MCP Printing to Windows

Paul Kimpel

2014 Universe Conference

Tuesday, 14 October 2014, 3:30 p.m.

Copyright © 2014, All Rights Reserved

Paradigm Corporation

Presentation Topics

- Background
- Printing to Windows PCs with MCPPRT
- Printing to Windows Printer Shares
- Printing to MCP Stream Files
  - PC IOHandler
  - STREAMFILE IOHander
  - Printing to the MCP Web Server
- Printing to Network Directory Shares
- Printing to Unix Systems [deprecated]

Background

What are We Trying to Do Here?

- "Print" MCP output so it can be viewed/used by
  - Users at external workstations and hosts
  - Applications at external workstations and hosts
- Types of destinations
  - Direct –output ends up on the remote system
  - Indirect –
    - Output stays on the MCP server
    - But is easily viewable by the remote system
- Generally want output as
  - Data stream formatted for a local printer PDL
  - Plain text (or possibly RTF, Postscript)

Paradigm 4

MCP Printing Modes

- Directly-attached printers (obsolete)
- Local "printing"
  - **CANDE BACK**
  - Print stream files to local MCP directories
- Inbound network printing (obsolete)
- Outbound network printing
  - TCP/IP Direct printing (e.g., JetDirect, port 9100)
  - Enterprise Output Manager (EOM)
  - Remote/BNA printing (separately licensed)
  - **MCPPRT** PC print server
  - **NXPRINT** handler for network-shared printers
  - **DISKSHARE** handler for remote network shares
  - Unix LPR/LPD and RSH printing (deprecated)

Paradigm 5

MCP Print System

- Manages and routes MCP printer output
  - "BD" (**BACKUPPRINTER**) file
  - Record-oriented and stream data files
- Highly customizable
  - IOHandlers and Virtual Servers
  - Printer drivers (PDL formatters)
  - File transforms
- Interface with user applications through
  - Devices ("printers")
  - Print requests
  - File and task attributes

Paradigm 6

Configuring Print Devices

- Establishes
  - Device name and type
  - Output mode and protocol (e.g., IOHandler)
  - Output formatting (driver)
  - Miscellaneous Print System features
    - Header/trailer pages
    - Translation
    - Error recovery, etc.
- Pre-defined configuration templates
  - See ***EXAMPLE/PRINT/PRINTERS**
  - Load once using **PS LOAD** command
  - All template printers marked as "hidden"

Paradigm 7

Applying a Configuration Template

- **PS CONFIG** <name> **LIKE** <name> **EXCEPT** …
  - **LIKE** names the (hidden) template printer
  - **EXCEPT** provides a list of attribute overrides
  - **PS CONFIG** commands are cumulative
- Example:

```
PS CONFIG + VIRTUAL PCTEXT
  LIKE EXAMPLE/CONNECTION/STREAMFILE
  EXCEPT IOHPARAM="FAMILY=PRINT"
PS CONFIG PCTEXT
  LIKE EXAMPLE/PRINTER/TTY
  EXCEPT IOHPARAM="BLANKLINE=CRLF
  NEWLINE=CRLF NEWPAGE=CRFF"
```

Paradigm 8

Output File Format

- Format is determined by the device driver
- May be a PDL or a text file:
  - Plain text (TTY formatting) – **.TXT**
  - HTML (web destination) – **.HTM**
  - Postscript – **.PS**
  - Rich Text Format – **.RTF**
  - XML – **.XML** (no Unisys driver at present)
- Text file extension
  - Generally determined by the device **PRINTERKIND**
  - If **PAGECOMP** has **TRANSPARENT** option, extension is determined by *request's* **PRINTERKIND**

Paradigm 9

Other Considerations

- Print device **SEPARATE** option
  - **REQUEST** – all BD files are appended to one output
  - **FILE** – each BD file becomes one output file
- File name collision
  - Most text IOHandlers offer auto- or user-assigned file names
  - Must be careful that multiple files or requests do not result in the same output file name
  - Output from later requests with same name will *overwrite/remove* output from earlier requests

Paradigm 10

MCPPRT Print Server

MCPPRT Characteristics

- Small print server for Windows systems
  - Can run as a program or a Windows service
  - Installed on a Windows client to drive *local printers*
  - Uses port 9100 by default
  - Can use SSL (see **`.chm`** help for details)
- Considerations
  - Must be installed on the Windows client
  - Client must have a static IP or stable DNS name
  - Can connect to any printer configured on the client
  - PDL (e.g., PCL, PS, text) is typically generated on the MCP host and passed through to printer
  - Does not require a REPRINTS key

Paradigm

12

Installing MCPPRT on the Client

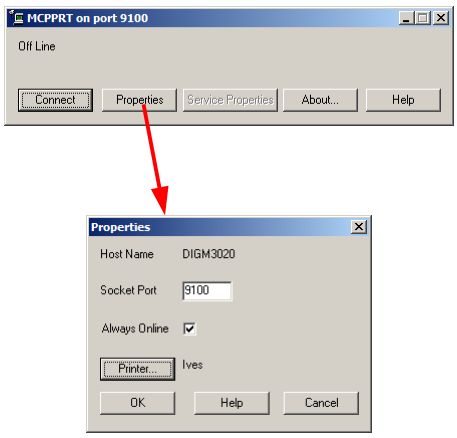
- MCPPRT.msi
  - Available from MCP Installs share
  - Also can download from support.unisys.com
  - Always installs as a plain program
  - Option to install as a service (recommended)
- Running in Program mode
  - Run from Start menu or command line
  - Can run multiple copies to serve multiple printers
  - Can run in parallel with the service
  - Each copy must have a unique port number
  - Command line:
    <path>**MCPPRT.exe /socket 9102 /printer "HP42A"**

Paradigm

13

MCPPRT Program GUI Configuration

- When run from Start menu:

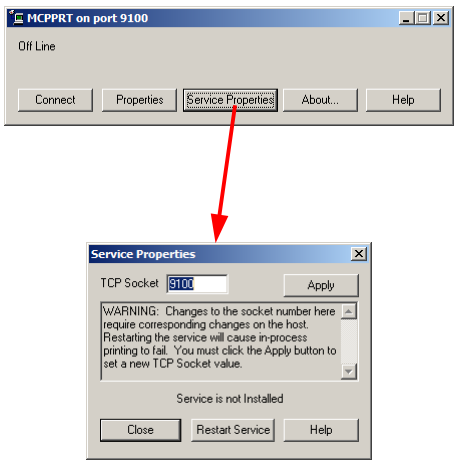


Paradigm

14

MCPPRT Service GUI Configuration

- When run from Start menu *as Administrator*:



Paradigm

15

Configure MCPPRT MCP Devices

- For each remote printer to be driven:
  - Need one Print System device configured
  - Need to specify the *Windows* printer name
- Easy way:

```
PS CONFIG + VIRTUAL PCPRT
  LIKE EXAMPLE/CONNECTION/MCPPRT
  EXCEPT IOHPARAM="DOMAIN=PCPRT.CORP.COM
         PORT=9105 PRINTER='lj41'"
PS CONFIG PCPRT
  LIKE EXAMPLE/PRINTER/PCL5
```

Paradigm

16

MCPPRT IOHPARAM Options

- **DOMAIN =** <DNS address>
- **IPADDRESS =** <IPv4 or IPv6 address>
- **PORT** | **SOCKET =** <number>
- **PRINTER =** <Windows printer name>
- **SSL**
- **USEREQUESTNAME**
- **MYIPADDRESS =** <local MCP IP address>
- **REQUIRESTATUS = IDLE** | **CANPRINT** (54.1+)

Paradigm

17

Printing with NXPRINT to Windows Printer Shares

NXPRINT Characteristics

- Print directly from MCP to Windows SMB/CIFS printer shares – part of the Redirector library
- Works with PCs, Windows print servers, SAMBA
- Solves the problem of requiring a static IP
- Nothing to install on the Windows system, but
  - Must configure the printer share on the server
  - May need to specify access control
  - May need to adjust Windows Firewall settings
- Printing to a print server –
  - Better than printing directly to networked printers
  - Minimizes printer conflict and MCP overhead

Paradigm 19

Configure NXPRINT MCP Devices

- May need to enable SMB (port 139) or CIFS (445) in Administration Center
- Determine how to supply user credentials
  - Can be embedded in Print System configuration
  - Better to use NX Services **CREDENTIALS** files
  - Good idea to establish a domain user just for printing
- Basic configuration:

```
PS CONFIG + VIRTUAL NETPRT
  LIKE EXAMPLE/CONNECTION/NXPRINT
  EXCEPT IOHPARAM="…"
PS CONFIG NETPRT
  LIKE EXAMPLE/PRINTER/PCL5
```

Paradigm 20

NXPRINT IOHPARAM Options

- **SERVER =** <SMB/CIFS server name>
- **SHARE =** <SMB/CIFS share name>
- **DOMAINNAME =** <DNS address>
- **IPADDRESS =** <IPv4 or IPv6 address>
- **CREDENTIALS =** username/password
- **NXCREDENTIALS =** <file name suffix>
- **USERDOMAIN =** <user domain name>
- **TIMEOUT =** <seconds>
- **TEMPLATE** (use external configuration file)

Paradigm 21

User Authentication for the Share

- **IOHPARAM CREDENTIALS** parameter:
  - Supplies a username and password to the server
  - Possibly qualified by the **USERDOMAIN** parameter
  - **Note:** *this exposes the password in clear text*
- **NXCREDENTIALS** files
  - Allows credentials for remote servers to be stored in an encrypted MCP file
  - Searched for automatically by server name if **CREDENTIALS** option not specified
  - **NXCREDENTIALS IOHPARAM** option specifies final node of the credentials file name
  - Can be protected by standard MCP file security (**GUARDFILE**, etc.)

Paradigm 22

Creating Credentials Files

- Created by special MCP utility
  - ***SYSTEM/NXSERVICES/MAKECREDENTIALS**
  - Single space-delimited string parameter containing
    - Remote server host name or "*****"
    - User name
    - Password (may be in quotes to preserve case)
    - Authentication domain name (optional)
- Generates a small file under the *originating* MCP usercode
  - **NXSERVICES/CREDENTIALS/**<server name>
  - **NXSERVICES/CREDENTIALS** (if server name="*****")

Paradigm 23

Credentials File Conventions

- Can be used only by the usercode that created it
- A non-usercoded run of **MAKECREDENTIALS**
  - Creates a "global" credentials file
  - Usable from any usercode
- Search order (family substitution applies)
  1. **CREDENTIALS** option in **IOHPARAM**
  2. **NXCREDENTIALS** option in **IOHPARAM**
  3. **(***usercode***)NXSERVICES/CREDENTIALS/***name*
  4. ***NXSERVICES/CREDENTIALS/***name*
  5. **(***usercode***)NXSERVICES/CREDENTIALS**
  6. ***NXSERVICES/CREDENTIALS**

Paradigm 24

Credentials File Examples

- WFL/CANDE **RUN** command:

```
RUN *SYSTEM/NXSERVICES/MAKECREDENTIALS
  ("WINSERV PAUL ""my!%#@&PW"" MYCORP")
```

- CANDE **UTILITY** command:

```
U *SYSTEM/NXSERVICES/MAKECREDENTIALS
  WINSERV paul "myPW" MYCORP
```

- Creating a "default" credentials file (run from non-usercode environment, e.g., ODT):

```
RUN *SYSTEM/NXSERVICES/MAKECREDENTIALS
  ("* PrintServ ""ps-pw"" MYCORP")
```

Paradigm 25

Template Files

- **IOHPARAM** parameters can be stored in a separate MCP file
- Must be under the usercode for the print request
  - File titled **NXSERVICES/CONFIG/***device-name*
  - Must have **FILEKIND=SEQDATA**
    - Max 250 chars read (including spaces)
    - "%" trims spaces from config file records
  - Server name, share name, etc. are taken from the configuration file
  - Cannot include **DOMAINNAME**, **IPADDRESS**, **SERVER**, **SHARE** in PS device config when using template
  - *Single-threaded through the Print System router!*

Paradigm 26

NXPRINT Example

- See "Setting up a Connection to a Network Printer Share" in the *Installing a Printer for MCP Print System Use* manual
- Example:

```
PS CONFIG +VIRTUAL SHAREPRN
  BLOCKSIZE=10000,
  TRANSLATION=NONE,
  PROTOCOL=TRANSPARENT,
  PPT=NONE, SPOOLER=NONE,
  IOH="NXPRINT (SERVER=PSVR1 SHARE=LAZR2
           DOMAINNAME="HPLJ204A.LOCAL"
           NXCREDENTIALS=PUSR TIMEOUT=30)
           IN SL REDIRSUPPORT"
  DRIVER="PCL5",… etc.
```


Printing to an MCP Stream File

Stream Files Overview

- Generate line-delimited text files from MCP print
  - Not really a print-to-Windows technique, but…
  - Can map a share to an MCP directory
  - Access the text files from Windows over the network
- Multiple output formats
  - Plain text – **`.TXT`**
  - Rich Text – **`.RTF`**
  - Postscript – **`.PS`**
  - HTML – **`.HTM`**
- Will concentrate here only on plain text output (the TTY driver)

Paradigm 29

Print Device Configuration

- IOHandlers
  - **`PC`** – older, less control over file names
  - **`STREAMFILE`** – newer, more control over names and file locations; supports **`DESTINATION`** options
- TTY Driver
  - Generates plain-text ASCII files
  - CR, LF, FF formatting, trims trailing blanks
  - Options to control delimiter characters:
    - **`NEWLINE`**, **`BLANKLINE`**, **`NEWPAGE`**
    - **`CR`**, **`LF`**, **`FF`**, **`CRLF`**, **`CRFF`**, **`IGNORE`**
  - Example:

```
NEWLINE=CRLF BLANKLINE=CRLF
  NEWPAGE=CRFF
```

Paradigm 30

PC IOHandler Configuration

- Default (no **IOHPARAM** specified):
  - Files stored under usercode of print request
  - To **DISK**, modified by usercode's family substitution
  - Stored in directory with name of print device
  - Final file name node: **R#***nnnn***.TXT** (nnnn=request #)
  - File name extension taken from **PRINTERKIND**
- **IOHPARAM** options
  - **FAMILY** – specifies destination disk family
  - **DIRECTORY** – specifies destination directory
  - **LONGNAME** –
    - Appends request name to directory name
    - Last node limited to 13 chars + extension

Paradigm 31

PC IOHandler Example

```
PS CONFIG + VIRTUAL PCTEXT
    NOLINK,
    IOHANDLER="PC (FAMILY=USERS)",
    AUTOCONNECT=BYDEVICE,
    BLOCKSIZE=5400,
    BLOCKSTRUCTURE=UNBLOCKED,
    DRIVER="TTY (NEWLINE=CRLF BLANKLINE=CRLF
        NEWPAGE=CRFF)",
    EXTMODE=(EBCDIC AS ASCII, LATIN1EBCDIC AS ASCII,
        ASCII),
    FORMID="*DONTCARE*",
    HEADER=SUPPRESSED, TRAILER=SUPPRESSED,
    PAGECOMP="PORTRAIT BORDER=(0) TM=0 BM=0
        PAPERSIZE=LETTER",
    PPT=NONE, PROTOCOL=NONE, SPOOLER=NONE,
    TRANSLATION=NONE,
    STATUS=IDLE,
    SEPARATE=FILE,
    PRINTERKIND=LINEPRINTER,  % TREATED AS TTY
    VFU=EMULATE;
```

Paradigm 32

STREAMFILE IOH Configuration

- Default (no **IOHPARAM** specified):
  - Files stored under usercode of print request
  - To **DISK**, modified by usercode's family substitution
  - Stored in directory with name of print device
  - Final file name node: **R***nnnn***.TXT** (nnnn=request #)
  - File name extension taken from **PRINTERKIND**
- **IOHPARAM** options
  - **SHORTNAMES** – restricts name nodes to 17 chars, must be specified before **DIRECTORY** option
  - **DIRECTORY** – specifies destination directory
  - **FAMILY** – specifies destination disk family
  - **READONLY** – specifies mode of output file

Paradigm 33

STREAMFILE IOH Example

```
PS CONFIG + VIRTUAL PRINT2STREAM
    NOLINK,
    IOHANDLER="STREAMFILE(FAMILY=PRINT DIR=*STREAMS)",
    AUTOCONNECT=BYDEVICE,
    BLOCKSIZE=5000,
    BLOCKSTRUCTURE=UNBLOCKED,
    DRIVER="TTY (NEWLINE=CRLF BLANKLINE=CRLF
        NEWPAGE=CRFF)",
    EXTMODE=(EBCDIC AS ASCII, ASCII, OCTETSTRING),
    FORMID="*DONTCARE*",
    HEADER=SUPPRESSED, TRAILER=SUPPRESSED,
    PAGECOMP="PORTRAIT BORDER=(0) TM=0 BM=0
        PAPERSIZE=LETTER",
    PPT=NONE, PROTOCOL=NONE, SPOOLER=NONE,
    TRANSLATION=NONE,
    STATUS=IDLE,
    SEPARATE=FILE,
    PRINTERKIND=TTY,
    VFU=EMULATE;
```

Paradigm 34

STREAMFILE Destination Overrides

- **DESTINATION** file attribute can override the STREAMFILE output file name
- Attribute syntax:
  - **DESTINATION="PRINT2STREAM (***param***)"**
  - **DESTINATION="PRINT2STREAM '***param***'"**
  - **DESTINATION="PRINT2STREAM ('***param***')"**
- Attribute parameter:
  - Full file name [on family]
    - Specifies output file name completely
    - *Must* have ***** or **(***usercode***)** prefix
  - Partial file name [on family]
    - Appended to the device **DIRECTORY** name

Paradigm 35

STREAMFILE Destination Examples

```
FILE PF-PRINT (KIND=PRINTER,
   PRINTDISPOSITION=EOT,
   DESTINATION="PRINT2STREAM (MY/LISTING)");
```

- Prints to ***STREAMS/MY/LISTING ON PRINT**

```
FILE LINE (PRINTDISPOSITION=CLOSE,
   DESTINATION="PRINT2STREAM
   '(HER)SPECIAL/LISTING ON OPS'"
```

- Prints to **(HER)SPECIAL/LISTING ON OPS**

Paradigm 36

Using STREAMFILE with WebTS

- **`STREAMFILE`** can be used with Atlas web server to make printer output available via the web
  - Specify an MCP destination directory under some virtual directory for the web server
  - Use a web-friendly driver (e.g., HTML or TTY)
  - Set device **`PRINTERKIND`** to match that driver
  - Perhaps enable directory browsing on the destination directory

Paradigm

37

Printing to a Network Share

DISKSHARE IOHandler Overview

- Similar to printing to an MCP stream file
  - Print System generates a stream file (e.g., **.TXT**)
  - Written *directly* to a network share instead of to the MCP file system
  - Uses the Redirector library to access the share
- Authentication to the remote share
  - Set up a **NXSERVICES/CREDENTIALS** file
  - If no credentials supplied, IOH attempts to use the Guest account (with no password)
- Supports **DESTINATION** attribute parameter
  - Same as for **STREAMFILE** IOHandler
  - Except it uses a full or relative *path name* (UNC) instead of an MCP file name

Paradigm 39

DISKSHARE IOH Configuration

- Default (no **IOHPARAM** specified):
  - Must specify a path name in **DESTINATION** attribute
  - If there is no effective path, request goes into an exception state
- **IOHPARAM** options
  - **SHORTNAMES** – restricts path name nodes to 17 chars, must be specified before **PATH** option
  - **PATH** –
    - Specifies path name (UNC) of remote share
    - Must specify at least the "*host**share*" part
    - May specify additional directory nodes relative to the share root
    - Missing directories will be created as needed

Paradigm 40

DISKSHARE IOH Example

```
PS CONFIG + VIRTUAL PRINT2SHARE
    NOLINK,
    IOHANDLER="DISKSHARE(PATH=\\corps1\spool\mlist)",
    AUTOCONNECT=BYDEVICE,
    BLOCKSIZE=3000,
    BLOCKSTRUCTURE=BLOCKED, BLOCKUNIT=RECORD,
    DRIVER="TTY (NEWLINE=CRLF BLANKLINE=CRLF
        NEWPAGE=CRFF)",
    EXTMODE=(EBCDIC AS ASCII, ASCII, OCTETSTRING),
    FORMID="*DONTCARE*",
    HEADER=SUPPRESSED, TRAILER=SUPPRESSED,
    PAGECOMP="PORTRAIT BORDER=(0) TM=0 BM=0
        PAPERSIZE=LETTER",
    PPT=NONE, PROTOCOL=NONE, SPOOLER=NONE,
    TRANSLATION=NONE,
    STATUS=IDLE,
    SEPARATE=FILE,
    PRINTERKIND=TTY,
    VFU=EMULATE;
```

Paradigm

41

Printing to UNIX Servers

Printing to UNIX Servers

- *DEPRECATED!* – deimplemented after MCP 18
- Uses the TCP/IP Print Enabler (TPE)
  - Print to UNIX LPD server (LPR/LPD protocol)
  - Print to UNIX RSH server (remote shell protocol)
  - Print to TCP/IP Direct device (port 9100, JetDirect)
- Current replacements for TPE
  - LPD, RSH
    - Print to EOM, EOM sends to LPD server
    - Print to **`MCPPRT`**, configure remote printer as LPR to send to LPD server
  - TCP/IP Direct
    - Use Print System **`TCPDIRECTPRINTER`** IOH

Paradigm 43

References

- *Installing a Printer for MCP Print System Use*
- *Print System User's Guide*
- *File Attributes Reference Manual*
- *I/O Subsystem Guide*
  - Section 29 – The Redirector, Credential files

Paradigm 44

END

MCP Printing to Windows

2014 Universe Conference