

Chapter 4

DATA TRANSFER AND RETRIEVAL

A. Methods of Data Transfer

This section discusses the principal data transfer methods districts will use to send data files (reporting formats) to NWRDC, and then to retrieve edit reports and error files. Most districts will need to read only one of the five parts of this section (as explained in Section B of Chapter 2). Districts with data residing at two locations (for example, a district that stores its Student data locally while using NWRDC as the repository for its Staff records) will have to read two parts of this section.

TYMNET/RJE Data Transfer

This data transfer and retrieval methodology makes use of a FIRM communication tool called Network Job Entry/Remote Job Entry (NJE/RJE). This facility allows a batch job to enter the network and be routed to the NWRDC. Essentially, RJE transmission districts make a copy of their data, build a batch job around the copy (by inserting job control statements in front of the copy, and behind it), and submit the job to the network. The batch job then executes to create the desired disk file at NWRDC.

The job control language statements (JCL) inserted in front of your data direct the batch job to execute at NWRDC, create a disk file, and copy your data to this file. The actual control statements you use will depend on your local computer. The specific JCL you should attach to your data will be found in Appendix G for these 3 types of sites:

PNET nodes (DOS/VSE with POWER version 2) and RJE emulation sites connected to Lee or to the Northeast Florida Education Consortium (NEFEC), see Appendix G.1;

sites using RJE emulation that are not connected to Lee or NEFEC, see Appendix G.2; and

JES2 nodes (Dade, Orange, etc.), see Appendix G.3.

Each of these three sections of Appendix G also include examples showing how to retrieve files from NWRDC for transmission back to the district. In this case, edit report files are routed back to the district's PRINT queue, while error record files are routed back to the district's PUNCH queue.

Transmission of files to NWRDC using RJE is a six step process. Apply these steps to each file you transmit:

- 1) **Segment large files into multiple transmission units.** Two hours has been found to be an acceptable amount of time to have a transfer active on an RJE initiator as well as an acceptable amount of time to have data retransmitted if some type of failure should occur. Should the transfer time needed to transmit your file exceed two hours, consideration must be given to segmenting the file into smaller files and transferring the smaller files in different jobs. This is vital to prevent the loss of very large quantities of data should the transfer job abnormally terminate.

If your Student Demographic file is larger than 50,000 records, segment the file into transmission units of no more than 50,000 records. If your Student Course file is larger than 50,000 records, segment the file into transmission units of no more than 50,000 records. If your Staff Benefits file is larger than 75,000 records, segment the file into transmission units of no more than 75,000 records. No other file for any district should be large enough to require a transmission time greater than two hours.

- 2) **Preprocess formats that are larger than 80 bytes into 80 byte records.** Batch jobs can be transmitted through the network only as 80 byte records, but eight of the files are 160 characters long. Before these data can be transmitted, the record should be run through a utility (FIRNU001) that will transform it into multiple 80 byte records. It is the output of FIRNU001, that you will actually transmit as your data. Another utility program, FIRNU002, will then be used to reformat the file to its original length and blocking once it arrives at NWRDC. This reconstruction has been automated, provided you use the RJE160RL procedure discussed below. FIRNU002 is used also at the district to reassemble the error files when they are retrieved from NWRDC. Appendix K explains the use of FIRNU001 and FIRNU002.

The source code for FIRNU001 and FIRNU002 is stored on dataset DPS.DISTRICT.SOURCE.Yyyy at NWRDC. (yyy = current fiscal year). It may be obtained in the same way as the edit programs in Section C of Chapter 3. To send your formats that are larger than 80 bytes, you must first compile and execute FIRNU001 against your data, saving the output file produced. After making sure that this job is completed normally, you would then proceed to step c of this procedure, to actually transmit the preprocessed file. Separating step b from step c avoids tying up an initiator any longer than necessary (preprocessing should be completed prior to your scheduled data transmission time slot). If you had to segment your Student Demographic file in step a, you will need to preprocess each segment separately.

- 3) Using the JCL and JES2 example in Appendix G that is appropriate for your district, **submit one of the following procedures for execution at NWRDC:**

RJE160RL - for the reporting formats larger than 80 bytes,
or
RJEXMIT - for any of the other reporting formats.

Remember that files may only be transmitted one at a time. You will need to execute one of the above procedures for each file you intend to transmit. If the file was segmented into multiple transmission units in step a, submit one execution of RJE160RL, or RJEXMIT for each transmission unit. A special naming convention is used in transmitting segmented files, as explained in Appendix G.

- 4) **Verify that the transmission was successful.** You can do this by checking the print output that will be routed back to you. Successful file transfer is indicated by zero condition codes and a statement in system messages that the dataset has been catalogued. An example of the print output is provided in Appendix G.4.
- 5) If your file was segmented into multiple transmission units in step a, **run a procedure at NWRDC to merge the transmission units** (after they are resident at NWRDC) back into a single file. Appendix G.6 explains how this is done.
- 6) After a file has been transmitted successfully, or after all transmission units of a file have been transmitted successfully and the merging of these units has been successful, **execute a procedure at NWRDC named XMITFINI.** This creates the indicator file used to notify the System and the DPS/MIS that a given file has been transmitted completely and is ready for edit processing. Appendix J explains how to execute XMITFINI.

The above 6 step procedure is used to transmit both original data files and batch update correction files to NWRDC. To retrieve edit reports and error files from NWRDC, this procedure is followed in reverse (once for each file and report to be retrieved), as follows:

- 1) **Retrieve error record files.** Using the JCL and JES2 example in Appendix G that is appropriate for your district, execute one of the following procedures at NWRDC:

NWRJRJE80 - for retrieving error record files larger than 80 bytes,
or

NWRRJE - for retrieving all other error record files and all edit report files.

Upon the successful execution of these procedures, your edit reports will be available for printing in your local computer's PRINT queue.

- 2) **Transfer error record files.** The above procedures will transmit your error record files to your local computer's PUNCH queue. You will then have to transfer these files from your PUNCH queue to disk, if you intend to use them for additional processing (i.e., correcting your errors for retransmission to NWRDC as batch updates).
- 3) **Reassemble error files into original record length.** If you intend to use the larger than 80 byte error files in additional processing, you will also need to use FIRNU002 to reassemble them into their original record lengths. See Appendix K for instructions on the use of FIRNU002. Remember that FIRNU002 can be obtained from dataset DPS.DISTRICT.SOURCE.Yyyy at NWRDC. (yyy = current fiscal year).

Common RJE Errors and Resolution

The following are typical errors encountered when executing a transmission using RJE and guidelines to resolve them.

- 1) "No ports available."
 - a. Wait a few minutes.
 - b. Resubmit the job.
 - c. If still unavailable, notify NWRDC.
- 2) Unable to initiate session with NWR JES2 or failed logon.
 - a. Make sure that both sites are active.
 - b. Verify that the line(s) are active.
 - c. Try again.

FTP Data Transfer (See Appendix V for Netview FTP Data Transfer)

IBM's System Network Architecture (SNA) is a set of software and hardware products which are integrated in such a way as to provide a variety of capabilities previously unavailable in an IBM environment. Among these is the ability of two computer programs executing at different sites to be in direct communication with one another. The two programs are said to be "in session" with one another in much the same manner as an SNA 3270 terminal is "in session" with a computer program such as CICS.

This capability allows the two programs to exchange data without requiring an intermediate program such as JES2 (although the programs may still interface with JES2 in order to utilize JES2's spooling function). Currently there are three SNA data transfer utilities:

IBM's Netview File Transfer Program;

IBM's TSO/E, an interactive program which can transmit files to other TSO/E sites (discussed in part 3 of this section); and

IBM's MVS/Bulk Data Transfer Utility.

At this time, the MVS/Bulk Data Transfer Utility has not been installed at NWRDC, so this manual will not discuss it. DOS/VSE sites will use FTP, since TSO/E cannot be installed at such sites.

1) Use of Netview File Transfer Program

Netview File Transfer Program, is a general purpose VTAM application that can be used to transmit fixed or variable length files between any two SNA connected IBM MVS and/or non-MVS sites.

It can be used to transmit many types of files, including:

- a) VSAM ESDS (VSE,MVS),
- b) VSAM KSDS (VSE,MVS) with insert, replace, or delete options,
- c) SAM tape files (VSE), and
- d) QSAM files (MVS).

Other dataset types can be transformed into one of the above arrangements of data, and then transmitted using FTP. Further, FTP supplies a dataset-handler- user-exit which provides support for file organizations not directly supported by FTP. FTP provides flexibility among the dataset types by allowing for dynamic allocation at both the sending and receiving locations. The blocksize of the dataset received may be different from that of the dataset sent. Likewise, data may be transmitted from or to different types of storage.

Netview FTP is designed to give high performance. It incorporates a recovery feature which negates the need to retransmit an entire file should the communication link fail.

For ease of operation and maintenance, naming conventions have been established for the definition of the sending and receiving logical unit names in the VTAM cross domain application tables. In order to send or receive multiple

datasets at the same time, more than one copy of FTP can be run at a location. To this end, dedicated logical units have been established at NWRDC.

Note in Appendix V that the district SENDING logical unit (SLU) name is placed opposite the name of its RECEIVING logical unit (RLU) at NWRDC and vice versa.

Appendix V details the JCL needed to transmit data from a district site and have it received and catalogued at NWRDC.

2) Recovery/Restart

A user-requested restart can be initiated only if the user specifies the RESTART=YES option at the sending site. A checkpoint/restart record would have been written during a previous transmission.

3) Common FTP Errors and Resolution

The following are some errors frequently encountered when executing FTP and some guidelines to follow to resolve them.

- a) "VTAM open error for logical unit: ACB error code = 5A."

Make certain that the logical unit name has been typed accurately and agrees with the cross domain table entries.

- b) "Logical error for VSAM Put: Reg. 15 return code = 08, Function code in RPL = 00, Feedback Field in RPL = 1C, File name = DVGCR, error message is DVG045I."

1. List the contents of the C/R data set, to make sure there are no checkpoint/restart records belonging to data sets for which transmission needs to be started again.

2. Delete checkpoint/restart data set and re-create.

4) FTP Transmission

Transmission of data files (reporting formats) to NWRDC using FTP is a three step process. Each step must be performed for each file transferred:

- a) **Execute FTP** using JCL and JES2 statements similar to those in Appendix V.
- b) **Verify that the transmission was successful.** You can do this by checking the print output that will be routed back to you. Successful file transfer is indicated by zero condition codes and a statement in system messages that the dataset has been catalogued. FTP will print a report enumerating the number of records successfully transmitted.
- c) After a file has been successfully transmitted, **execute a procedure at NWRDC named XMITFINI.** This creates the indicator file used to notify the System and the DPS that a given file has been completely transmitted and is ready for edit processing. Appendix J explains how to execute XMITFINI.

The above procedure is used to transmit both original data files and batch update correction files to NWRDC. To retrieve edit reports and error files from NWRDC, this procedure is played back in reverse (once for each file and report to be retrieved), as follows:

Using the JCL and JES2 example in Appendix V-9 that reverses the process, so that the local site is the receiving site and NWRDC is the sending site, submit one execution for each file you wish to retrieve. The reversing process requires changing the following control parameters:

- a) change XMODE (both sites),
- b) reverse the SLU and RLU,
- c) update the SFTYPE and RFTYPE and
- d) change the SFNAME and RFNAME at both sites.

If you are retrieving edit report files, it may be easier to use a procedure at NWRDC named NWRRJE instead of FTP. Upon the successful execution of this procedure, your edit reports will be available for printing in your local computer's PRINT queue. Detailed instructions on the use of NWRRJE may be found in Appendix G.

Use of TSO/E Interactive Data Transmission Facility

The TRANSMIT/RECEIVE commands in TSO allow data to be transmitted during an interactive session and received on another system through an interactive session.

The TRANSMIT command will transmit sequential or partitioned datasets, (residing on direct access storage,) of F, FB, FBS, V, VB, VBS or U format. It

does not support datasets with keys, i.e., ISAM or VSAM. Transmission of a PDS as a sequential dataset can be forced by using the SEQUENTIAL operand. This method however, does not preserve the directory information. If directory information is to be maintained, unload the PDS with IEBCOPY, transmit the dataset, and have the receiver reload with IEBCOPY.

The RECEIVE command is used to retrieve transmitted files and restore them to their original format. Generally, RECEIVE cannot reformat datasets. The record format of the file received must be the same as that transmitted. The record length must be equal to that transmitted for fixed length records and greater than or equal to that transmitted for variable length records. The blocksize may be any valid blocksize. You can choose to accept the default dataset name and space parameters or to override any of the above.

Transmission of data files (reporting formats) to NWRDC using TSO/E is a three step process. Each step must be performed for each file transferred:

- 1) **Execute TSO/E Commands** using statements similar to those in Appendix I.
- 2) **Verify that the transmission was successful as** described in Appendix I.
- 3) After a file has been successfully transmitted, **execute a procedure at NWRDC named XMITFINI**. This creates the indicator file used to notify the System and the DPS that a given file has been completely transmitted and is ready for edit processing. Appendix J explains how to execute XMITFINI.

The above procedure is used to transmit both original data files and batch update correction files to NWRDC. To retrieve edit reports and error files from NWRDC, this procedure is played back in reverse (once for each file and report to be retrieved), by using the same commands but by being signed on to NWRDC for transmission instead of your local computer.

NWRDC Resident Files

For those districts whose data reside at NWRDC, preparing data for the State edit programs requires a two-step process. Each step must be performed for each file transferred:

- 1) **Prepare your district's data.** Copy your data to a dataset with the appropriate characteristics. Use the reporting format information in Appendix S. Use the following:

```
DSN=DPSTT.GG.FFFFFFF.YNNNNS,  
DISP=(NEW,CATLG,DELETE),  
DCB=(FORMAT=FB,LRECL=1recl,BLKSIZE=blksize),  
UNIT=SYSDA,VOL=SER=DPSR85,  
SPACE=(TRK,(X,5),RLSE)
```

where TT is your district number prefixed by "DPS"
GG is = GQ for Student or is = GU for Staff or is = EU for Finance reporting formats,
FFFFFF,lrecl,blksize are defined in Appendix S
YNNNN is the Fiscal or School Year prefixed by "Y", and
S is the number of the Survey Period being submitted.
In SPACE = '(TRK,(X,5),RLSE)', X is the number of records submitted divided by the number of records per track (see Appendix S). Round up the final result to the next whole number.

- 2) After a file has been transmitted successfully, **execute a procedure at NWRDC named XMITFINI.** This creates the indicator file used to notify the System and the DPS that a given file has been completely transmitted and is ready for edit processing. Appendix J explains how to execute XMITFINI.

The above procedure is used to prepare both original data files and batch update correction files for NWRDC. Edit reports and error files from NWRDC may be accessed directly or may be renamed according to local standards.

B. Data Transfer Test for each District

This section discusses the actions to be taken by districts in order to test their network connection prior to the data submission date. It is important that every district submitting data participate in this test. Two weeks prior to the beginning of Survey Week, each district should do the following:

- 1) Prepare a test file having a record length of 160 characters and containing 100 records. RJE districts should remember that the file must be preprocessed using FIRNU001.

- 2) Transmit the data following the instructions in Chapter 4 to transmit Student Demographic data that are pertinent to your district.
*** Omit the step in which XMITFINI is executed. ***
- 3) Once the file has been transmitted successfully, contact the DPS/MIS Systems and Programming Contact Person to verify that it is catalogued at NWRDC and complete.
- 4) Retrieve the file you transmitted using the instructions in Chapter 4 for retrieving Student Demographic error files. RJE districts will need to reconstruct the 80 character images into 160 character format.
- 5) Verify that the file you received is identical to the file you originally transmitted.