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WhitePaper

Printing from a Mainframe Over HOBCOM

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Processing the Data on the Mainframe

HOBCOM can output print data that is generated on a Mainframe to printers (ASCII or EBCDIC printers) in several different ways. In the following, you will find a short description of how the print data are processed on the Mainframe.

The print output data are generated on the Mainframe in the form of a list. There are two possibilities of doing this: Online printing and Batch printing.

1. Online Printing

With online printing the data are created in CICS, IMS, etc. CICS, for example, is output directly to a printer, i.e., a LU1 or LU3 data stream is sent to a 3270 printer. Hereby there are no ANSI control characters (column 0). With NON-SNA printing there is a CCW (Channel Command Word), that is generated in CICS. Thus, for example, F1 or F5 (erase / erase write) data of the CCW. For output to a 3270 printer, CICS uses drivers.

With SNA printing the CCWs are generated by VTAM. Every terminal (e.g., tape recorder, screen terminal, printer, etc.) has to receive different CCWs, the CCWs control the device, as well as the printer.

With online printing (e.g., from CICS), the CICS transaction will generate the line feed ('X'15'). This LU1 or LU3 data stream (with 'X'15') is now received by HOBCOM, the program PR3287. HOBCOM converts the 'X'15' into, for example, a 0D0A, i.e., characters that the printer can interpret and it interprets additional control characters.

2. Batch Printing

With batch printing the list is generated, for example, from a batch program. This program generates in column 0 the channel feeds (ANSI control characters). If the print job is sent to the spooling system (JES Power, RSCS), these channel feeds will be interpreted by the drivers linked to the batch program. These drivers are, for example, defined in the MVS via the macro DCB (with CMS it is named FSCBD), which is called in the batch program. These drivers interpret the channel feeds and from them, generate the CCWs even before the list is placed in the spool.

In the spool (e.g. JES) the CCWs are converted to Vertical Format Controls (only with RJE). Now the data leave the spool in the direction of the RJE station. These data are LU1 data, which are, however, different from the 3270 LU1 data.

The RJE station is, for example, simulated by HOBCOM's PR3770 program. HOBCOM receives the Vertical Format Controls and evaluates these. With CMS, the PRINT command corresponds to the batch printing.

Output over LPD

If the print job is to be output over LPD (line printer daemon), then in the conversion of the CCW one must pay attention that the created file may only contain LF (0A), but normally no CR (0D). HOBCOM, however, always generates 0D0A. Therefore, the printer must be correspondingly set.

Direct Forwarding of the Printer Data from HOBCOM

HOB customers have often expressed the desire to have HOBCOM forward the data directly to ASCII printers, i.e., print transparently. For the following reasons, however, this cannot be done:

- The printer data have to be converted from EBCDIC to ASCII. Some EBCDIC data have, however, no correspondent in the ASCII character set.
- The LU1/LU3 data stream that HOBCOM receives can contain non-printable characters (characters < x40).
These control characters can only be interpreted by 3270 components (SNA printer), and not by ASCII printers, to which HOBCOM usually sends the data.
- The control characters in the SNA area are much more powerful than the ASCII control characters (CR, LF, FF), i.e., many SNA control characters have no correspondents in ASCII printing.

For the reasons listed above, a direct output is only possible to an SNA printer (3270-capable device or program), but not for output over LPD or other TCP/IP data streams..

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