop and restart the Transform Manager daemon (aopxfd).

Using Both Transforms At Once

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- The new product was designed to coexist with the old product, to ease transition.
- If you do not use symbolic links to point to the new transforms, you can use both transform products at the same time because the names of the transform commands, filters, and daemons differ between versions.
- The Infoprint Server transform configuration file (aopxfd.conf) can contain entries for both Print Transforms from AFP V1.1 and Infoprint Transforms from AFP V2.1.

Issues with error-handling in previous transforms

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- Previous transforms error-handling was not ideal. Transforms would either:
  - Ignore the problem and continue
  - Stop processing with error message appended to output document
- Return code of zero even for data stream errors
- No messages issued to the Infoprint Server message log and no ability to suppress trailer error message page on output.
- No convenient way for system programmer to monitor the message log or implement return code checking to prevent printing or distribution of bad output, except for certain specific IOCA decoding errors.

To fix these problems, error-handling enhancements have been added

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- Now, with error-handling enhancements added in OA35704:
  - Transform messages are issued to the Infoprint Server message log, in addition to transform stderr file and (optionally) output data.
  - Ability to request whether or not the transform signals a non-zero return code for data stream warnings and errors.
  - Ability to tell the transform whether or not to append a trailer message page to output.
  - Ability to request more granular MVS-style (0/4/8) return codes, rather than UNIX-style (0/1)

Customizing the Transforms

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Specify enough memory for large PostScript and PDF jobs

- –m option specifies memory allocated for the transform to run

- This option is crucial for large PostScript and PDF jobs!
  - Default of 32M is not sufficient for very large jobs, and generally not even optimal for large jobs
  - 256M suggested, 1024M for large jobs, 2047M maximum
  - If enough memory isn't specified for a job, you will see: AOP2505E Not enough memory is available to transform the data stream. Increase the memory available to this transform in the Infoprint Server transform configuration file. Also, make sure the region size is large enough.

Customizing the Transforms

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Specify enough memory for large PostScript and PDF jobs, cont'd

- Example of a transform entry specifying increased memory:

```
transform ps2afp
   start-command = "ps2afpd -m 1024M"
   min-active = 1
   max-active = 3
   maximum-idle-time = 300   # 5 minutes
   environment = {
      _BPX_JOBNAME -> PS2AFPD
   }
;
```

- Note: stop and restart transform daemon (**xfd**) after any change to aopxfd.conf

Customizing the Transforms

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Other settings that may limit memory

- REGION size

  AOPSTART JCL: set in REGION parameter of the EXEC statement

  - **aopstart** Unix System Services command: set in SIZE option on the logon panel for TSO user ID

    Note: Specify a region size that is at least 10M greater than the value in the -m option.

- MAXASSIZE value in the BPXPRMxx member of SYS1.PARMLIB, which sets the system-wide maximum address space size.
  - To set: **SETOMVS MAXASSIZE=268435456**
  - To check: **D OMVS,O**

- RACF ASSIZEMAX value for the user ID that starts Infoprint Server.
  - Can be increased on the RACF ALTUSER command.

- IEFUSI exits that limit region sizes – make sure these do not apply to OMVS.
  - If you do not want any exits to apply to OMVS, enter this command:
    SETSMF SUBSYS(OMVS,NOEXITS)
  - If you need some exits to apply to OMVS, enter this command:
    SETSMF SUBSYS(OMVS,EXITS(exits))
    and then do not specify IEFUSI in the EXITS parameter.

Customizing the Transforms

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What to do if an error occurs

- Look for a CEEDUMP
- Take a trace for IBM support
- Customizing with AOP_FAIL_ON_ERROR for PostScript and PDF files makes life much easier!
- Common messages and what they mean

Customizing the Transforms

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What to do if an error occurs

- **Set AOP_FAIL_ON_ERROR to make life easier!**
  - The **AOP_FAIL_ON_ERROR** environment variable directs the transform to stop processing when any transform error occurs during the transform
    - No partial output is created.
    - No empty output with error messages.
    - Return code from the transform is >0.
    - The transform stderr file will still contain the same error messages, but AOP2501E will also be sent to stdout to give a more immediate indication of failure.

- Set **AOP_FAIL_ON_ERROR -> yes** in the aopxfd.conf configuration file, for each PS/PDF/PCL2AFP transform entry.

Explicit Page Size Improves Performance

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- Specifying the page size explicitly with -l and -w for non-default-sized pages can also help with performance
  - If you know the actual page dimensions of transform input file, specifying them in the transform parameters can improve performance
  - -l *length* and -w *width* can be specified in inches, millimeters or pels
    - recommend using inches or millimeters, as they are independent of the output resolution

```
pdf2afp -a io1-mmr -r 300 -l 11in -w8.5in …
```

Print Services Facility

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Use the Printer Inventory

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- The Printer Inventory can define PSF FSAs and FSSs
  - The Printer Inventory is part of Infoprint Server
  - PSF integrated with Infoprint Server inventory in PSF 3.4
  - Can use without Infoprint Server license in PSF 4
- Also controls AFP Download Plus FSS/FSA
- Contains parameters for FSAs and FSSs
  - Changing a parameter in the Inventory and stopping ($P) and starting ($S) the FSA or FSS causes the settings to take effect
    - no need to take down the entire FSS
  - You can avoid stopping the FSS to change the PSF PROC JCL

Use the Printer Inventory

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- Can set most parameters set with keywords in the PRINTDEV
  - Also, most flags and single values that required coding Exit 7
  - printer initialization, tracing, and execution options
- You can use a migration program to copy parameters into the Printer Inventory
  - from the PRINTDEV statement, EXEC PARM statement, and the AFPPARMS control statement
    - ✓ Most PRINTDEV parms except Library allocations
  - Change the printer startup procedure to specify INV=piname as the first parameter in the PARM field of the EXEC statement:

```
// EXEC PGM=APSPPIEP,PARM=('INV=AOP1')
```

Use the Printer Inventory

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- In PSF V4R4, you can see PSF messages, including job messages that usually print on the trailer pages, in Infoprint Central
  - If PSF is enabled to write messages to the Infoprint Server common message log
    - View FSA and print job messages that PSF has written to the common message log.
    - Search for print jobs and view the properties for each job
    - Release held print jobs, delete jobs, change the priority of jobs, and move jobs (as long as PSF has not started processing the jobs)

Use the Printer Inventory

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```
FSA Name. . . PRT714
Description . Office Lexmark X792                                        (e
Location. . . B4 B8-2  FSS                                               (e
                                                                         Mor
Operator security profile
    . . .
Processing Information:
     Blank compression
   / Consolidate IM1 images
     Inhibit recovery
   / SNMP reporting
   / Close libraries when idle
     Capture inline resources
     Release data set when repositioning
     Suppress copy marks
   / Issue intervention messages
     Highlight communications failure message
     CSE sheet eject
     CSE preserve page position
     Use Line-Mode Migration LINECT
   Check CSE fit . . . . . .     1. No  2. First  3. All
   CSE orientation . . . . .     1. Portrait  2. Landscape
   Eject to front facing . .     1. None  2. Job  3. Document  4. Both
   Issue setup messages. . . 4   1. None  2. Burst  3. Forms  4. All
   Offset stacking . . . . .     1. None  2. Data set  3. Job
   Default process mode. . .
   Resolution. . . . . . . . 300   (240, 300)
                                                          more:     -
   Disconnect action . . 1  1. Stop  2. Redrive
   Disconnect interval . 30      (0-86400)
   Management mode . . . 3  1. Immediate  2. Dial in  3. Output available
   No response action. . 3  1. Notify JES       2. Notify user
                            3. Notify operator  4. Terminate
      Notify . . . . . .
   Response timeout. . . 60      (0-86400)
   Printer IP address. . op3.bldev.infoprint.com                  (extend)
   Port number . . . . . 5001

Printer Sharing:
   Release mode . . . . 1  1. Idle  2. Time  3. None
   Release interval . .       (0-86400 seconds)
   Acquire interval . .       (0-86400 seconds)
```

Calculating Print Performance

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- How fast can you print (and why not)
- Performance is Simple
  - Either the printer is running at rated speed

    - or - it's not.
  - If the printer is not running at rated speed: either it's starving - or - it's choking.

  - **Starving: not getting data fast enough**
  - **Choking: not processing the data fast enough**

PSF Processing

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- Reads print data from Spool
- Processes print data
- Accesses resources from libraries
- Sends IPDS data to printer
- 2-way communication with printer

Tuning PSF

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- Separate spool disk from resource libraries
- Minimize number of resource libraries to search
- Minimize number of resources sent to printer
- Avoid errors: increases communication
- Checkpointing: minimize frequency
- TCP/IP: use large send buffers of 65K or greater
- z/OS:
  - JES Spool: use TRKCELL (full or half track)
  - channel: use optimum BUFNO value on PRINTDEV
  - minimize number of USERLIBs

Data rate for Rated Speed

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Bytes per page (data + control bytes)
x
Pages per time period (minute or second)

Infoprint 4100
Pages per Minute
(Pages per Second)

	1-UP (210 mm length)		2-UP (297 mm length)	
	Simplex	Duplex	Simplex	Duplex
4100-HD1/2	251 (4.2)	506 (8.4)	359 (6.0)	718 (12.0)
4100-HD3/4	406 (6.8)	812 (13.5)	574 (9.6)	1148 (19.1)

Application Complexity

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- Mainframe SYSOUT
  - Worst case: 132 columns x 60 rows = 7920 bytes per page
  - Assume truncated and blank lines = 6000 bytes per page
- Statement Applications
  - Pages range from 2000 to 10000+ bytes depending on complexity coding efficiency
- PostScript Applications
  - Business letter = 200Kbytes per page
  - Manual page without illustrations = 500Kbytes per page
  - Full page image = 1Mbytes and larger per page
- 50mm x 50mm 600-dpi Monochrome Photograph = 87Kbytes

Data Rate Example - Statement Application

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- Average of 6 000 bytes per page
- 4100-HD3/4 prints A4 pages 2-UP at 1148 pages per minute or 19.1 pages per second
- 6 000 x 19.1 = 114,600 bytes per second bandwidth required

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Create Wrapped Resources

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- AFP Conversion and Indexing Facility converts input to AFP, Indexes the output, and **collects print resources**
  - Traditional AFP resources: FORMDEF, PAGEDEF, Overlay, Page Segment, Fonts
  - Newfangled resources--Objects: Image objects (TIFF JPEG), TrueType Fonts, Color Management Resources, PostScript™, PDF (single or multiple pages)…
    - none of these objects are AFP data structures
    - they don't live in the MVS file system
      - ✓ because they're "unstructured" they live in the z/OS UNIX file system

Create Wrapped Resources

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- However, you can put them in the MVS file system!
  - They must be “wrapped” in an AFP Object Container
    - AFP data structure that encloses the Non-OCA Data Object
    - identifying information and data encapsulated in AFP structured fields:

```
Begin Object Container  (BOC, D3A892)
      [  (     D3..C7)     Object Environment Group                    ]
      [  (OCD, D3EE92)     Object Container Data                (S)    ]
End Object Container  (EOC, D3A992)

Object Environment Group (OEG) for Object Container
Begin Object Environment Group  (BOG, D3A8C7)
      [  (PEC,  D3A7A8)    Presentation Environment Control            ]
      [  (OBD, D3A66B)     Object Area Descriptor                      ]
      [  (OBP, D3AC6B)     Object Area Position                        ]
      [  (MCD, D3AB92)     Map Container Data                          ]
      [  (MDR, D3ABC3)     Map Data Resource                    (S)    ]
      [  (CDD, D3A692)     Container Data Descriptor                   ]
End Object Environment Group  (EOG, D3A9C7)
```

Create Wrapped Resources

RICOH imagine. change.

Fine. That looks like a lot of work…

- ACIF will "wrap" these objects into Object Containers
  - relevant ACIF parameters:
    - RESTYPE=OBJCON (or ALL)
    - Includes color mapping tables specified by the COLORMAP parameter, the COM setup file specified by the COMSETUP parameter, color management resources (CMRs), Encapsulated PostScript (EPS), Portable Document Format (PDF) objects, and TIFF images
      - ✓ Note: When printing only one page from a multiple page object container file, all pages in the object container are still saved in the resource file.
    - RESFILE=PDS
      - ✓ places each resource in a PDS/PDSE member
    - RESFILE=SEQ
      - ✓ creates a sequential dataset in the form of an AFP Resource Object File (Resource Group)

Create Wrapped Resources

RICOH imagine. change.

```
//ACIF EXEC=APKACIF,PARM=[['PARMDD=ddname][,MSGDD=ddname']],REGION=3M
//INPUT    DD DSN=print file
//OUTPUT   DD DSN=output file,DISP=(NEW,CATLG),
//         DCB=(LRECL=32756,BLKSIZE=32760,RECFM=VBA,DSORG=PS),
//         SPACE=(32760,(nn,nn)),UNIT=SYSDA
//RESOBJ   DD DSN=resource file,DISP=(NEW,CATLG),
//         DCB=(LRECL=32756,BLKSIZE=32760,RECFM=VBA,DSORG=PS),
//         SPACE=(32760,(nn,nn)),UNIT=SYSDA
//INDEX    DD DSN=index file,DISP=(NEW,CATLG),
//         DCB=(LRECL=32756,BLKSIZE=32760,RECFM=VBA,DSORG=PS),
//         SPACE=(32760,(nn,nn)),UNIT=SYSDA
//SYSPRINT DD SYSOUT=*
//SYSIN    DD /* control statements follow */
CC  = YES                          /* Carriage control used */
CCTYPE  = A                        /* Carriage control type */
CPGID  = 500                       /* Metadata Code page ID */
                        /* RESOURCE INFORMATION              */
FORMDEF = F1A10110                 /* Formdef name          */
PAGEDEF = P1A08682                 /* Pagedef name          */
FDEFLIB = SYS1.FDEFLIB
FONTLIB = SYS1.FONTLIBB,SYS1.FONTLIBB.EXTRA
OVLYLIB = SYS1.OVERLIB
PDEFLIB = SYS1.PDEFLIB
PSEGLIB = SYS1.PSEGLIB
USERLIB = MY.RESLIB                /* custom resources      */
RESFILE = SEQ                      /* Resource file type      */
RESTYPE = OBJCON                   /* Resource type selection */
                      /* FILE INFORMATION                     */
INDEXDD = INDEX                    /* Index file ddname       */
INPUTDD = INPUT                    /* Input file ddname       */
OUTPUTDD  = OUTPUT                 /* Output file ddname      */
RESOBJDD  = RESLIB                 /* Resource file ddname    */
RESFILE = PDS                      /* save as PDS members     */
```

Questions?

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