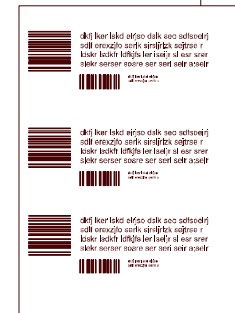# iSeries Output Application Development
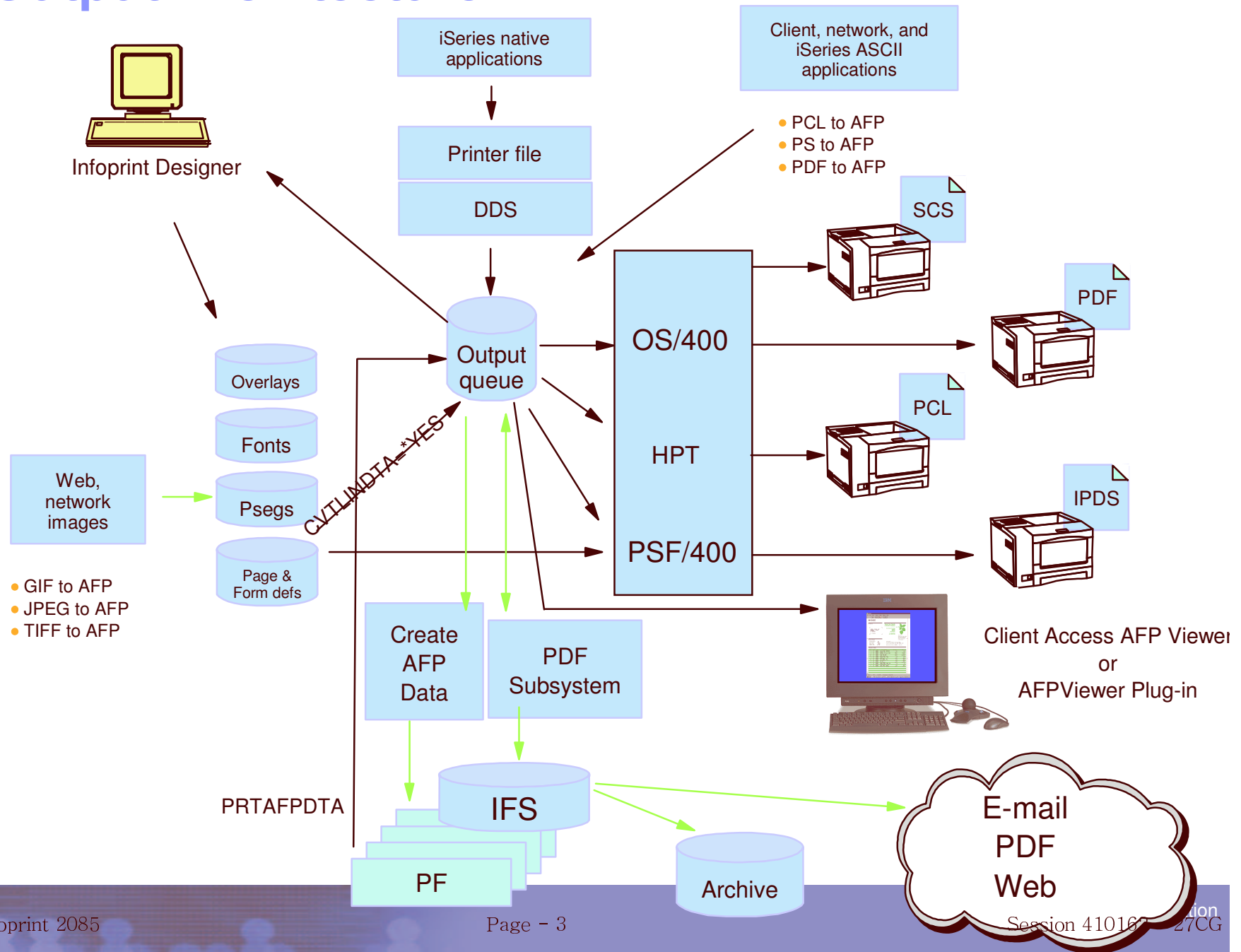
Glenn Rose, IBM Printing Systems
agrose@us.ibm.com

Agenda

- **Provide Enthusiasm for iSeries Output Tools**
  - **Understanding the Architecture**
- **Power of Native Tools - V5Rx**
  - **Printer File and DDS**
    - **Fonts, Multi-up, Duplex**
    - **Overlays, Page segments, Page Definitions, Form Definitions**
  - **Other iSeries Integrated Tools**
    - **Infoprint Server**
    - **Infoprint Designer**
    - **Advanced Function Print Utility - Print Format Utility**
    - **Advanced Print Utility**
    - **Toolbox, SAP R/3**
- **Help you get the most out of your iSeries**
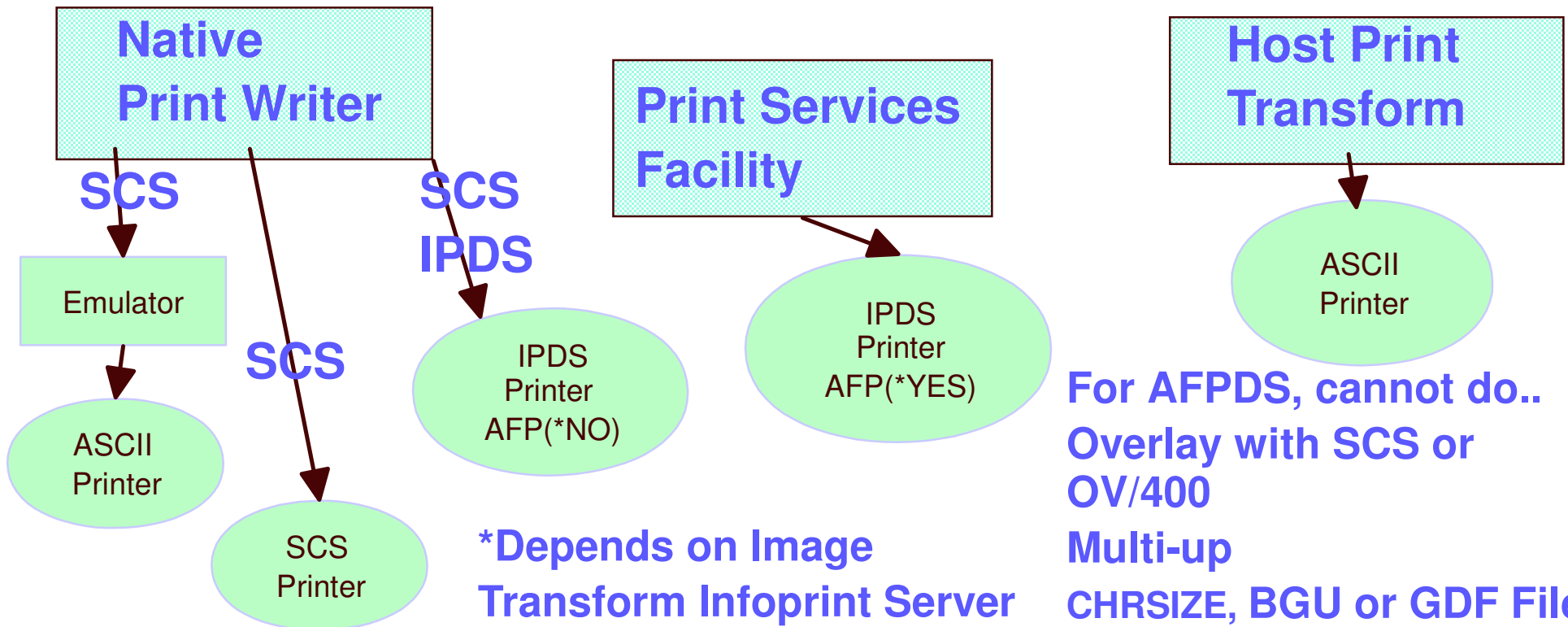- **Reference List - Additional Information**

iSeries Output Architecture

Infoprint Designer

iSeries native applications

Client, network, and iSeries ASCII applications

Printer file

DDS

- PCL to AFP
- PS to AFP
- PDF to AFP

SCS

Overlays

Fonts

Web, network images

Psegs

Page & Form defs

- GIF to AFP
- JPEG to AFP
- TIFF to AFP

CVTLINDTA=*YES

Output queue

OS/400

HPT

PSF/400

PDF

PCL

IPDS

Create AFP Data

PDF Subsystem

Client Access AFP Viewer
or
AFPViewer Plug-in

PRTAFPDTA

IFS

PF

Archive

E-mail
PDF
Web

Print Writer and Printer File Types

SCS
IPDS
AFPDS
LINE
AFPDSLINE
USERASCII*

SCS
AFPDS
(PCL4/5 or PPDS
3/4)
USERASCII

SCS
IPDS
USERASCII

Native Print Writer

SCS

Emulator

ASCII Printer

SCS

SCS Printer

SCS
IPDS

IPDS Printer AFP(*NO)

Print Services Facility

IPDS Printer AFP(*YES)

*Depends on Image Transform Infoprint Server for pcl, ps and pdf to AFP

Host Print Transform

ASCII Printer

For AFPDS, cannot do..
Overlay with SCS or OV/400
Multi-up
CHRSIZE, BGU or GDF Files
V5R1 - Expanded Color

PRINTFILE

- **Provided with System, Command Created,DDS created**
- **Parameters that are used by the application/Spool Writer**
  - → **Data Stream is Determined**
    - ☑ ***SCS, *LINE, *IPDS, *AFPDS, *AFPDSLINE, ...**
    - ☑ **Can limit where spool file can be printed**
    - ☑ **Every spool file has a print file**
  - → **Parameters have changed**
    - ☑ **New Hardware and Software Capabilities**
    - ☑ **Adding function and power for output**
  - → **Each Release**
    - ☑ **V5R1 - CVTLINDTA=*NO**
    - ☑ **V4Rx - 'Stapling, Constant Back, etc.'**
    - ☑ **V3R2 - 'Page/Form Definitions**

Printer Files

- **Printer files can be created, overridden, changed**
- **CRTPRTF**
  - **Printer file affects entire characteristics of spool file**
  - **DDS printer file**
    - **Complete flexibility - field and page level**
    - **Dynamic selection of overlays, page segments, etc.**
- **OVRPRTF**
  - **Interactive, CL Program, HLL Program**
  - **Temporary - job, program, sign-on session**
- **CHGPRTF**
  - **Permanent**
- **DSPOVR**
- **DLTOVR**
- **You or your application are in control**

Common Uses of the Printer File

- **Change to specific printer or output queue**
- **Change CPI and LPI**
- **Change font**
- **Implement duplex**
- **Use multi-up (2, 3, 4)**
- **Use Computer Output Reduction (COR)**
- **Add overlays**
- **Page size/rotation**
- **Select input/output bin**
- **DDS for external print formatting**
- **Finishing Options, Stapling, etc.**

DDS Example

```
100        A* Sample of keywords and the use of variables
200        A* Demonstrate multiple DDS FUNCTIONS for IBM AS/400
300        A*    Add QGDDM to library list for GDDM scalable fonts
400        A* USE: CHGPRTF FILE(EXAMPLE) DEVICE(XXXXXXX) TYPE(*AFPDS)
500        A*          OVRFLW(64)  GRAPHIC CHARACTER SET 1264 & CODE PGE 420
600        A*
700        A        R HEADR1
800        A                                    PAGRTT(0)
900        A                                    DRAWER(1)
1000       A          LIN01          35A
1100       A                                    FNTCHRSET(C0H400J0 T1V10037)
1200       A                                    POSITION(0.7 3.0) COLOR(RED)
1300       A          LIN02          35A
1400       A                                    FNTCHRSET(C0H200B0 T1V10037)
1500       A                                    POSITION(&VALDWN &VALACR) CO
1600       A          VALDWN         5S 3P
1700       A          VALACR         5S 3P
1800       A*
1900       A        R LINE1
2000       A                                    LINE(1.3 2.6 0.2 *VRT *NARROW)+
20xx                                            COLOR(*RGB 75 20 0)
2100       A                                    LINE(1.1 2.8 0.4 *VRT *MEDIUM)
2200       A                                    LINE(0.9 3.0 0.6 *VRT *WIDE)
   ...........................
97         A        R PSG2
98         A                                    PAGSEG(BOOT3  9.7 7.0 +
99         A                                    (*SIZE 0.7 0.5) (*ROTATION   0))
100        A                                    PAGSEG(BOOT3  9.7 7.0 +
101        A                                    (*SIZE 0.8 0.55) (*ROTATION  90))
```

Overlays

Front side overlay:

   Overlay . . . . FORM1   Name, *NONE, *SAME

    Library . . . .   MYLIB   Name, *LIBL, *CURLIB

   Offset down 0   0-57.790, *SAME

   Offset across 0   0-57.790, *SAME

Back side overlay:

   Overlay . . . .   TERMS   Name, *FRONTOVL, *NONE, *SAME

    Library . . . .   MYLIB   Name, *LIBL, *CURLIB

   Offset down 0   0-57.790, *SAME

   Offset across 0   0-57.790, *SAME

Print on both sides. . . . . *YES

- **Can specify overlay for SCS, IPDS, AFPDS data streams and OV/400**
- **For SCS and IPDS can specify after spool file creation**

DDS parameter:

   OVERLAY(*LIBL/DDSOVL1 6.0 1.3)

Application must produce second page to print on the back (Until V4R4)

Overlays

- **Can create with..**
  - **Infoprint Designer (GUI)**
  - **AFP Utilities for AS/400 (Green Screen)**
  - **AFP Printer Driver for Windows (in CA Express/web download)**
    - ▸ **Create overlay from any Windows application and upload to AS/400 - Op Nav GUI**
    - ▸ **Excellent for text overlays such as "Terms and Conditions"**
- **DDS and Equivalent to an Overlay**
  - **DDS can draw lines, boxes, place page segments**
  - **Advanced Print Utility (PrintSuite) allows placement of page segments and box draw (no shading)**
- **PC design tools**
  - **Infoprint Designer - 5733-ID1**
  - **ISIS Forms Designer, Elixir/400 for AFP, other OEM products**

  Note: Can specify Overlay in Printer File, DDS, Page Definition, Form Definition, Advanced Print Utility, Print Format Utility, AFP Toolbox

Page Segments

DDS parameter:

Example 1

PAGSEG(BUSPART 7.20 1.9)

Example 2

PAGSEG(&PSGNAM &PSGDWN &PSGACR)

PSGNAM   8A   P

PSGDWN   5S   3P

PSGACR   5S   3P

P indicates Program-to-system
Dynamic placement of Overlays, Page Segments, Boxes, Lines
Must be 8 positions
Must be 5 positions with 3 decimals

Note: Can specify Page Segments in Overlays, Advanced Print Utility, Print Format Utility, Page Definition, AFP Toolbox

IPDS & AFPDS DDS KEYWORDS

IPDS KEYWORDS

- **BARCODE**
- **CHRSIZ**
- **COLOR**
- **FONT**
- **LPI**
- **PAGRTT**

AFPDS KEYWORDS

- **BOX**
- **CDEFNT**
- **ENDPAGE**
- **FNTHRSET**
- **GDF**
- **IGCCDEFNT**
- **LINE**
- **OVERLAY**
- **PAGSEG**
- **POSITION**
- **TXTRTT**

Page and Form Definitions

- **Created by Infoprint Designer or from Source with PPFA**
- **Another method for document formatting**
- **Application independent**
- **Works with *LINE or *AFPDSLINE data**
- **Source entry via PDM, compile via PPFA**
- **PPFA required only for page and form def creation**
  - **Can use page and form defs without PPFA**
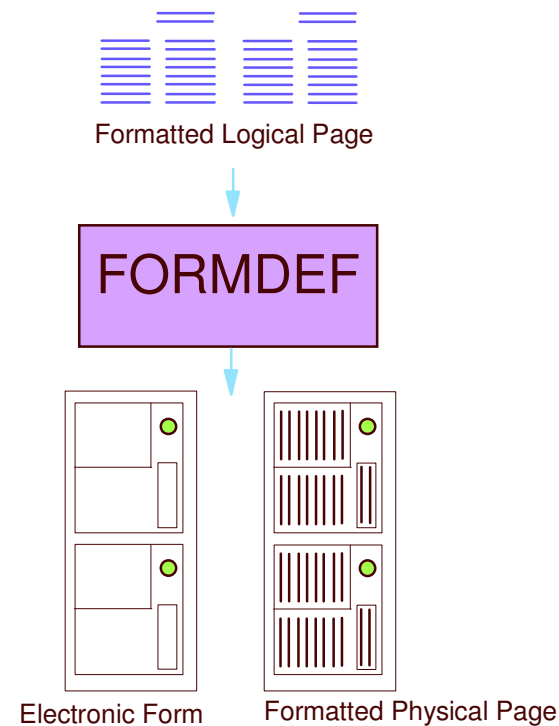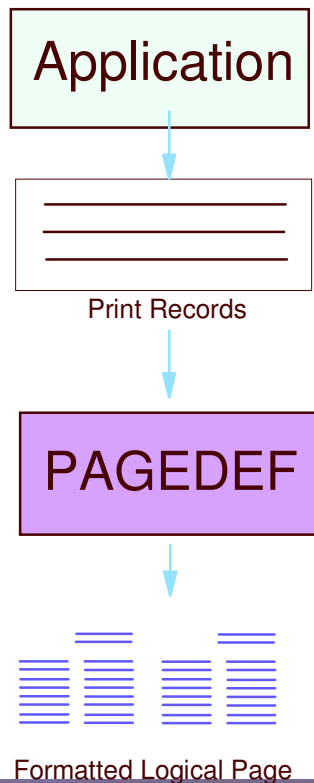- **Specify Form Def in Printer File**
- **Cross platform tool**

Printer file parameters:

Page definition	**MYPDF**	**Name, *SAME, *NONE**
Library	**MYLIB**	**Name, *LIBL, *CURLIB**
Form definition	**MYFMDF**	**Name, *SAME, *NONE, *DEVD**
Library	**MYLIB**	**Name, *LIBL, *CURLIB**

Standard Form Definitions documented in "Guide to Output"

Page and Form Def Concept

- ■ **Page Def: Similar function to AS/400 DDS**
  - − Formats logical page, selects fonts, positions and rotates fields, etc.

- ■ **Form Def: Similar function to AS/400 Printer File**
  - − Positions logical page on physical page, selects overlays, duplexing, etc.

Application

Print Records

PAGEDEF

Formatted Logical Page

Formatted Logical Page

FORMDEF

Electronic Form   Formatted Physical Page

Sample Source - Formatting

- **Offsets for Duplex on Three Hole Punch Paper**

- **Formdef To Offset Front And Back For Three Hole Paper.**

- **No Pagedef, Formdef Ignored If Sent To Non-APF Printer**

```
Columns . . . :    1  71              Edit                        CUSTOM/PPFASRC
 SEU==>                                                                   FBOFST
 FMT **   ...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7
        *************** Beginning of data ***********************************
0001.00 SETUNITS 1 IN 1 IN;
0002.00 FORMDEF FBOFSP OFFSET .65 .5  .20 .5 DUPLEX NORMAL REPLACE YES;
        *************** End of data***************************
```

Page Definition Example

Data File

John Smith
890 Bean Hill Road
Louisville, KY 50301

193-45-8901
Don't forget to take advantage of an abundance of online material on our
new World Wide Web homepage at http://www.stocks-r-us.com.
General Parts Inc.   (GPIX)   67.00   68.25   67.75
Rasterpunkt Inc.   (RPGH8H)   14.00   15.00   15.00
Ecocycle Inc. (ECO)   5.25   5.50   5.25
1Linda Noll
14 Hillcrest Drive
Houston, TX 60443

677-12-7468
Don't forget we offer a pre-approved Check payment plan. Call our
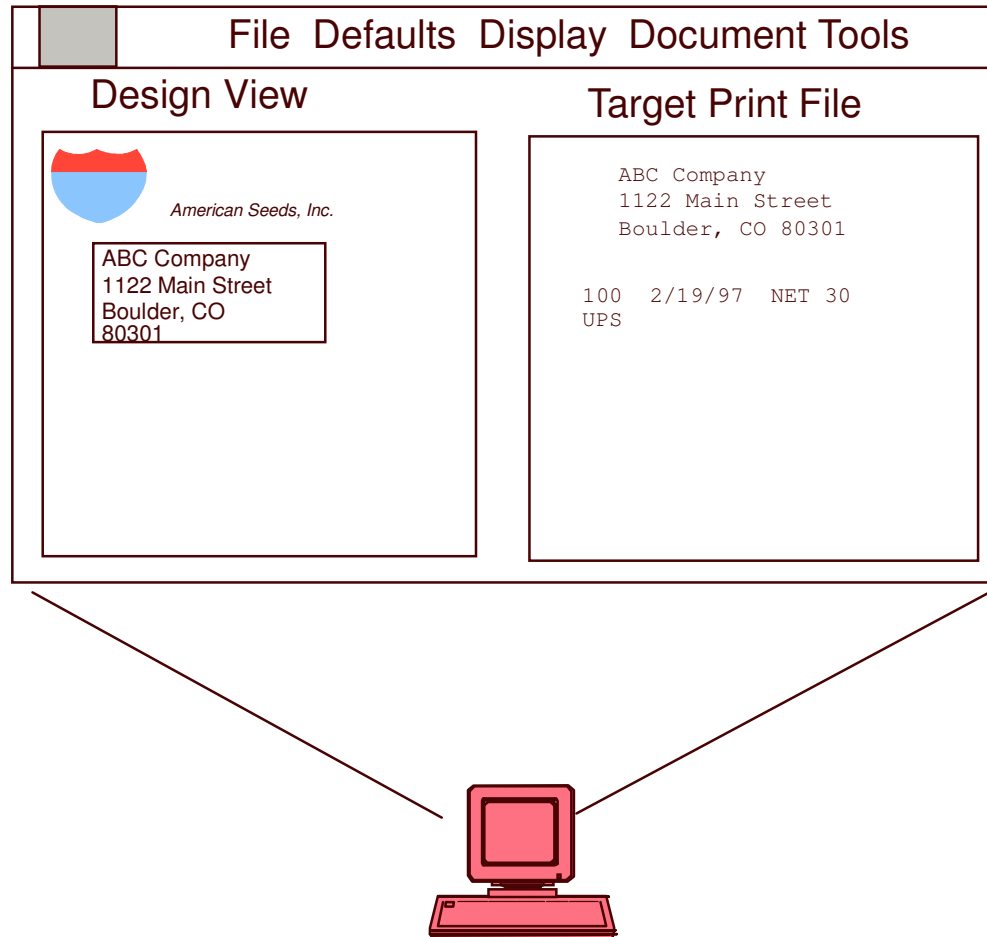toll-free number 1-800-STOCKSR to join.

Page Def Source (PPFA)

```
MEMBER  . . . . . . . . . . . STOCKQ
SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ..
 100   PAGEDEF STOCKQ        /* CVTPPFASRC will create STOCKQ          */
 200     REPLACE YES              /* PPFA should replace existing copy      */
 300     LINEONE 0.5 IN 1.0 IN;   /* Position of topmost line              /
 400     FONT BIG  PR10;          /* Prestige Roman 10 Char/Inch           */
 500     FONT NORM PR12;          /* Prestige Roman Normal 12 Char/Inch    */
 600     FONT ITAL PI12;          /* Prestige Italic Normal 12 Char/Inch   */
 700     SETUNITS LINESP 6 LPI;  /* 6 lines per inch                       */
 800
 900     /* Customer Address Block - 4 input lines                         */
1000     PRINTLINE
1100       CHANNEL 1             /* When an input line has a first col.    */
1200                             /* (CC) '1' value, this PRINTLINE gets     */
1300                             /* control - meaning: top of a new page    */
1400       POSITION 2 IN 1 IN    /* position across 2 inches down 1 inch   */
1500       FONT BIG              /* Use the font nicknamed BIG             */
1600       REPEAT 4;             /* Do this for 4 lines ¥¥ subsequent      */
1700                     */ lines are positioned down the page          */
1800                             /* at 6 line/inch (see SETUNITS above).    */
1900
2000     /* Soc. Sec. Number - 1 input line rotated/placed in upper right */
2100     PRINTLINE
2200       POSITION 7.8 IN 0.8 IN  /* position across 7.75 in down 0.75 in  */
2300       FONT NORM             /* Use the font nicknamed NORM */
2400       DIRECTION DOWN;      /* Print down the page (rotated 90 dgs)    */
2500
2600     /* Customer-specific text - 2 input lines                         */
2700     PRINTLINE                                                         /*
2800       POSITION 1.25 IN 3.0 IN/* position across 1.25 in down 3 in      */
2900       FONT ITAL             /* Use the font nicknamed ITAL            */
3000       REPEAT 2;             /* Do this for two input lines            */
3100
3200     /* Sales Quote - up to 30 lines of text                           */
3300     PRINTLINE
3400       POSITION 2.5 IN 4.25 IN/* position across 2.5 in down 4.25 in    */
3500       FONT NORM             /* Use the font nicknamed NORM  */
3600       REPEAT 30;                 /* Do this for up to 30 input lines   */
                         * * * *  E N D  O F  S O U R C E  * * * *
```

Infoprint Designer for iSeries

Product Summary

- State of the art design front-end to the robust, integrated AFP/IPDS print/presentation subsystem on AS/400

File Defaults Display Document Tools

Design View

American Seeds, Inc.

ABC Company
1122 Main Street
Boulder, CO
80301

Target Print File

```
ABC Company
1122 Main Street
Boulder, CO 80301


100  2/19/97  NET 30
UPS
```

Key Features

- Integrated for design operations, integrated for print operations
- Overlay Design editor for designing electronic forms
- Image Design editor for designing images
- Layout Design editor for designing the complete application
- Creates standard AS/400 print resources
- Windows design functions integrated with upload/download for ease of design and production
- Professional, high-precision system geared to the demands of business communications
- Existing applications can be redesigned without application changes
- Entire AFP Font Collection integrated into Infoprint Designer
- Design platform for new Java print architecture

Infoprint Server for iSeries V5R1

Focus of Infoprint Server

- **Electronic Distribution of output**
- **iSeries management of network print**

iSeries support for PDF

- Transform services for any iSeries standard output (AFP, IPDS, SCS, even OV/400)
- PDF output to e-mail, IFS, or PDF printer
- High-function PDF Server
- Segmentation - "Electronic Burst and Bind"

Integrated e-mail of output

- PDF output can be automatically e-mailed
- Multiple e-mails based on segmentation
- Exits for customization

iSeries as a network print server

- PCL, Postscript, and PDF to AFP
- Postscript and PDF transform is IBM-Adobe full-function Level 3

Web-ready AFP

- Add external resources to AFP data for portability
- Add indexing for navigation

Image transforms

- GIF, TIF, and JPEG transforms to IOCA
- Windows-based

CRTAFPDTA - Create AFP Data
New iSeries command providing:

- **Transform line data to AFP**
  - Applications formatted with page definitions can be written out in AFP
  - Enables use of HPT (Host Print Transform) for printing to PCL printers
  - Enables viewing of line data formatted applications

- **Transform AFP to fully composed AFP**
  - Encapsulate output file with external references for system to system portability or network viewing
  - Web view using with AFP Viewer plug-in for Netscape

- **Indexes AFP**
  - Create indexing for line data or AFP output files
  - Embedded indexes provides navigation for web viewing

- Part of Infoprint Server

Output Queue

CRTAFPDTA

IFS
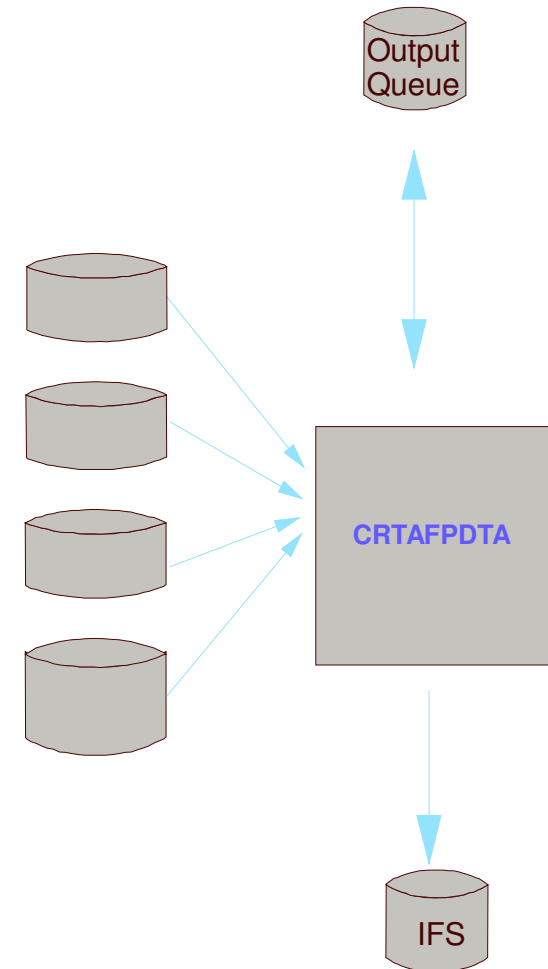
AFP Utilities for AS/400 - Overlay

- **Look and feel of PDM**
  - **Function key driven**
- **Place**
  - **Page Segments**
  - **Text**
    - ▸ **Can present in different orientations**
  - **Bar codes (14 types)**
  - **Graphics**
    - ▸ **GDDM or BGU**
- **Draw**
  - **Lines - solid, dashed, or dotted, line thickness**
  - **Box with or without shading, solid, dashed or dotted**
- **Support for all type fonts**
- **Can position by row/column or inches/centimeters**
- **Can use any terminal**
- **Creates efficient AFPDS overlay**
- ***View option with Client Access Viewer (Operations Navigator) during design**
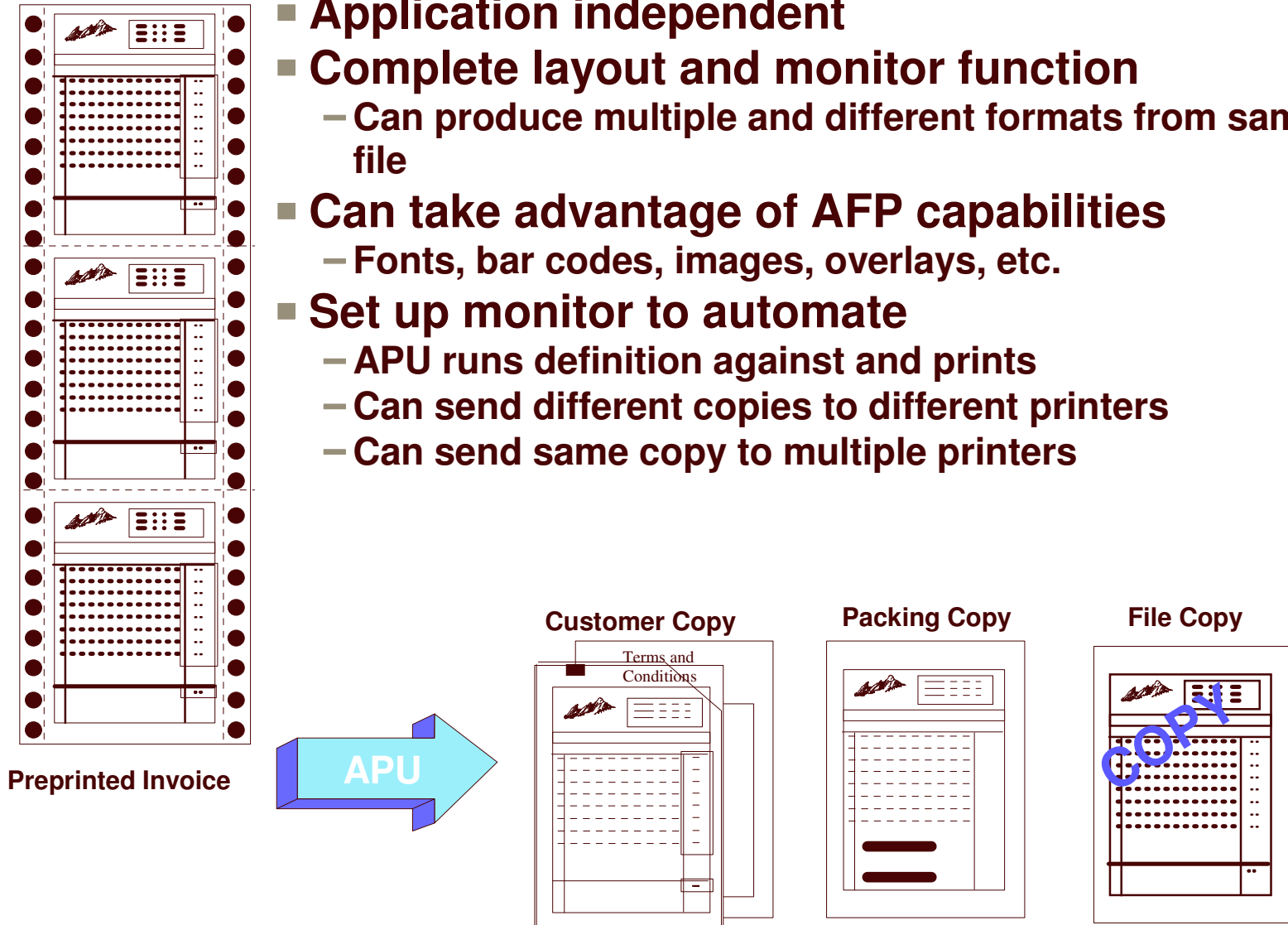
Print Format Utility

- **AFP output directly from database file, an "AFP Query/400"**
- **Easy to use interface**
- **Full AFP resource and document composition support**
- **Ability to replicate page layouts - ideal for multi-up applications such as labels**
- **A module of AFP Utilities/400**

Advanced Print Utility

- **End user, interactive tool for reformatting existing SCS Spool File**
- **Application independent**
- **Complete layout and monitor function**
  - **Can produce multiple and different formats from same spool file**
- **Can take advantage of AFP capabilities**
  - **Fonts, bar codes, images, overlays, etc.**
- **Set up monitor to automate**
  - **APU runs definition against and prints**
  - **Can send different copies to different printers**
  - **Can send same copy to multiple printers**

Preprinted Invoice

APU

Customer Copy

Terms and Conditions

Packing Copy

File Copy

COPY

Preprinted Invoice

APU Visual Data Mapping

```
                        Define Field Mapping

        Spooled file . . . . :  INVPRE      Page/Line . . . . . . . : 1/11
        Control  . . . . . . :  9           Column  . . . . . . . . : 9 - 85



   .1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....

                                          ┌─────────────────────────────────┐
       IMPROVED PRINTING CORP             │        Select Function          │
       PERFORMANCE BOULEVARD              │                                 │
       PRINTERSVILLE                      │ from Row/Column 15 / 16         │
       CO                                 │ Length  . . . . . 10            │

        80302-8351                        │ Type option, press ENTER        │
       100   31300                        │                                 │
                                          │   1 = Select                    │
       BEST WAY    7/02/96                │                                 │
                                          │ Opt     Function                │
                                          │                                 │
                                          │                                 │
    1 CT00003041HIGH ALTITUDE WATERMELON  │ __      Map as Text             │
    1 PK 78921009SPARTAN SEEDS            │ __      Map as Bar Code         │
    9 PK 75950014NORTHERN LITE BLUE SEEDS │ __      Suppress                │
                                          │                                 │
                                          │                                 │
                                          │                                 │
                                          └─────────────────────────────────┘

          F3=Exit            F11=Hide Mapping      F14 Begin Field
          F15=End Field      F16=Delete Range
```

APU Print Process

Typical AS/400 Print environment

Application

Printer File

Spool

Application creates SCS line data

System default parameters

SCS line data

AFP Resources Fonts Overlays Psegs

AS/400 terminal or session

User creates print definition
(one-time job set-up)
- can re-arrange data on the page, change fonts, and specify overlays, psegs, bar codes
- can control mult. page formats and copies

APU Print Definition

APU Monitor

APU Print Engine

Spool

Reformatted data AFPDS

Writer applies:
Overlays
Page Segments
Fonts

AFP Printer

AFP Toolbox

- **Set of Application Program Interfaces for generating AFP documents**
  - **Callable from ILE application programs (RPG, COBOL, or C)**
- **Designed for complex, dynamic printing applications**
- **Absolute control over all AFP functions**
  - **Combine application data with overlays, image, bar code, fonts**
  - **Dynamic text with justification and wrapping**
  - **Indexing tags for archive/retrieval applications**
  - **Dynamic positioning of all design elements**
  - **Image integration**

Toolbox Application Program

Will need to follow AFP Hierarchy

Begin and End Documents and Pages

Put Data on the Page

Add Resources, Overlays, Page Segments, Fonts, etc.
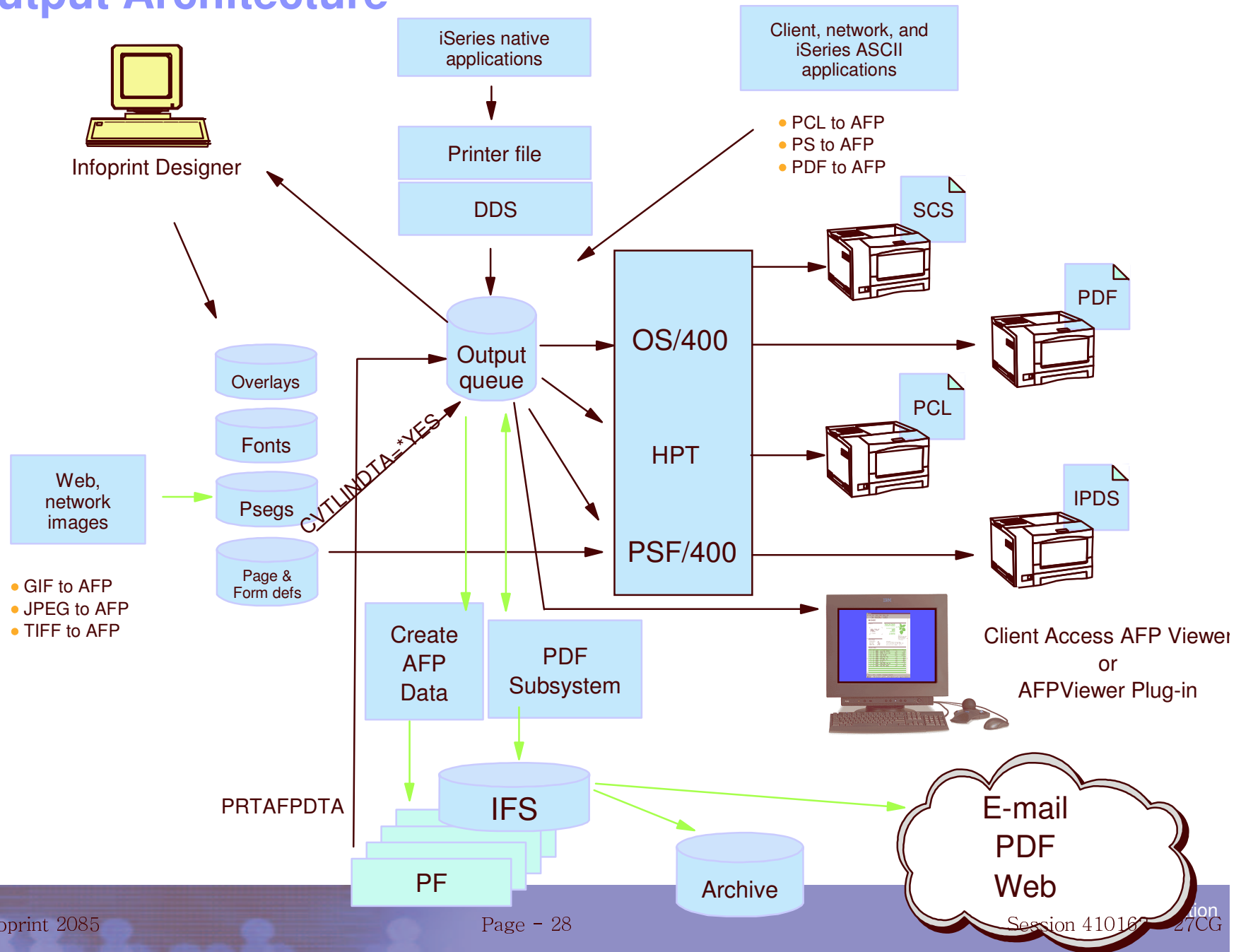
Control over All Objects

- Barcodes, Graphics, etc.

SAP R/3 Print

- **Can implement AFP with SAP R/3**
  - **OTF becomes AFPDS data stream**
  - **ABAP becomes LINE data**
    - **Can use supplied Page Definitions and Form Definitions**
    - **Create customized**
  - **AIX and AS/400 support**
- **Uses Z access method**
- **Enhanced output with overlays, images, bar codes, fonts**
- **PSF management and error recovery**
  - **Access to full range of IPDS printers**
- **Recommend Font Collection**
- **OTF - Print Services Facility/400 or Host Print Transform**
- **ABAP - Print Services Facility/400**

iSeries Output Architecture

- iSeries native applications
- Client, network, and iSeries ASCII applications
- Printer file
- DDS
- PCL to AFP
- PS to AFP
- PDF to AFP

Infoprint Designer

Web, network images

- GIF to AFP
- JPEG to AFP
- TIFF to AFP

Overlays

Fonts

Psegs

Page & Form defs

CVTLINDTA=*YES

Output queue

OS/400

HPT

PSF/400

SCS

PDF

PCL

IPDS

Client Access AFP Viewer or AFPViewer Plug-in

Create AFP Data

PDF Subsystem

PRTAFPDTA

IFS

PF

Archive

E-mail PDF Web

Comparisons

Summary

V5R1 can:

- produce PDF from any iSeries output
- e-mail automatically any iSeries output
- publish iSeries output in either PDF or AFP format for web/client access
- design iSeries output applications with a new, integrated, fully graphical system
- archive iSeries output to a new, strategic, fully web-enabled archival system
- develop server print applications in Java
- print directly to iSeries-attached printers using Internet Print Protocol (IPP)
- segment iSeries output electronically for presentation or e-mail
- manage printing with the iSeries from any ERP software
- separate page formatting from applications without giving up anything
- Integrate web image into iSeries output applications
- print directly to PDF printers

V5R2 adds:

- Comprehensive control over email distribution and content
- SMTP support for integration with most mail servers
- PDF size control and bookmarking
- API access to PDF and email functions
- Planned interactive configuration of PDF and email
- Infoprint Designer enhancements including wizard-based complex design, 2D barcode, MICR, national language, finishing
- 2D barcode support integrated in DDS
- Finishing by group
- XML formatting with page definitions
- PDF and email functions in iSeries Access
- PDF printing in Web Access
- IPP Client Support
- New iSeries printers

**Output to Printers
or to the web**

Conclusions

- The iSeries tools are powerful and have many options
- Applications can be totally contained within the iSeries
- Tight integration results in lower cost and increased productivity
- Web ready output is here today and will only get better! Color, color, color
- The future is colorful - use the color capability to design better documents - Hardware limtations today

2D Barcode Support

- What is 2D?
  - ► One-dimensional barcodes (i.e.. UPC, Postnet) are series of bars and white spaces that are scanned by a point scanner
    - – Scanning UPC would yield 10-12 characters of data -- the product ID
  - ► 2D barcodes are a two-dimensional image pattern (i.e.. 2 inches square) that is read in its entirety
    - – 2D barcodes can yield up to 4000 characters of data
- V5R2 Support for 2D
  - ► Support for three 2D symbologies
    - – PDF 417 - up to 1850 characters
    - – Datamatrix - up to 138 characters
    - – UPS Maxicode - up to 3116 characters
  - ► 2D programming
    - – New DDS keywords
    - – Support in PPFA/400
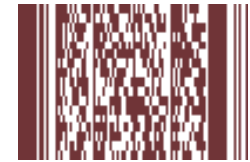
PDF417

Datamatrix
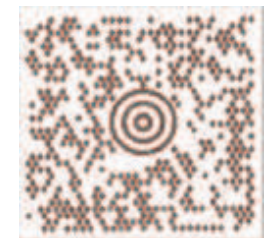
Maxicode

Additional Information

- **AS/400 Guide to Output (S544-5319-04)**
- **Ethernet and Token Ring Configuration Guide (G544-5240)**
- **IBM AS/400 Printing II (GG24-3704)**
- **IBM AS/400 Printing III (GG24-4028)**
- **IBM AS/400 Printing IV (GG24-4389)**
- **IBM AS/400 Printing V (SG24-2160)**
- **IBM iSeries Printing VI (SG24-6250)**
- **AS/400 System API Reference (SC41-4801) V4 (SC41-3801) V3**
- **AS/400 Printer Device Programming (SC41-5713) V4 (SC41-4713) V3**
- **AS/400 Guide to Programming for Printing (SC41-8194)**
- **AS/400 TCP/IP Configuration and Reference (SC41-5420) V4 (SC41-3420) V3**
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