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COMMUNICATION NETWORK MANAGEMENT
REMOTE MAINTENANCE
AND DISTRIBUTION

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COMMUNICATION NETWORK MANAGEMENT
Remote Maintenance and Distribution

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LIST OF ILLUSTRATIONS

CHAPTER 1. INTRODUCTION.

There has been a rapid growth in the number of interconnected, and often remotely distributed computing sites. This growth has not been accompanied by a corresponding growth in the necessary skills required to maintain and control such interconnected system networks.

Control over both the levels of software installed and the implementation standards used at each site has become difficult. In many cases this is further complicated by the use of different operating systems within the same network.

A centrally located software maintenance team is often the best and sometimes the only way to provide the skills and controls to address the problems generated by the installation of such networks.

The use of a central site team is recommended and this guide demonstrates the use of appropriate maintenance tools to meet the team's requirements. These requirements include typical data processing maintenance such as updating of network definitions, job streams and application program maintenance. In addition, traces and dumps need to be transferred to the central site for problem determination.

NON-NETWORK RELATED DATA

Many of the techniques for data transfer described in this guide are equally applicable to non-networking related activities. These include:

- operating system maintenance,
- distribution of user programs,
- maintenance of operating procedures,
- transfer of data sets including VSAM, and
- remote problem determination.

SUMMARY OF DOCUMENT CONTENTS

The document is structured into the following chapters:

- "Chapter 2. Approaches to Remote Maintenance" on page 3 provides an overview of the alternative maintenance methods available.
- "Chapter 3. Central Site Network Maintenance" on page 9 sets out the philosophy of central maintenance.
- "Chapter 4. Maintenance Tools" on page 13 lists the products required for maintenance together with short description of each product.
- "Chapter 5. MVS Host to MVS Sub-Host" on page 17 describes in detail the products recommended for use in the MVS-MVS environment.
- "Chapter 6. MVS Host to VSE Sub-Host" on page 25 describes in detail the products recommended for use in the MVS-VSE environment.
- "Chapter 7. VSE Host to VSE Sub-Host" on page 39 describes in detail the products recommended for use in the VSE-VSE environment.
- The appendices contain the definition tables and other coding used by the examples contained in the body of the document.

SOFTWARE ENVIRONMENT

The precise levels of software in use during this project varied continuously, since a Systems Centre is by its nature an experimental environment.

In order to give an indication of the products in use, the major products and their releases are as follows:

- MVS/SP-JES2 Version 1 Release 3 (containing NJE),
- TSO/System Extensions,
- VSE Version 1 Release 3,
- POWER Version 2 (except JEP which used POWER Version 1),
- ACF/VTAM Version 2 Release 1 (except JEP which used Version 1 Release 3 with MSNF),
- ACF/NCP Version 2 Release 1.

Other products used include NCCF, OCCF, CDNDT, FTP, and JEP.

NOTE ON THE SAMPLE MATERIAL

The project work for this book was performed at the Raleigh International Systems Centre (RISC), an IBM World Trade Systems Centre.

The examples such as JCL listings used in this guide are specific to the levels of software and network configuration in use at RISC at the time of writing. Material should not be used without first checking against both installation standards and the appropriate product manuals.

CHAPTER 2. APPROACHES TO REMOTE MAINTENANCE

The approaches described here although oriented to physically remote sites, are often equally applicable to interconnected systems within the same physical location.

ORGANISATION

There are a number of reasons why an organisation should adopt a central site approach to system and network maintenance, amongst these being:

- the high cost of obtaining and distributing expensive and often scarce skills to remote sites,
- the need for good change control,
- the need for consistent standards across the network, and maybe different operating systems.

The case for central site maintenance teams will strengthen as networks grow in size and complexity.

CONTROL OF REMOTE SITES

There are basically two ways to implement central site control to maintain remote sites. These are Direct and Central Site maintenance.

This guide recommends the Central Site method as the standard approach to maintenance for reasons which follow.

Direct Maintenance

In this approach the central site team maintains the remote (sub-host) site by logging onto that system's maintenance tool directly (Figure 1 on page 4).

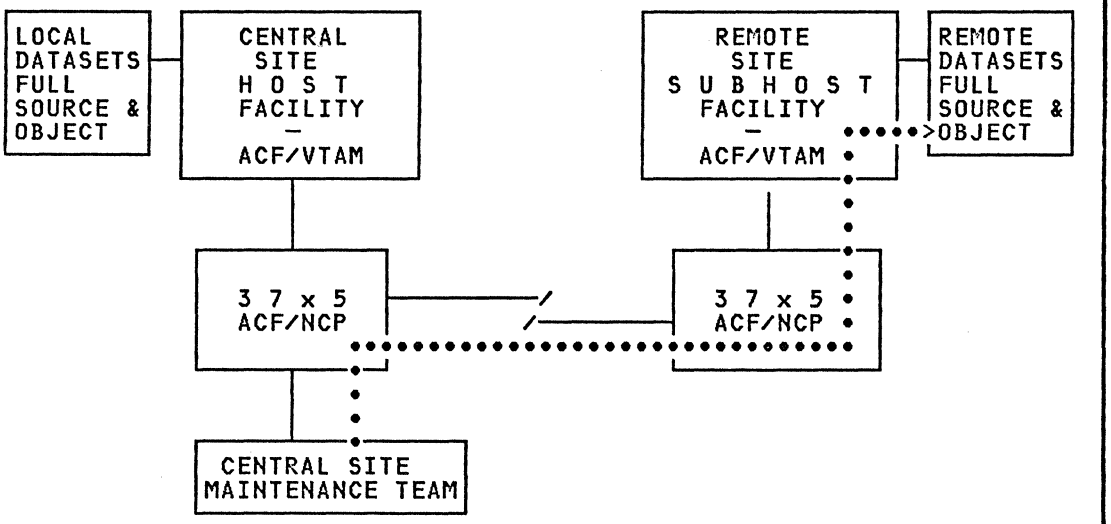

Figure 1. Direct maintenance of sub-host data: Central site team logged directly on to sub-host maintenance tool to update remote datasets.

- Advantages:
  - change will be made immediately.
- Disadvantages:
  - full source needs to be duplicated at the sub-host,
  - maintenance function has to be repeated in full for each sub-host,
  - separately maintained copies of system data will certainly lead to incompatibilities between what should be duplicate data,
  - more difficult to enforce change management,
  - sub-host performance may be degraded by full maintenance procedures,
  - testing may not be able to be done before updating because of a lack of either resources or modification of the link being used for maintenance,
  - extensive work may need to be done at the remote site both during initial installation and to correct errors made as a result of the use of untested code.

Central Site Maintenance.

In this case the central site team maintains the necessary data at the central site (host) and distributes it to the sub-host (Figure 2 on page 5).

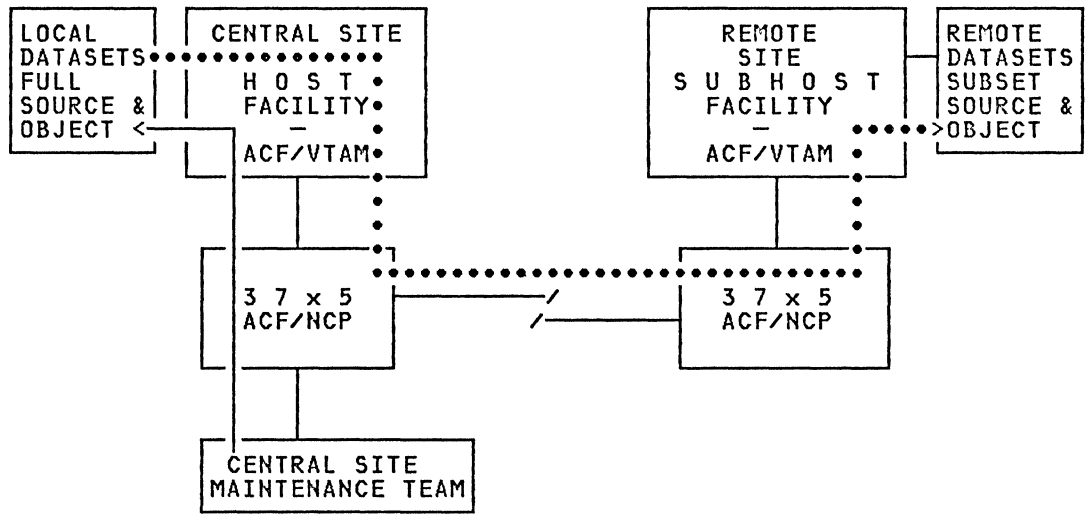

Figure 2. Maintenance of sub-host data on host machine: Central site maintenance team log on to host maintenance tool and update the master copy of the sub-host data. The updated and tested data is then sent to the sub-host by a file transfer program.

- Advantages:
  - easy change management through the use of a single master copy of the data to be distributed,
  - changed data can be tested in a non-critical environment at the host,
  - testing resources typically exist at the host site,
  - backout and recovery procedures can be more easily tested,
  - the amount of data distributed is kept to a minimum,
  - the use of pre-assembled and pre-linked code reduces the maintenance load at the sub-host,
  - the central maintenance procedures may be adapted to produce a comparatively small initial installation package for distribution on tape.
- Disadvantages:
  - need duplicate datasets at host,
  - automatic procedures may be more complicated to cater for variations in data needs between sub-hosts maintained from common datasets.

MAINTENANCE RECOMMENDATIONS.

It is recommended that Central Site maintenance is adopted as the standard approach to the maintenance of distributed sub-hosts. Exceptions to this rule should be kept to a minimum, deviating only where adherence is physically impossible.

It is also recommended that testing facilities be provided at the host to validate changes in data prior to distribution. This testing can often be performed in a VM (Virtual Machine) environment where sufficient real

facilities do not exist or are not readily available. High performance during testing is usually not a consideration.

NETWORKING TOOLS SUMMARY

There are a number of tools available for the distribution of data to remote sites, and these are described in more detail in "Chapter 4. Maintenance Tools" on page 13.

The selection of a particular tool obviously depends on the state of the network and the nature of the data being distributed. Figure 3 on page 7 summarises some of the possible combinations. Guidance to product selection under various conditions is given in following chapters under the different combinations of host and sub-host operating systems.

Product Combinations	MVS Host	MVS Sub-Host	MVS Host	VSE Sub-Host	VSE Host	VSE Sub-Host
TSO/E TSO Extensions	Yes (1)	Yes (1)				
CDNDT Cross Domain Network Data Transfer	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)
NJE MVS/SP JES2 Network Job Entry	Yes	Yes				
FTP File Transfer Program	Yes (1)	Yes (1)	Yes (1)	Yes (3)	Yes (3)	Yes (3)
POWER VSE POWER Version 2				Yes	Yes	Yes
JEP Job Entry Program				Yes (4)	Yes (4)	Yes (4)

Notes: (1) requires NJE
(2) requires VTAM
(3) requires POWER Version 2 or JEP/POWER Version 1
(4) requires POWER Version 1

Figure 3. Table of Products versus Environments: The combinations shown are possibilities but may not be practical under all circumstances.

Type of Data	Environment	Recommended	Product Alternative
Load Module	MVS-MVS MVS-VSE VSE-VSE	TSO/E CDNDT CDNDT	CDNDT FTP/PNET (1) FTP/PNET (1)
Source/ Object	MVS-MVS MVS-VSE VSE-VSE	TSO/E FTP/PNET (1) FTP/PNET (1)	FTP CDNDT CDNDT
Dump/Trace	MVS-MVS MVS-VSE VSE-VSE	TSO/E (2) CDNDT (3) CDNDT (3)	CDNDT FTP/PNET FTP/PNET
VSAM	All	Repro - then as for Load Modules	

Notes: (1) JEP is an older alternative to PNET
(2) if the dump is small and easy to reproduce, use NJE directly
(3) if the dump is small and easy to reproduce, use PNET directly

Figure 4. Types of data versus Environments and products: The first product is that recommended by RISC.

CHAPTER 3. CENTRAL SITE NETWORK MAINTENANCE

This chapter sets out what needs to be done to maintain a network from a central host site. The tools for performing these functions are described in "Chapter 4. Maintenance Tools" on page 13, and their implementation in specific environments in subsequent chapters. These environments are MVS/SP and DOS/VSE in varying combinations.

The network environment is assumed to be based solely on IBM's Systems Network Architecture (SNA). The general network layout showing the sub-areas and operating systems used is shown in Figure 5.

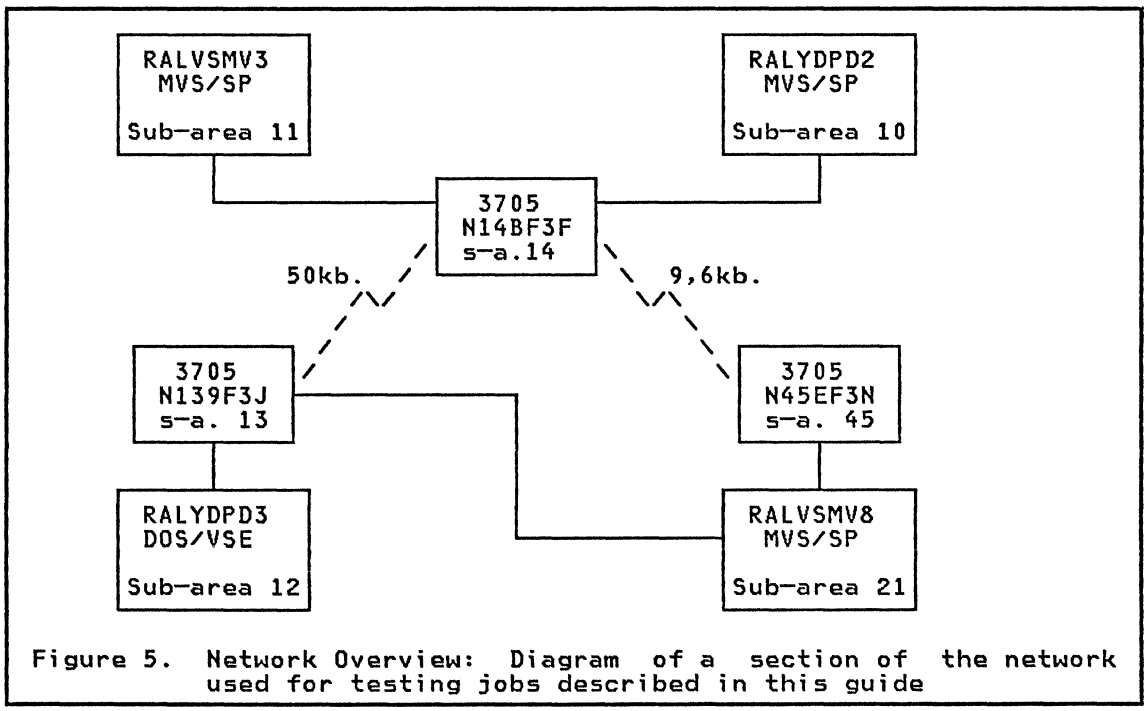

Figure 5. Network Overview: Diagram of a section of the network used for testing jobs described in this guide

STANDARDS

The concept of centrally based maintenance teams implies rigid change control. For this to be effective, a set of naming conventions is needed to cover the products required at the hosts and sub-hosts, and must cover the different operating systems in use.

As with all standards, the earlier a set of even draft standards can be adopted, the easier control becomes as the network expands. An example of some networking standards in use at RISC are included in "Appendix A. Network Naming Conventions" on page 47.

NETWORK DISTRIBUTED DATA

As previously mentioned, most of the techniques described in this guide are generally applicable. However, the main purpose of this book is to show how a network can be centrally maintained, and so the discussions and examples are confined to networking.

The sorts of data to be maintained at the host and then distributed to the sub-host are as follow:

- VTAM lists:

  - start-up lists,
  - configurations,
  - application program nodes,
  - cross-domain resources.
- USS tables,
- Log mode Tables,
- NCP:
  - load module,
  - source,
  - RRT.
- NCCF definitions,
- VTAM/NCCF/etc., start-up JCL,
- JEP or POWER version 2 macro's (DOS/VSE only),
- Output listings:
  - LOGS,
  - traces,
  - dumps.

DATA STRUCTURE

It is recommended that the data required at the remote sites first be tested at the central site. After testing this data should be placed in a set of carefully controlled data sets. The contents of these data sets reflect the current production state of the network, except while the network is physically being updated.

Members are extracted from the central data sets and transmitted to the sub-hosts as required. Often it is easier to replace the whole data set rather than individual members, thus ensuring the currency of distributed network data.

An example of the structure of data sets and program libraries used during the preparation of this guide follows.

Central Site Datasets.

The central site library consists of four data sets.

The first two qualifiers of these dataset names are the same, these being 'FLETCH.RCNM'. The first qualifier 'FLETCH' indicates the maintenance team, and the second 'RCNM' indicates that they contain the data for remote communications network management products.

The third qualifier characterises the contents of the data set as follows:

- 'VTAMLST' contains the macros required by VTAM.
- 'SOURCE' contains JCL and source code.
- 'OBJECT' contains unlinked object such as the NCP stage 2 output.
- 'LINKLIB' contains linked object such as the NCP load modules.

These conventions are used for both MVS and VSE systems. In the latter case, 'VTAMLST' and 'SOURCE' are user source libraries, 'OBJECT' is a user relocatable library, and 'LINKLIB' is a user core image library.

Remote Datasets

The conventions used for the distributed datasets exactly parallel those used for the centrally held datasets, except for the second qualifier.

The second qualifier is changed from 'RCNM' to 'SAnn', where 'nn' is the VTAM sub-area node number.

CHAPTER 4. MAINTENANCE TOOLS

The recommended approach to the maintenance of sub-hosts is the use of Central Site maintenance wherever possible. In this approach definitions are updated at the host and distributed to the sub-host. For example, the sub-host VTAMLST and NCCF definition are updated at the host site, then copied and distributed to the sub-host by batch file/job transfer programs.

Various network management products are available for remote maintenance. These products provide the ability to transfer data sets around the network to meet the requirements for remote maintenance. This includes the need to move data sets from sub-host to host such as transaction or other application data, and diagnostic and maintenance data sets such as ACF/VTAM traces.

Different combinations of products are used in this guide to meet the requirements of the different operating environments. Not all the products are required for every environment. The products used in this guide to move data around the network are:

NETWORK JOB ENTRY (NJE) PROGRAM PRODUCT.

Program Product. Available both as a separate product and as an integral part of MVS/SP Program Product, 5740-XYS MVS/SP JES2 version 1 release 2 and later.
NJE: Program Number (as a separate Program Product) 5798-DAE
NJE: General Information, GC23-0010
NJE: Program Description/Operations Manual, SC23-0003

The JES2 Network Job Entry Facility (NJE) allows selected data sets to be transmitted from one MVS system to another. Data sets that can be transmitted include jobs, SYSIN and SYSOUT data sets, operator commands, and messages.

POWER Version 2 Networking (PNET) is an exact VSE functional equivalent.

CROSS DOMAIN NETWORK DATA TRANSFER (CDNDT)

Field Developed Program. Program Number 5798-DAE
CDNDT: Availability Notice, GB21-2498
CDNDT: Program Description/Operations Manual, SB21-2499

Cross Domain Network Data Transfer FDP (CDNDT) is a simple VTAM application program allowing data transfer across the network. CDNDT uses SNA cross domain APPL to APPL communication to perform its file transfer functions. The program is used to transmit problem determination data such as abend dumps, traces, error logs, etc. from one SNA node to another in the network, as well as the data needed to operate the network.

CDNDT comes in both VSE and MVS versions and these transmit compatible datasets, making the product particularly useful in mixed interconnected systems environments.

In an MVS environment, CDNDT may transfer less than a third the amount of data that NJE transfers when communicating large volumes of printed output, such as dumps and traces. This is because NJE transfers data in listing format ready to be printed, while CDNDT transfers raw data prior to output formatting.

CDNDT does have some limitations, for example it is only able to send or receive one sequential dataset or member of a partitioned dataset at a time. If there are ten members to be transferred, the CDNDT job (which consists of a send-CDNDT job at the host and a receive-CDNDT job at the sub-host), must be scheduled ten times.

Under MVS datasets may be concatenated at run time, but the data still arrives at its destination as a single dataset. In an MVS to VSE environment this concatenation of data sets is useful for wrapping VSE job control around data. If however, the requirement is for the transmitted data to be split into the original members, then further user processing is required.

Under VSE only disk or tape data sets can be created or transmitted. This requires that print datasets must first be stored as a disk or tape file. JCL changes are normally required and maybe even changes to programs.

Caution - Pacing Value

Usually dumps and traces generate large volumes of data to be transmitted through cross domain links. Neither CDNDT nor NJE programs are concerned with the capacity of the network. Therefore if you do not specify appropriate 'PACING' values for an NJE or CDNDT application, NCP will soon enter slowdown causing other transaction response times to be increased. So a PACING value must be specified for both sides of NJE and CDNDT application definitions. VPACING is specified on the APPLID statement. PSNDPAC and SSNDPAC are pacing counts that can be added to the mode table used for the session.

POWER VERSION 2

Program Product Available as a standard, integral part of the VSE POWER Product.
POWER: Program Number 5666-273
POWER: Networking User's Guide, SC33-6140

POWER Networking (PNET) is a standard non-optional feature of POWER Version 2. It allows selected data sets to be transmitted from one computer system to another, including MVS. Data sets that can be transmitted include jobs, SYSIN and SYSOUT data sets, operator commands, and messages.

PNET is fully compatible with NJE, making MVS/VSE dialog very much easier. PNET transfers both input and output datasets between systems on the same basis as NJE. For example, a punch file received by PNET is placed on the receiving system's punch queue and not the reader queue, as is the case with JEP.

JOB ENTRY PROGRAM/FILE TRANSFER (JEP/FTP)

Program Products. Program Numbers 5746-XE6 (JEP), 5748-XE8 (FTP)
JEP/FTP: Program Reference and Operations Manual, SH12-5331

The Job Entry Program and File Transfer Program (JEP/FTP) are Program products designed to transfer jobs and files between interconnected systems.

JEP

JEP is an addition to VSE/POWER, and provides job transmission and receipt to and from an SNA network. It communicates with both VSE/POWER Remote Job Entry, or with Job Entry Subsystem/Network Job Entry. It is functionally replaced by POWER version 2.

FTP

FTP is a batch program that is run on either VSE or MVS. Its function is to change data sets into 80 byte records to allow transmission by NJE, JEP, or POWER version 2.

FTP is designed for job/file transmission between VSE and MVS, however FTP can also be used between two MVS systems.

FTP has basically four functions which are 'JOB IN', 'JOB OUT', 'FILE IN' and 'FILE OUT'. All four functions are used to transfer files or jobs between MVS and VSE. In the case between two MVS systems, only the 'JOB IN' function of FTP is used.

The FTP function of 'JOB IN' is the most useful. Input is read from a sequential file and transferred to a punch file without processing. This punch file is designed to be directed to a remote VSE JEP program as shown in Figure 29 on page 37and Figure 30 on page 37. It can also be directed to a JES2 internal reader making it useful for MVS and VSE POWER version 2 sub-hosts.

From an MVS host to an MVS sub-host, the input data which consists of SYSIN data, the partitioned data set members concatenated with a IEBUPDTE utility job to update members of VTAMLST or NCCF definition as shown in Figure 11 on page 21. By inserting an NJE '/*ROUTE' control statement in the job control language, the IEBUPDTE job is routed to the sub-host and updates the sub-host network definition. The results of IEBUPDTE execution are routed back to the host system.

For a VSE POWER version 2 sub-host from a MVS host, the VSE 'MAINT' program is used instead of the IEBUPDTE, and the 'XMIT' control statement replaces the '/* ROUTE XEQ' statement. Figure 26 on page 34 shows an example.

The file transfer capabilities are only of use in VSE and are better performed by CDNDT. For examples see CNM/Managing Interconnected Systems as listed in "Chapter 8. Bibliography" on page 43.

OPERATOR COMMUNICATIONS CONTROL FACILITY (OCCF)

VSE

Program Product. Program Number 5746-XC5
OCCF: Availability Notice, GB
OCCF: Program Description/Operations Manual, SB

MVS

Program Product. Program Number 5665-288
OCCF: Availability Notice, GC24-5227
OCCF: General Information, GC24-5225
OCCF: Installation and Operation Manual, SC24-5226

The Operator Communications Control Facility (OCCF) provides the capability to operate either a VSE or MVS system through the network. As well as the ability to enter system commands, system messages are routed back to the OCCF operator in the normal manner for a console.

TSO

TSO has the ability to submit jobs to the system and to get notification of job completion from the system. This function is useful in submitting jobs to remote MVS sub-hosts. When the job is submitted from TSO to the remote sub-host, the TSO user is notified:

- when the job leaves the host system.
- when the job execution ends at the sub-host.
- when the SYSOUT data set arrives at the host system.

TSO EXTENSIONS (TSO/E)

Program Product. Program Number 5665-285
TSO/E: Availability Notice, GC28-1123
TSO/E: General Information, GC28-1061
TSO/E: IDTF User's Guide, SC28-1104

The TSO/E Interactive Data Transmission Facility (IDTF) allows the transmission and subsequent receipt of datasets and messages from one TSO user to another. These users may be on the same or separate systems connected via the network.

The dataset is unloaded by the 'TRANSMIT' command and restored to it's original format when received by the 'RECEIVE' command. A selection of members or the whole dataset may be transmitted.

ISAM, VSAM, user labelled or keyed datasets are not handled directly.

SPOOL DISPLAY AND SEARCH FACILITY (SDSF)

Field Developed Program. Program Number 5798-DGN
SDSF: Availability Notice, GB21-2865
SDSF: Program Description/Operations Manual, SB21-2866

The Spool Display and Search Facility (SDSF) is a system management aid which allows the user to analyse and control (on an authorised basis) an MVS/JES2 based system.

Amongst its capabilities, it enables a user to interactively browse the MVS system log and JES2 spool queues, including those currently active. Selective printouts of the material being browsed is possible.

SDSF is either executed directly under TSO or via ISPF menus.

The environment used as an example consists of two MVS/SP systems interconnected through the MSNF feature of ACF/VTAM. This general environment is illustrated in Figure 6.

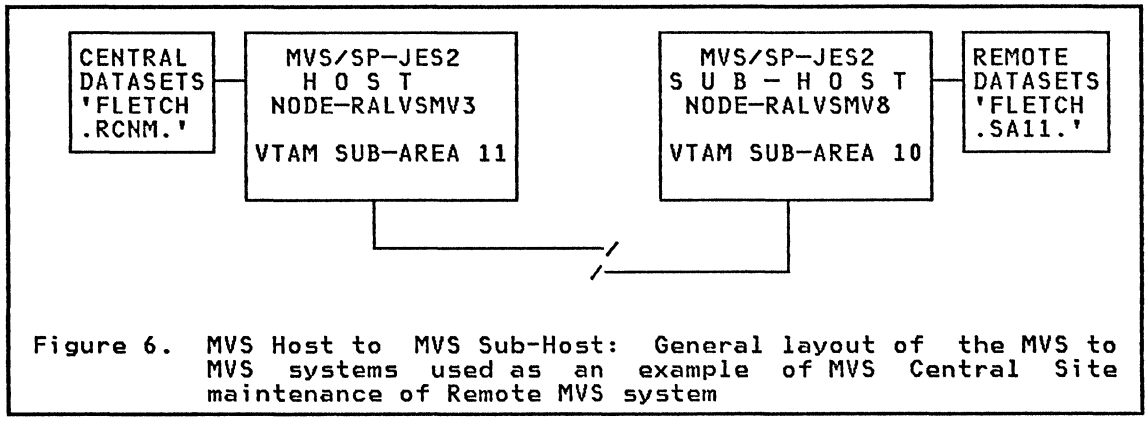

Figure 6. MVS Host to MVS Sub-Host: General layout of the MVS to MVS systems used as an example of MVS Central Site maintenance of Remote MVS system

Various combinations of file transfer products are use to show how the sub-host is maintained.

The approach taken is that of Central Site maintenance as described earlier ("Central Site Maintenance." on page 4).

Central maintenance of a remote MVS sub-host by an MVS host is not technically difficult, the most important aspect being the adoption of this principle of maintenance.

MAINTENANCE PRODUCT SELECTION

This section comments on some of the products in use in the MVS-MVS remote maintenance environment. Refer to "Chapter 4. Maintenance Tools" on page 13 for the product summaries.

Data Transfer

By far the most convenient and easy to use product is the IDTF facility of TSO/Extensions. It also appears to be a reasonably quick and efficient method of data transfer.

Data is directly transmitted and received by the appropriate TSO maintenance user ID. The data transmitted is either a complete sequential or partitioned dataset, or selected members of a PDS.

The only point to remember is that it is not possible to selectively receive members sent together in the same transmission.

Other products used were FTP in conjunction with NJE, and CDNDT. Both these options worked well.

CDNDT is better for large volumes of data since it is more efficient with its larger blocksizes and checkpointing at the record level.

FTP/NJE is more convenient for a number of small jobs since it uses the spooling system and requires no special transmission jobs to be scheduled. The 'JOBIN' function of FTP is used to create a concatenated job stream and then NJE routes this job to the sub-host for execution.

NJE is used by itself when data manipulation during job creation is minimal.

Interactive Subsystems

TSO is used as both the host and sub-host maintenance tool.

Network operation and control is performed by NCCF, and OCCF is used where direct system intervention is required, such as to retry CDNDT transmissions.

SDSF is a convenient tool to view job output and is included in the TSO systems in use in RISC.

NCP LOAD MODULES

It is recommended that each operating system is able to load at least its adjacent 3705/3725 devices. This requires that the relevant NCPs be distributed to each remote site in both source and load format.

Either CDNDT or TSO/Extensions are suitable for these purposes, the use of the latter method is shown in the example which follows.

TSO/Extensions for NCP data

Operation is very simple:

1. Log on to the Central Site maintenance TSO user ID.
2. Issue the 'TRANSMIT' (or 'XMIT') command followed by the dataset and the members being transmitted, Figure 7. In this case an NCP source module is being sent together with another member.
3. Log off the sending ID on the host and Log on to the TSO at the sub-host.
4. Issue the 'RECEIVE' command and then the restore parameters when prompted (Figure 8 on page 19).

```
READY
xmit ralvsmv8.liberty dataset(rcnm.source) members(n45ef3n jobldtxt)
14.26.11 TSU  210 $HASP546 FLETCH   SYSTEM OUTPUT RECEIVED AT RALVSMV8 CN(00)
                                        IEBCOPY MESSAGES AND CONTROL STATEMENTS
                              PAGE 0001
                    COPY OUTDD=SYS00020,INDD=((SYS00014,R))
                    SELECT MEMBER=(N45EF3N,JOBLDTXT)
 IEB167I  FOLLOWING MEMBER(S) UNLOADED FROM INPUT DATA SET REFERENCED BY SYS0001
4 -
 IEB154I  JOBLDTXT HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  N45EF3N  HAS BEEN SUCCESSFULLY UNLOADED
 IEB147I  END OF JOB -00 WAS HIGHEST SEVERITY CODE
 0 message and 62 data records sent as 2312 records to RALVSMV8.LIBERTY
 READY
```

Figure 7. TSO Transmit selected members to MVS sub-host: The selected members are sent from the cataloged dataset (prefixed by the TSO userid).

```
 READY
 receive
 Dataset FLETCH.RCNM.SOURCE from FLETCH on IBM
 Members: N45EF3N,JOBLDTXT
 Enter restore parameters or 'DELETE' or 'END'
 dataset ('fletch.sa21.source')
                                        IEBCOPY MESSAGES AND CONTROL STATEMENTS
                              PAGE 0001
                    COPY INDD=((SYS00019,R)),OUTDD=SYS00018
 IEB167I  FOLLOWING MEMBER(S)  LOADED  FROM INPUT DATA SET REFERENCED BY SYS0001
9 -
 IEB154I  JOBLDTXT HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  N45EF3N  HAS BEEN SUCCESSFULLY  LOADED
 IEB144I  THERE ARE 0000002 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY SYS00
018
 IEB149I  THERE ARE 0000000  UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
 IEB147I  END OF JOB -00 WAS HIGHEST SEVERITY CODE
 Restore successful to dataset 'FLETCH.SA21.SOURCE'
```

Figure 8. TSO receive selected partial dataset from host: The transmitted members are placed in the previously allocated dataset.

NCP RESOURCE RESOLUTION TABLES (RRT) AND OTHER LOAD MODULES

The NCP RRTs, Mode and USS tables required at each sub-host are distributed in the same way as the NCPs.

The only differences between nodes is possibly the sign on format.

VTAMLST DEFINITIONS

These definitions are in source code format. They are stored on the system as members of a PDS, and as such may be maintained by the 'IEBUPDTE' utility, or replaced directly by some function such as that provided by TSO/Extensions.

If TSO is readily available at the sub-host, then the latter method is very convenient.

TSO/Extensions for Definitions

The procedure followed is identical to that shown in "TSO/Extensions for NCP data" on page 18, and a further example follows in which a whole dataset is transmitted. Figure 9 on page 20 shows the transmission, and Figure 10 on page 20, the corresponding receipt.

```
 READY
 xmit ralvsmv8.hal dataset(rcnm.vtamlst)

                                        IEBCOPY MESSAGES AND CONTROL STATEMENTS
                                PAGE 0001
                      COPY OUTDD=SYS00009,INDD=((SYS00003,R))

 IEB167I  FOLLOWING MEMBER(S) UNLOADED FROM INPUT DATA SET REFERENCED BY SYS0000
3 -
 IEB154I  APPCON12 HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  ATCCON12 HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  ATCSTR00 HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  A10CDN   HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  A12CDN   HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  A12CICS  HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  A12JEP   HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  A12TAF   HAS BEEN SUCCESSFULLY UNLOADED
 IEB154I  R11CDN   HAS BEEN SUCCESSFULLY UNLOADED
 IEB147I  END OF JOB -00 WAS HIGHEST SEVERITY CODE
 0 message and 12 data records sent as 142 records to RALVSMV8.HAL
 READY
```

Figure 9. TSO transmit to MVS sub-host: The cataloged dataset (prefixed by the TSO userid) is sent in it's entirety.

```
 READY
 receive
 Dataset FLETCH.RCNM.VTAMLST from FLETCH on IBM
 Enter restore parameters or 'DELETE' or 'END'
 dataset(sa21.vtamlst) volume(m111b1) new
                                        IEBCOPY MESSAGES AND CONTROL STATEMENTS
                                PAGE 0001
                      COPY INDD=((SYS00007,R)),OUTDD=SYS00005
 IEB167I  FOLLOWING MEMBER(S)  LOADED  FROM INPUT DATA SET REFERENCED BY SYS0000
7 -
 IEB154I  APPCON12 HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  ATCCON12 HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  ATCSTR00 HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  A10CDN   HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  A12CDN   HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  A12CICS  HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  A12JEP   HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  A12TAF   HAS BEEN SUCCESSFULLY  LOADED
 IEB154I  R11CDN   HAS BEEN SUCCESSFULLY  LOADED
 IEB144I  THERE ARE 0000001 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY SYS00
005
 IEB149I  THERE ARE 0000000  UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
 ***
--------------------
 IEB147I  END OF JOB -00 WAS HIGHEST SEVERITY CODE
 Restore successful to dataset 'SA21.VTAMLST'
```

Figure 10. TSO receive of a complete dataset: The dataset is not allocated prior to this step and so is allocated to the volume specified at this time

Two further alternatives exist if the sub-host definitions are updated in an off-line fashion. CDNDT is used to transmit a file containing concatenated data and JCL, or FTP is used in conjunction with NJE to make use of standard spooling facilities. CDNDT is cumbersome for the large number of small files which constitute the VTAM definitions, and so the FTP method is preferred when TSO is not convenient at the sub-host.

FTP with NJE for VTAM Definitions

FTP is used to compose a job stream made up of JCL and members of the central site maintenance PDS. A number of members may be included in one run, the example which follows has two.

1. TSO is used to submit the JCL to the JES2 at the host (Figure 11).
2. The FTP 'JOBIN' creates a second jobstream including the data from the master copies of the source data, and this punched to the internal JES2 reader of the MVS host. Figure 12 on page 22 shows the output of the FTP jobstep.
3. The '/*ROUTE XEQ' JCL statement routes the following JOB (FLETCHB), to the sub-host for execution. Figure 13 on page 23 shows the output from the job executed at the sub-host.

```
//FLETCHA JOB MSGCLASS=O,CLASS=A,MSGLEVEL=1,NOTIFY=USER
/*ROUTE PRINT RALYDPD3.FLETCHER
//* THIS JOB TRANSFERS CDNDT APPL AND CDRSC DEFINTION FROM OS TO OS
//FTPJOBN      EXEC  PGM=DVGXJIN
//SYSPRINT     DD    SYSOUT=*
//DVGPR        DD    SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
//DVGPU        DD    SYSOUT=(A,INTRDR),DCB=(BLKSIZE=80,RECFM=F)
//DVGRD        DD    DATA,DLM=XX
//FLETCHB      JOB   MSGCLASS=A,CLASS=A,MSGLEVEL=1
/*ROUTE        XEQ   RALVSMV8
/*ROUTE PRINT RALYDPD3.FLETCHER
//             EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSPRINT     DD    SYSOUT=A
//SYSUT1       DD DSN=FLETCH.SA21.VTAMLST,
//             VOL=SER=WTLIB1,DISP=SHR,UNIT=3330-1
//SYSUT2       DD DSN=FLETCH.SA21.VTAMLST,
//             VOL=SER=WTLIB1,DISP=SHR,UNIT=3330-1
//SYSIN        DD    *,DLM=XX
./       ADD     LIST=ALL,NAME=A10CDN
./       NUMBER   NEW1=10,INCR=10
XX
//             DD    DSN=FLETCH.RCNM.VTAMLST(A10CDN),DISP=SHR
//             DD    *,DLM=XX
./       ADD     LIST=ALL,NAME=R11CDN
./       NUMBER   NEW1=10,INCR=10
XX
//             DD    DSN=FLETCH.RCNM.VTAMLST(R11CDN),DISP=SHR
//             DD    *,DLM=XX
./       ENDUP
/*
//
XX
/*
//
```

Figure 11. FTP JOBIN used for MVS-MVS file transfer.: This example shows the FTP input job control statements, the output of FTP is input to the internal reader of JES2. The output of this second job is in turn submitted to the JES2 internal reader of the sub-host defined in the '/*ROUTE' NJE statement. The second '/*ROUTE' statement transfers the printout from the sub-host to a third node defined to NJE.

```
                    J E S 2  J O B  L O G  --  S Y S T E M  S A 1 1  --  N O D E
15.25.57 JOB   71  $HASP373 FLETCHA  STARTED - INIT  A - CLASS A - SYS SA11
15.26.10 JOB   71       FLETCHA     FTPJOBN     DVGXJIN     0000
15.26.10 JOB   71  $HASP395 FLETCHA  ENDED
------ JES2 JOB STATISTICS ------
 24 FEB 83 JOB EXECUTION DATE
        34 CARDS READ
        53 SYSOUT PRINT RECORDS
         0 SYSOUT PUNCH RECORDS
      0.22 MINUTES EXECUTION TIME
    1      //FLETCHA JOB MSGCLASS=0,CLASS=A,MSGLEVEL=1,NOTIFY=USER
           ***ROUTE PRINT RALYDPD3.FLETCHER
           *** THIS JOB TRANSFERS CDNDT APPL AND CDRSC DEFINTION FROM OS TO OS
    2      //FTPJOBN      EXEC  PGM=DVGXJIN
    3      //SYSPRINT     DD    SYSOUT=*
    4      //DVGPR        DD    SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
    5      //DVGPU        DD    SYSOUT=(A,INTRDR),DCB=(BLKSIZE=80,RECFM=F)
    6      //DVGRD        DD    DATA,DLM=XX
    7      //             DD    DSN=FLETCH.RCNM.VTAMLST(A10CDN),DISP=SHR
    8      //             DD    *,DLM=XX
    9      //             DD    DSN=FLETCH.RCNM.VTAMLST(R11CDN),DISP=SHR
   10      //             DD    *,DLM=XX
           //
IEF236I ALLOC. FOR FLETCHA FTPJOBN
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I JES2 ALLOCATED TO DVGPR
IEF237I JES2 ALLOCATED TO DVGPU
IEF237I JES2 ALLOCATED TO DVGRD
IEF142I FLETCHA FTPJOBN - STEP WAS EXECUTED - COND CODE 0000
IEF285I   JES2.JOB00071.S00105                          SYSOUT
IEF285I   JES2.JOB00071.S00106                          SYSOUT
IEF285I   JES2.JOB00071.S00107                          SYSOUT
IEF285I   JES2.JOB00071.SI0101                          SYSIN
IEF285I   FLETCH.RCNM.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   JES2.JOB00071.SI0102                          SYSIN
IEF285I   FLETCH.RCNM.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   JES2.JOB00071.SI0103                          SYSIN
IEF373I STEP /FTPJOBN / START 83055.1525
IEF374I STEP /FTPJOBN / STOP  83055.1526 CPU    0MIN 00.33SEC SRB    0MIN 00.02S
IEF375I  JOB /FLETCHA / START 83055.1525
IEF376I  JOB /FLETCHA / STOP  83055.1526 CPU    0MIN 00.33SEC SRB    0MIN 00.02S
DVG02I NUMBER OF RECORDS
DVG03I   INPUT       : 0000024  RECORDS
DVG04I   OUTPUT      : 0000024  RECORDS
DVG0AI PROGRAM DVG$JIN ENDED
```

Figure 12. Output of FTP job using NJE for MVS to MVS job streamtransmission. : This job places data on the JES2 internal reader for NJE to NJE transmission for execution at the sub-host.

```
                    J E S 2  J O B  L O G  --  S Y S T E M  M V S 8  --  N O D E
 24 FEB 83 JOB EXECUTION DATE
        24 CARDS READ
        56 SYSOUT PRINT RECORDS
         0 SYSOUT PUNCH RECORDS
      0.02 MINUTES EXECUTION TIME
    1      //FLETCHB      JOB   MSGCLASS=A,CLASS=A,MSGLEVEL=1
           ***ROUTE        XEQ   RALVSMV8
           ***ROUTE PRINT RALYDPD3.FLETCHER
    2      //              EXEC  PGM=IEBUPDTE,PARM=NEW
    3      //SYSPRINT      DD    SYSOUT=A
    4      //SYSUT1        DD DSN=FLETCH.SA21.VTAMLST,
           //               VOL=SER=WTLIB1,DISP=SHR,UNIT=3330-1
    5      //SYSUT2        DD DSN=FLETCH.SA21.VTAMLST,
           //               VOL=SER=WTLIB1,DISP=SHR,UNIT=3330-1
    6      //SYSIN         DD    *,DLM=XX
IEF236I ALLOC. FOR FLETCHB
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I 267  ALLOCATED TO SYSUT1
IEF237I 267  ALLOCATED TO SYSUT2
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I FLETCHB - STEP WAS EXECUTED - COND CODE 0000
IEF285I   JES2.JOB00072.S00102                          SYSOUT
IEF285I   FLETCH.SA21.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   FLETCH.SA21.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   JES2.JOB00072.SI0101                          SYSIN
IEF373I STEP /        / START 83055.1625
IEF374I STEP /        / STOP  83055.1625 CPU    0MIN 00.31SEC SRB    0MIN 00.03
IEF375I  JOB /FLETCHB / START 83055.1625
IEF376I  JOB /FLETCHB / STOP  83055.1625 CPU    0MIN 00.31SEC SRB    0MIN 00.03
       SYSIN                              NEW MASTER
       ./       ADD     LIST=ALL,NAME=A10CDN
       ./       NUMBER   NEW1=10,INCR=10
                                          A10CDN VBUILD TYPE=APPL
                                          CDN10S11  APPL AUTH=(ACQ)
                                          CDN10R11  APPL AUTH=(ACQ),EAS=1,VPACING
IEB817I MEMBER NAME (A10CDN  ) NOT FOUND IN NM DIRECTORY.  STOWED WITH TTR.
       SYSIN                              NEW MASTER
       ./       ADD     LIST=ALL,NAME=R11CDN
       ./       NUMBER   NEW1=10,INCR=10
                                          R11CDN VBUILD  TYPE=CDRSC
                                          CDN11S10 CDRSC  CDRM=M11
                                          CDN11R10 CDRSC  CDRM=M11
                                          CDN11S12 CDRSC  CDRM=M11
                                          CDN11R12 CDRSC  CDRM=M11
       ./       ENDUP
IEB817I MEMBER NAME (R11CDN  ) NOT FOUND IN NM DIRECTORY.  STOWED WITH TTR.
IEB818I HIGHEST CONDITION CODE WAS 00000000
```

Figure 13. Edited output of FTP assembled job on the MVS sub-host: This job is transmitted from the host by NJE in the host and sub-host as a result of the'/*ROUTE XEQ' statement.

DUMP AND TRACE DATASETS

Where possible large printouts are handled on the system on which they are created. Either TSO is used directly to examine printouts, or SDSF is used as an alternative. SDSF is used in the RISC, and is invoked from TSO/ISPF.

Dump/Trace Dataset Creation

NCCF is used with OCCF to control the production of the necessary datasets. NCCF is regarded as an essential tool in any network

environment, and OCCF is highly desirable for remote site operation.

File Transfer

Where TSO is not possible, or hardcopy is required, there are other options available to transfer the data to the host for analysis.

Datasets may be transferred by file transfer processes such as TSO/Extensions Transmit-Receive or CDNDT, or use may be made of the NJE-NJE routing capability to transfer printed output. This latter method is easy to use, since no further processing is required. However, it impacts both the network and spool resources if the datasets are large. Printed output is routed either on the basis of returning output to the submitting system, else the output destination is defined in a '/*ROUTE PRINT' statement.

The environment used as an example consists of a MVS/SP and VSE system interconnected through the MSNF feature of ACF/VTAM. Various combinations of file transfer products are used to show how the sub-host is maintained. The approach taken is that of Central Site maintenance as described earlier ("Central Site Maintenance." on page 4).

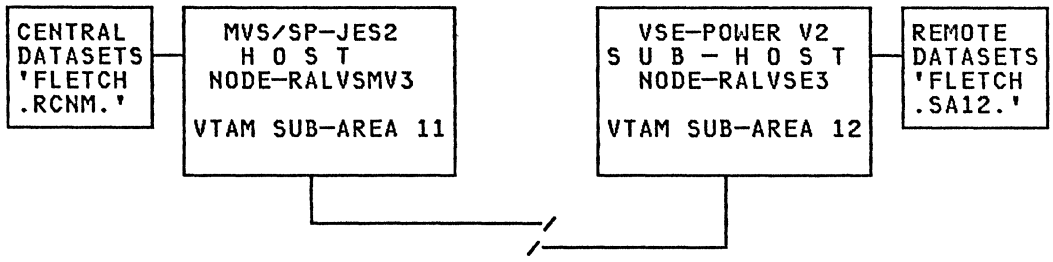

Figure 14. MVS Host to VSE Sub-Host: General layout of the MVS to VSE systems used as an example of MVS Central Site maintenance of Remote VSE system

MAINTENANCE PRODUCT SELECTION

This section gives a brief note on the usefulness of products used in the test MVS-VSE environment. Refer to "Chapter 4. Maintenance Tools" on page 13 for the product descriptions.

Data Transfer

The most useful products for JCL and Printout interchange are NJE in MVS, and POWER Version 2 in VSE. Both products are now standard features of MVS/SP-JES2 and POWER Version 2 respectively. Both SNA and non-SNA links are supported. These products are easy to use, fully compatible, and POWER networking is particularly easy to install. These products should be used wherever possible as the basis for remote maintenance of VSE systems from MVS.

Installation of POWER Version 2 requires a cold start of POWER and so the POWER queues have to be suitably backed up prior to installation.

CDNDT was used for transfer of larger datasets and worked well. Care must be taken to synchronise the transmit and receive jobs. The receive job occupies a partition awaiting data without giving any messages to that effect. The transmit job sends a message to the MVS operator console and waits for a reply if the receive job has not opened its ACB, a retry is possible once this is done.

FTP was used to transmit both to JEP and then to POWER Version 2 when it replaced JEP. In the latter case FTP is required to concatenate files to 80 byte records for transmission and subsequent restoration to original record size.

JEP is much more difficult to set up than POWER 2 and has less functions. It nevertheless worked well during the early MVS-VSE runs and some of the output is included later in this section. **JEP and POWER 2 Networking cannot coexist.**

Interactive Subsystems

TSO is used as the MVS maintenance tool. ICCF is not necessary on the VSE sub-host since all libraries are maintained on the MVS host.

NCCF is used on both the Host and Sub-host from the same physical screen that used for TSO during these tests. OCCF is in turn accessed from NCCF to control the VSE system. If remote operator intervention is to be kept to a minimum, then OCCF is an essential part of the operation.

In large scale operation, more physical screens are probably an advantage.

OPERATING SYSTEM INCOMPATIBILITIES

Apart from the obvious JCL differences between MVS and VSE, the linked object code is also generally incompatible. In the networking environment, this is not too serious since the assembly and/or linkage editing of the required modules is trivial.

The exception is the Load module for the NCP. Generation and assembly from source of NCPs at the sub-hosts can be very resource consuming. Worse, the output modules of the generation process may differ at the object level for the same NCP source coding due to variations in SSP level, and on the operating system used for generation.

NCP LOAD MODULES

An NCP Load Module is not necessarily required at a remote sub-host having an attached 37X5. However it is recommended that this be done to allow the sub-host to perform a local load. This provides additional network backup capability. During testing for this guide, a VSE load of a NCP directly from a core image library to the 37X5 using ACF/VTAM Version 2 took a matter of seconds.

Although the object code required in the 37X5 is independent of the loading operating system, the loading mechanisms in VSE differ from those used in MVS. These means that the linked NCP Load modules are not compatible between these operating systems. The quantity of JCL created at NCP generation time is such that it is better to rerun the generation process on the VSE system, rather than to try to manually create this JCL around the object code produced by the stage 2 NCP generation.

An alternative to repeating this generation is to write a program to unload a MVS NCP load module into VSE CSERV format. An example of this type of coding is shown in "Appendix C. Conversion Program for MVS to VSE Load Modules." on page 51. The output of this program is then linked into the VSE user core image library, and then used to create the VSE NCP load file. The program as listed was executed and successfully produced VSE format TXT records.

The following set of figures show the JCL and procedures required to move an NCP generated under MVS thru to the VSE NCP Load File, using the example program. The associated POWER and Networking definitions are in "Appendix D. POWER Version 2 Networking Definitions" on page 59. The steps are all performed from a screen attached to the MVS Host, and run as follows:

1. Sign on to Host TSO then -

    a. Unload the generated NCP to VSE format using the program 'BLDTXT' (Figure 15 on page 27).

    b. Submit the JCL via MVS to VSE to start the Receive job. This JCL includes the job steps necessary to link edit the received object and to create an NCP Load File, and are executed after the receive is complete (Figure 16 on page 28).

c. Start the transmit job from MVS (Figure 17 on page 28).

2. Log off TSO and use NCCF/OCCF in VSE subarea 12 to run the VSE system -

   a. Log on to NCF12 being the VSE NCCF application.

   b. Sign on as the NCCF network operator.

   c. Check the status of the inter system links and activate these as necessary.

   d. Sign on to OCCF, in this case CLISTS have not been used to obviate the need for the 'o' command prefix etc. (Figure 18 on page 29).

   e. Check the status of the VSE system. (Figure 19 on page 29).

   f. Check POWER networking status and activate if necessary (Figure 20 on page 30).

   g. Monitor job giving operator replies as necessary (Figure 21 on page 30 and Figure 22 on page 31).

Figure 23 on page 31 shows the corresponding MVS log. The run times differ between the two systems due to different initial clock settings.

A similar procedure must be used to change the VSE VTAM start up lists and procedures to reflect any change in NCP names before loading the new NCP.

```
//FLETCH  JOB 'FLETCH',MSGCLASS=A,CLASS=A,NOTIFY=FLETCH
//JOBLIB   DD  DSN=FLETCH.RCNM.LINKLIB,DISP=SHR
/*ROUTE    PRINT RALYDPD3.FLETCHER
//        EXEC PGM=BLDTEXT
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSUT1   DD  DSN=NCP800.LOAD,DISP=SHR
//SYSUT2   DD  DSN=FLETCH.RCNM.SOURCE(N139F3K),DISP=SHR
//SYSIN    DD  *
         LOAD  LOADMOD=N139F3K
//
```

Figure 15. Job to unload NCP from MVS to VSE load format: The unloaded NCP module is now in a suitable format for input to VSE linkage editing and cataloging.

```
//DOSREC JOB MSGCLASS=A,CLASS=A
/*XMIT   RALVSE3,DLM=%%
* $$ JOB JNM=CDNDTR,CLASS=0,DISP=D
* $$ LST DEST=RALVSE3
// JOB CDNDT RECEIVE PROGRAM
// DLBL OUTPUT,'SA12.CDNDT.RECEIVE.FILE',01/001,SD
// EXTENT SYS021,DOSRES,1,0,12673,133
// ASSGN SYS021,160
// LIBDEF CL,SEARCH=(VTMV2CL,USRCL1)
// EXEC CDDTA,SIZE=AUTO
R,RLU=CDN12R11,SLU=CDN11S12,BLKSIZE=1000,RECFM=U
/*
/&
// JOB CATALOG NCP
// DLBL IJSYSIN,'SA12.CDNDT.RECEIVE.FILE',,SD
// EXTENT SYSIPT,DOSRES,1,0,12673,133
ASSGN SYSIPT,160
// OPTION CATAL
        INCLUDE
/*
// ASSGN SYS003,160
// LIBDEF CL,TO=USRCL1
// EXEC  LNKEDT
/&
// JOB RESET SYSIPT
CLOSE SYSIPT,SYSRDR
/&
// JOB CSERV NCP LOAD FILE
// DLBL IJSYSPH,'NCP.SA12.LOADLIB',99/365,SD
// EXTENT SYSPCH,SYSWK1,1,0,6403,133
ASSGN SYSPCH,161
// LIBDEF CL,FROM=USRCL1,TEMP
// EXEC  CSERV
  PUNCH N139F3K
/*
/&
// JOB ASSGNPH
CLOSE SYSPCH,00D
/&
* $$ EOJ
%%
```

Figure 16. VSE job to receive NCP text from MVS: This job is submitted thru NJE to PNET to run in the VSE sub-host RALVSE3.

```
//FLETCH JOB MSGCLASS=A,CLASS=A
//STEP1 EXEC PGM=CDDTA
/*ROUTE  PRINT RALYDPD3.FLETCHER
//SYSIN DD *
T,RLU=CDN12R11,SLU=CDN11S12
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//INPUT DD DSN=FLETCH.RCNM.SOURCE(N139F3K),DISP=SHR
```

Figure 17. MVS job to transmit NCP text from MVS: The NCP has previously been unloaded from MVS Load Library.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                    02/21/83 23:38:05
U NCF12    FSM100 FULL SCREEN MONITOR ENDED
C NCF12    DSI013I COMMAND LIST LOGON    COMPLETE
--------------------------------------------------------------------------------




 ???
o qlogon
```

Figure 18. Sign on to OCCF in VSE sub-host from MVS Host: The sign on is cross domain via NCCF in VSE sub-area 12.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                    02/21/83 23:40:42
U NCF12    FSM100 FULL SCREEN MONITOR ENDED
C NCF12    DSI013I COMMAND LIST LOGON    COMPLETE
* NCF12    O QLOGON
+ NCF12    OC47I QLOGON ACCEPTED BY VSE/OCCF
* NCF12    O D A
E NCF12    F1 001 1R48I  C-RV ,SNA,    AWAITING     NODE=RALVSMV3
E NCF12    F1 001 1R48I  LST,00E,A,1,      INACTIVE,
E NCF12    F1 001 1R48I   BG,00C,A0,      INACTIVE,
E NCF12    F1 001 1R48I   F2,00C,B2,      INACTIVE,
E NCF12    F1 001 1R48I   F3,00C,C3,  VTAMV2  ,00021,3
E NCF12    F1 001 1R48I   F4,00C,D4,  OCCFV2  ,00024,4
E NCF12    F1 001 1R48I   F5,00C,E5,  CPRESET ,00028,5
E NCF12    F1 001 1R48I   F6,00C,F6,  VCNA    ,00030,6
E NCF12    F1 001 1R48I   F7,00C,G7,      INACTIVE,
E NCF12    F1 001 1R48I   F8,00C,H8,      INACTIVE,
E NCF12    F1 001 1R48I   F9,00C,I9,      INACTIVE,
E NCF12    F1 001 1R48I   FA,00C,JK,      INACTIVE,
E NCF12    F1 001 1R48I   FB,00C,LM,      INACTIVE,
E NCF12    F1 001 1R48I   F5,00E,,  CPRESET ,00028,A
E NCF12    F1 001 1R48I   F6,00E,,  VCNA    ,00030,A
E NCF12    F1 001 1R48I   F3,00E,,  VTAMV2  ,00021,A
??? ***
```

Figure 19. Sign on to OCCF in VSE complete: The operator checks outstanding reader files.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                    02/24/83 21:40:51
* NCF12     O PLOAD PNET,POWRJE3
E NCF12     F1 001 1RB4I  PLOAD NETWORK DEFINITION TABLE POWRJE3 LOADED
* NCF12     O S PNET,RALVSMV3
E NCF12     F1 001 1RB3I  NODE RALVSMV3 SIGNED-ON ON LINE
            SNA,BSIZE=00400,TIME=21:40:36
* NCF12     O D PNET,ALL
E NCF12     F1 001 1RB7I  *****  NDT NAME = POWRJE3   *****
E NCF12     F1 001 1RB7I  NODE     ROUTE1   ROUTE2   AUTH  BSIZ APPLID
            PASSWORD
E NCF12     F1 001 1RB7I  RALVSE3  ----- LOCAL -----            RALVSE3
E NCF12     F1 001 1RB7I  RALVSMV3 *SNA *             NET    400 RALVSMV3
E NCF12     F1 001 1RB7I  RALYDPD3 RALVSMV3           NET
-------------------------------------------------------------------------------




???
```

Figure 20. Sample VSE PNET commands to start and display links: The PLOAD is normally performed during POWER start up.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                    02/21/83 23:56:10
E NCF12     F1 001 1R48I   F4,00D,,  OCCFV2  ,00024,A
E NCF12     F1 001 1R48I   F4,00E,,  OCCFV2  ,00092,Q
E NCF12     F1 001 1R48I  RDR,00C,A,      INACTIVE,
E NCF12     F1 001 1RB5I  JOB DOSREC 00093(00207) RECEIVED FROM RALVSMV3 FOR
            RALVSE3
E NCF12     F1 001 1Q47I   BG DOSREC 00093 FROM RALVSMV3 , TIME=23:51:19
E NCF12     BG 000 // JOB CDNDT RECEIVE PROGRAM    DATE 02/21/83,CLOCK 23/51/21
E NCF12     BG 000 DAE01 COMMUNICATIONS ESTABLISHED.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0000500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0001000.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0001500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0002000.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0002500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0003000.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0003500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0004000.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0004500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0005000.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0005500.
E NCF12     BG 000 DAE04 THRESHOLD REACHED. RECORDS= 0006000.
E NCF12     BG 000 DAE05 TRANSMISSION COMPLETE.
??? ***
```

Figure 21. VSE OCCF console log of CDNDT receive: The receive job is transferred from MVS via NJE and POWER 2.

```
NETWORK COMMUNICATIONS CONTROL FACILITY                    02/22/83 00:06:41
E NCF12    BG 000 DAE07 RECORDS WRITTEN TO OUTPUT = 0006042.
E NCF12    BG 000 DAE03 RECORDS READ FROM INPUT = 0006042.
E NCF12    BG 000 DAE08 ACKNOWLEDGEMENT SENT TO TRANSMITTER.
E NCF12    BG 000 EOJ CDNDT    DATE 02/21/83,CLOCK 23/56/15,DURATION 00/04/54
E NCF12    BG 000 // JOB CATALOG NCP    DATE 02/21/83,CLOCK 23/56/15
E NCF12    BG 000 EOJ CATALOG    DATE 02/22/83,CLOCK 00/01/44,DURATION 00/05/28
E NCF12    BG 000 // JOB RESET SYSIPT    DATE 02/22/83,CLOCK 00/01/44
E NCF12    BG 000 1T20I  SYSIPT HAS BEEN ASSIGNED TO X'00C'
E NCF12    BG 000 EOJ RESET    DATE 02/22/83,CLOCK 00/01/45,DURATION 00/00/00
E NCF12    BG 000 // JOB CSERV NCP LOAD FILE    DATE 02/22/83,CLOCK 00/01/45
E NCF12    BG 000 4433D EQUAL FILE ID IN VTOC  IJSYSPH  SYSPCH=161  SYSWK1
           NCP.SA12.LOADLIB
E NCF12    BG-000 0C66D READY
* NCF12    0 0 DELETE
E NCF12    BG 000 EOJ CSERV    DATE 02/22/83,CLOCK 00/06/37,DURATION 00/04/51
E NCF12    BG 000 // JOB ASSGNPH    DATE 02/22/83,CLOCK 00/06/38
E NCF12    BG 000 EOJ ASSGNPH    DATE 02/22/83,CLOCK 00/06/38,DURATION 00/00/00
E NCF12    F1 001 1Q34I   BG WAITING FOR WORK
E NCF12    F1 001 1Q34I  LST WAITING FOR WORK ON 00E
-------------------------------------------------------------------------------

???
```

Figure 22. VSE OCCF console log of NCP catalog and load file build: This job follows the receive JCL and is transferred from MVS to VSE in the same manner.

```
                    J E S 2  J O B  L O G  --  S Y S T E M  S A 1 1  --  N O D E

18.51.18 JOB  208  $HASP373 FLETCH   STARTED - INIT  A - CLASS A - SYS SA11
18.51.26 JOB  208  +DAE19 LERAD/SYNAD ENTERED. R0=00000010
18.51.26 JOB  208  +DAE20 RPLFDBK= 1001  RPLFDBK2= 08090000
18.51.27 JOB  208  +DAE27 BIND REJECTED.
18.51.27 JOB  208 @21 DAER3 REPLY 'R' TO RETRY CONTACT,'C' TO CANCEL
18.53.09 JOB  208  R 21,R
18.53.15 JOB  208  +DAE01 COMMUNICATIONS ESTABLISHED.READY TO SEND.
18.53.31 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0000500.
18.53.44 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0001000.
18.53.58 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0001500.
18.54.15 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0002000.
18.54.31 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0002500.
18.54.44 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0003000.
18.54.58 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0003500.
18.55.13 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0004000.
18.55.28 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0004500.
18.55.41 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0005000.
18.55.54 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0005500.
18.56.07 JOB  208  +DAE04 THRESHOLD REACHED. RECORDS= 0006000.
18.56.09 JOB  208  +DAE05 TRANSMISSION COMPLETE.
18.56.09 JOB  208  +DAE03 RECORDS READ FROM INPUT = 0006042.
18.56.11 JOB  208  +DAE06 RECORD COUNT ACKNOWLEDGED BY RECEIVING LU
18.56.15 JOB  208  IEC130I SNAP     DD STATEMENT MISSING
18.56.17 JOB  208      FLETCH      STEP1       CDDTA       0000
18.56.17 JOB  208  $HASP395 FLETCH   ENDED
------ JES2 JOB STATISTICS ------
```

Figure 23. Sample MVS log of CDNDT transmission of the NCP text: The MVS transmission program began execution before the VSE receive program resulting in the 'RETRY' shown above.

NCP RESOURCE RESOLUTION TABLE (RRT).

The VSE system is locally attached to the 37X5 and always requires an RRT to communicate with this sub-area, whether it loads the NCP itself or not.

As with the NCP Load module, it is desirable to copy this table directly from the MVS system.

This may be performed in a number of ways. The technique used for the NCP Load module may be used with either the MVS linked NCP RRT unloaded thru the BLDTXT program, or the object output of the MVS NCP generation as input to a VSE linkage edit.

Another technique is to use CDNDT to transfer a file consisting of the NCP RRT with the VSE JCL concatenated around it.

Figure 24 shows the VSE job control required to link the NCP object module to produce a resource resolution table; however the job is transferred from MVS. Note that the name in the 'PHASE' card is the phase name of the resource resolution table. The linkage editor control card 'INCLUDE ,($RRT)' tells the linkage editor to include the CSECT $RRT from the object deck submitted in the jobstream. This name must be the NCP name with an 'R' appended. In the example the NCP object module is an integral part of the jobstream, and is added after the 'INCLUDE' card. As the object module is first cataloged before this job, it is not available after job execution.

```
// JOB CATALOG NEW N245FX9 RRT
// OPTION CATAL
// LIBDEF CL,TO=IJSYSRS,TEMP
   PHASE N245FX9R,*
   INCLUDE ,($RRT)
   INCLUDE
****** Place object module from MVS Stage 2 Object library here.
/*
// EXEC LNKEDT
/&
/&
* $$ EOJ
```

Figure 24. VSE Jobstream transmitted by CDNDT for NCP RRT: This job stream link edits the NCP RRT. After execution the object module no longer exists.

The next example (Figure 25), shows the situation where the object module is first cataloged into a relocatable library, and then included in the linkage edit job step.

There are many unresolved external references from the linkedit, but these can be ignored. All the external references refer to modules required for the NCP load module.

```
// JOB CATALOG N139F3K OBJECT MODULE
// LIBDEF RL,TO=USRRL1
// EXEC MAINT
   CATALR N139F3KR
****** Member N139F3K of PDS containing the
       object member resulting from the stage two NCP generation.
/*
// OPTION CATAL
// LIBDEF CL,TO=USRCL1
   PHASE N139F3KR,*
   INCLUDE ,($RRT)
   INCLUDE
// EXEC LNKEDT
/&
* $$ EOJ
```

Figure 25. VSE Jobstream transmitted by CDNDT for NCP RRT: This job stream is assigned as SYSIN for execution and must have a seperate unassign job behind it on the same file extent.

VTAMLST DEFINITIONS

Most of the user code required to be maintained for VTAM execution is in source code format. There is no difference between MVS and VSE coding for these modules and so transmission of the source statements to VSE is fairly straightforward.

The VTAM definition members are held as members of a 'VTAMLST' partitioned dataset on the MVS host. In this example they are in 'FLETCH.RCNM.VTAMLST'.

Because there are often many small members to be transmitted it is better to use FTP in conjunction with NJE/POWER version 2 rather than CDNDT. FTP is able to build a single concatenated job stream to handle several members in one transmission through the spooling system. This compares to multiple schedulings of CDNDT, one per member, and the savings in transmission time do not offset this inconvenience.

Both JEP and POWER version 2 are able to handle the FTP transmission in the VSE sub-host, while NJE handles the MVS host.

JEP and POWER version 2 differences

The approaches to the receipt of data by JEP and POWER version 2 are very different.

JEP accepts punched data into the POWER reader queue, in the same manner as POWER/RJE.

POWER version 2 Networking (PNET) works in the same manner as its MVS equivalent, NJE. Data sent via the punch is received and placed in the POWER punch queue.

In a VSE-VSE situation, a special disposition of 'I' on the host punched data informs PNET to place the received data in the POWER reader queue.

In MVS it is not possible to specify the necessary 'DISP=I' on transmitted output, instead the internal reader of JES2 is used to route the FTP output to VSE.

These steps sound more complex than they are in practice. Examples of both procedures follow.

VTAMLST transfer with FTP/NJE/POWER version 2

"Appendix D. POWER Version 2 Networking Definitions" on page 59 contains the definitions used in these examples.

The output of the FTP JOBIN is sent to JES2 internal reader with a 'XMIT' statement to route the execution of the following FTP built jobstream to VSE.

1. TSO is used to submit the FTP job stream to MVS (Figure 26 on page 34).
2. Figure 27 on page 35 shows the output of this job, the punched records are routed to the JES2 internal reader in the same system.
3. The XMIT statement causes the records to be sent to VSE, the output of the catalog is shown in Figure 28 on page 36.

```
//FTPJOBIN  JOB MSGCLASS=0,CLASS=A,MSGLEVEL=1,NOTIFY=USER
/*ROUTE  PRINT RALYDPD3.FLETCHER
//* THIS  JOB TRANSFERS 'VTAMLST' DEFINTIONS FROM OS TO DOS/VSE.
//FTPJOBN   EXEC  PGM=DVGXJIN
//SYSPRINT  DD  SYSOUT=*
//DVGPR     DD  SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
//DVGPU     DD  SYSOUT=(A,INTRDR),DCB=(BLKSIZE=80,RECFM=F)
//DVGRD     DD  DATA,DLM=XX
//SENDFTP   JOB   MSGCLASS=A,CLASS=A,MSGLEVEL=1
/*XMIT   RALVSE3,DLM=YY
* $$ JOB JNM=FTPJOB1,CLASS=0,DISP=D
* $$ LST DEST=RALYDPD3.FLETCHER
//  JOB  FTPJOB1
// LIBDEF SL,TO=USRSL1,TEMP
//  EXEC  MAINT
  CATALS B.A12CDN
  BKEND B.A12CDN
XX
//          DD  DSN=FLETCH.RCNM.VTAMLST(A12CDN),DISP=SHR
//          DD  DATA,DLM=XX
  BKEND
  CATALS B.R11CDN
  BKEND B.R11CDN
XX
//          DD  DSN=FLETCH.RCNM.VTAMLST(R11CDN),DISP=SHR
//          DD  DATA,DLM=XX
  BKEND
/*
/&
* $$ EOJ
XX
//
YY
```

Figure 26. FTP JOBIN/PNET to produce multiple VSE jobs from MVS: The output of the first job produces JCL for a second MVS job. This second job contains an 'XMIT' statement directing the execution to the VSE sub-host.

```
                  J E S 2  J O B  L O G  --  S Y S T E M  S A 1 1  --  N O D E

12.02.07 JOB  170  $HASP373 FTPJOBIN STARTED - INIT  A - CLASS A - SYS SA11
12.02.14 JOB  170       FTPJOBIN    FTPJOBN     DVGXJIN     0000
12.02.14 JOB  170  $HASP395 FTPJOBIN ENDED
------ JES2 JOB STATISTICS ------
 25 FEB 83 JOB EXECUTION DATE
        33 CARDS READ
        53 SYSOUT PRINT RECORDS
         0 SYSOUT PUNCH RECORDS
      0.13 MINUTES EXECUTION TIME
    1      //FTPJOBIN  JOB MSGCLASS=O,CLASS=A,MSGLEVEL=1,NOTIFY=USER
           ***ROUTE  PRINT RALYDPD3.FLETCHER
           *** THIS  JOB TRANSFERS 'VTAMLST' DEFINTIONS FROM OS TO DOS/VSE.
    2      //FTPJOBN   EXEC  PGM=DVGXJIN
    3      //SYSPRINT  DD  SYSOUT=*
    4      //DVGPR     DD  SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
    5      //DVGPU     DD  SYSOUT=(A,INTRDR),DCB=(BLKSIZE=80,RECFM=F)
    6      //DVGRD     DD  DATA,DLM=XX
    7      //          DD  DSN=FLETCH.RCNM.VTAMLST(A12CDN),DISP=SHR
    8      //          DD  DATA,DLM=XX
    9      //          DD  DSN=FLETCH.RCNM.VTAMLST(R11CDN),DISP=SHR
   10      //          DD  DATA,DLM=XX
           //
IEF236I ALLOC. FOR FTPJOBIN FTPJOBN
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I JES2 ALLOCATED TO DVGPR
IEF237I JES2 ALLOCATED TO DVGPU
IEF237I JES2 ALLOCATED TO DVGRD
IEF142I FTPJOBIN FTPJOBN - STEP WAS EXECUTED - COND CODE 0000
IEF285I   JES2.JOB00170.S00105                          SYSOUT
IEF285I   JES2.JOB00170.S00106                          SYSOUT
IEF285I   JES2.JOB00170.S00107                          SYSOUT
IEF285I   JES2.JOB00170.SI0101                          SYSIN
IEF285I   FLETCH.RCNM.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   JES2.JOB00170.SI0102                          SYSIN
IEF285I   FLETCH.RCNM.VTAMLST                           KEPT
IEF285I   VOL SER NOS= WTLIB1.
IEF285I   JES2.JOB00170.SI0103                          SYSIN
IEF373I STEP /FTPJOBN / START 83056.1202
IEF374I STEP /FTPJOBN / STOP  83056.1202 CPU    0MIN 00.30SEC SRB    0MIN 00.02S
IEF375I  JOB /FTPJOBIN/ START 83056.1202
IEF376I  JOB /FTPJOBIN/ STOP  83056.1202 CPU    0MIN 00.30SEC SRB    0MIN 00.02S
DVG02I NUMBER OF RECORDS
DVG03I   INPUT      : 0000024  RECORDS
DVG04I   OUTPUT     : 0000024  RECORDS
DVG0AI PROGRAM DVG$JIN ENDED
```

Figure 27. FTP JOBIN/PNET output listing from MVS: The output of this job goes to the JES internal reader and thence to VSE.

```
// JOB  FTPJOB1                                                    DATE 02
// LIBDEF SL,TO=USRSL1,TEMP
//  EXEC  MAINT


  CATALS B.A12CDN
  CATALS B.R11CDN


 S T A T U S    R E P O R T                  DATE: 02/25/83 (MM/DD/YY)    TIME
  LIBRARIES ON          STARTING        NEXT          LAST     DIRECTORY
  COUNT KEY DATA         ADDRESS        ENTRY         ENTRY     ENTRIES
  (CKD) DEVICES:          C  H  R     C  H  R  E     C  H  R  E  ACTIVE  ALLOC
USRSL1   VOLID: SYSWK1
SOURCE-STMT  DIRECTORY   109 00 01   109 00 12 09   109 07 44 09      40
             LIBRARY     109 08 01   112 07 27      123 18 44              1218

EOJ FTPJOB1                                                         DATE 02
```

Figure 28. FTP JOBIN/PNET output listing from VSE: This job is received from the MVS host via FTP/NJE/PNET.

VTAMLST transfer using FTP/NJE/JEP

"Appendix F. JEP Related Definitions" on page 65 contains the JEP related definitions used in this example.

The output of the FTP job is placed on a punch dataset and transmitted directly to the VSE reader queue via NJE/JEP.

1. The FTP JOBIN job is submitted via TSO to the host MVS system, Figure 29 on page 37 shows the JCL.

2. The FTP job output punch dataset is transmitted to VSE by NJE/JEP, resulting in the same VSE jobstream at the sub-host.

The JCL used to route the printed output back to the MVS host is first cataloged into a VSE source library. Figure 30 on page 37 shows an example of this process. Note that the LST class is 'J' which is the JEP output default, if this is not correct then no output transmission from VSE takes place even though the remote ID is correct. Also note that the MVS JCL being cataloged is immediately used to send the printed output back to MVS.

```
//FTPJOBIN  JOB MSGCLASS=0,CLASS=A,MSGLEVEL=1,NOTIFY=USER
//* THIS  JOB TRANSFERS '.VTAMLST' MEMBERS FROM OS TO DOS/VSE.
//FTPJOBN   EXEC  PGM=DVGXJIN
//SYSPRINT  DD  SYSOUT=*
//DVGPR     DD  SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
//DVGPU     DD  SYSOUT=B,DCB=(BLKSIZE=80,RECFM=F),DEST=RMT12
//DVGRD     DD  DATA,DLM=XX
* $$ JOB FTPJOB1
* $$ LST JEP=S.CHRSJEP,REMOTE=011,CLASS=J
//  JOB  FTPJOB1
// LIBDEF SL,TO=USRSL1,TEMP
//  EXEC  MAINT
  CATALS B.M00
  BKEND B.M00
XX
//          DD  DSN=FLETCH.RCNM.VTAMLST(M00),DISP=SHR
//          DD  DATA,DLM=XX
  BKEND
  CATALS B.A22JEP
  BKEND B.A22JEP
XX
//          DD  DSN=FLETCH.RCNM.VTAMLST(A22JEP),DISP=SHR
//          DD  DATA,DLM=XX
  BKEND
/*
/&
* $$ EOJ
XX
//
```

Figure 29. FTP job to transfer a jobstream using NJE/JEP: This job places data on a punch dataset for transmission by NJE and JEP to the VSE sub-host POWER reader queue.

```
//FLETCH  JOB 'FLETCH',MSGCLASS=A,CLASS=A,NOTIFY=FLETCH
/*ROUTE    PUNCH RMT12
/*ROUTE    PRINT RALYDPD3.FLETCHER
//* THIS JOB RUNS A JOB IN THE VSE SYSTEM IN SA 22 VIA THE FILE
//* TRANSFER PROGRAM AND THE JOB ENTRY PROGRAM UNDER VSE
//FTPJOBN  EXEC  PGM=DVGXJIN
//SYSPRINT DD  SYSOUT=*
//DVGPR    DD  SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
//DVGPU    DD  SYSOUT=B,DCB=(BLKSIZE=80,RECFM=F)
//DVGRD    DD  DATA,DLM=XX
* $$ JOB JNM=RCNM11,CLASS=0,DISP=D
* $$ LST JEP=RCNM11,REMOTE=011,CLASS=J
// JOB RCNM11
* CATALP RCNM11 JEP MODULE
// LIBDEF SL,TO=USRSL1
// EXEC MAINT
 CATALS S.RCNM11
 BKEND S.RCNM11
//FLETCH  JOB 'FLETCH',MSGCLASS=A,CLASS=A,NOTIFY=FLETCH
/*ROUTE    PUNCH RMT12
/*ROUTE    PRINT RALYDPD3.FLETCHER
//FTPCHRS EXEC PGM=DVGXJOUT
//DVGPR   DD  SYSOUT=*,DCB=(LRECL=132,BLKSIZE=132,RECFM=F)
//DVGPU   DD  SYSOUT=B,DCB=(BLKSIZE=80,RECFM=F)
//DVGRD   DD  DATA,DLM=YY
DVGINCLUDE
YY
//
 BKEND S.RCNM11
/*
/&
* $$ EOJ
XX
//
```

Figure 30. File Transfer Program - JOB in from MVS to VSE

DUMP AND TRACE FILE HANDLING

Physical transfer of printed output to the host may not be necessary if no hardcopy is required. If the sub-host and the network have the capacity to use ICCF directly at the sub-host, then the central maintenance team log directly onto the sub-host for problem determination. Alternatively, VM may be available through VNCA.

When file handling is necessary, the approach taken depends very much on the volume and urgency of the required data. Either the file itself is transferred using CDNDT or the file is printed to the spool queue and transferred through POWER version 2 or JEP to NJE. The first method is the most efficient for larger files whereas the latter method is much more convenient.

Creating Dump/Trace files

NCCF and/or OCCF is used to initiate and close off the production of the appropriate files, unless of course the network is unavailable.

File Transfer

If CDNDT is used to move the file to the Host, the transfer takes place using the technique described earlier in "NCP Load Modules" on page 26, except that the sending and receiving roles are reversed.

If the volume of data can be tolerated in the spooling systems, then a job is run in the sub-host with a print destination of the host specified in the correct manner in the '* $$ LST' for either PNET or JEP.

Figure 31, shows the JCL submitted via TSO at the host to print a VTAM trace file. The print out is spooled to the destination explicitly specified in the JCL or implicitly back to the originating host as is the case in this example.

```
//RTPRINT JOB MSGCLASS=A,CLASS=A,MSGLEVEL=1,NOTIFY=USER
/*XMIT   RALVSE3,DLM=%%
* $$ JOB JNM=TPRINT,CLASS=0,DISP=L
* $$ LST DEST=(RALYDPD3,FLETCHER)
// JOB TPRINT PRINT OUT ACF/VTAM TRACE OUTPUTS
// LIBDEF CL,SEARCH=USRCL1,TEMP
// DLBL TRFILE,'VSEIPOE.SNA.VTAM.TRACE.FILE',99/365,SD
// EXTENT SYS001,DOSRES
// ASSGN SYS001,160
// ASSGN SYSLST,00E
// EXEC TPRINT
/&
* $$ EOJ
%%
```

Figure 31. POWER Version 2 used to transfer print of VTAM trace file to MVS: The Job is submitted from TSO to JES2, which in turn routes the execution to the VSE sub-host.

The use of the utility 'TPRINT' involves operator replies at the sub-host and so OCCF is required if these replies are to be entered remotely. A disposition of 'L' is used on the VSE job to keep it in the reader queue for repeated execution. It is then released through OCCF.

If TPRINT is not used, then the trace file is only printed at VTAM end of job. Transmission therefore only takes place when VTAM is again started.

The environment used as an example consists of two VSE systems interconnected through the MSNF feature of ACF/VTAM. An overview of this environment is shown in Figure 32.

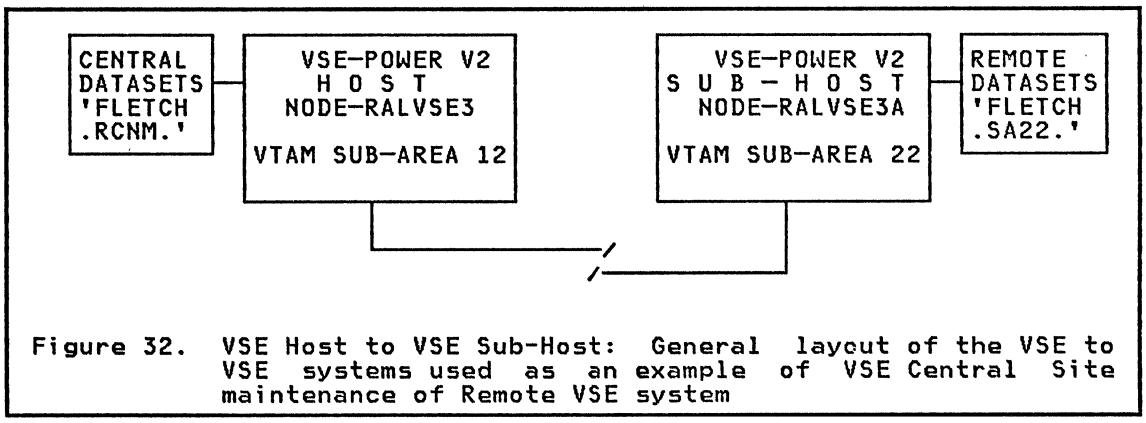

Figure 32. VSE Host to VSE Sub-Host: General layout of the VSE to VSE systems used as an example of VSE Central Site maintenance of Remote VSE system

Various combinations of file transfer products are use to show how the sub-host is maintained. The approach taken is that of Central Site maintenance as described earlier ("Central Site Maintenance." on page 4).

The main obstacle to remote maintenance in a VSE multisystems environment is the extent of operator intervention required compared to a MVS system. The data transfer products themselves are very similar to those used in the MVS host to VSE sub-host environment, without the obvious difficulties of operating system incompatibilities.

VSE-VSE maintenance is very well covered in the publication : 4331 Distributed Data Processing and VSE/POWER V2 Design Guide listed in "Chapter 8. Bibliography" on page 43.

MAINTENANCE PRODUCT SELECTION

This section comments briefly on the usefulness of products used in the test VSE-VSE environment.

Data Transfer

There are two alternatives for data transfer between VSE systems. These are FTP with either JEP or PNET, or CDNDT.

The easiest to use is POWER Version 2 Networking (PNET) in conjunction with FTP. PNET makes use of the spooling queues in both systems to actually move the data. FTP is used to get the data into a suitable form for transmission (80 byte records), and to reconstitute it after receipt. It is suitable for a number of small files, where the volume of data does not warrant the greater inconvenience, but greater efficiency of CDNDT.

JEP is an older product which is superceded by PNET. Note that JEP places punched output it receives in the POWER **reader** queue. PNET behaves as MVS/NJE and normally places any output received in the POWER **output** queue. A **DISP of I** must be specified on transmitted punched data to override this default and place the data in the POWER reader queue.

CDNDT is used for the transfer of the larger individual files such as trace or dump datasets. CDNDT has recovery facilities and is able to transfer data in an efficiently blocked manner, however it only transfers one file per execution.

Interactive Subsystems

ICCF is the maintenance tool used at the host. It is also of use at the sub-host to initially view printed output where machine resources permit. However, any major problem determination should take place at the central site on the central site equipment where the proper analysis tools and archiving facilities exist. This approach also facilitates better record keeping of problems and change management.

NCCF is used to control the network in conjunction with OCCF to control remote VSE console operation. This combination of products is regarded as mandatory for successful remote system maintenance.

NCP LOAD MODULES

It is recommended that each remote operating system be able to load at least its own locally attached 37X5 control units. Each remote site therefore needs copies of the appropriate NCP source and load modules.

The load modules are fairly large and are transmitted by a CDNDT job. An example of the steps that have to be performed follows:

1. Punch the load module out of the host core image library using the VSE CSERV maintenance program. This may already have been done if the NCP is also loaded from the host, in which case there will be a NCP load file containing punched object data.

2. Send a job to the remote VSE system to initiate the CDNDT receive program using PNET.

3. Start the CDNDT transmit job at the VSE host to transfer the punched object deck. PNET is used to transfer this JCL to the sub-host.

4. The transmitted file is used directly as an NCP load file.

5. The NCP object deck is also linked into a core image library which allows ACF/VTAM Version 2 to load the NCP directly from this library where core storage resources permit. This method of loading is very fast, since the whole module is loaded from core via a channel program compared to the single record process from the NCP load file.

NCP RESOURCE RESOLUTION TABLE (RRT) AND OTHER LOAD MODULES

There is no special difficulty involved in transferring core image modules from one system to another. The larger modules, such as the RRT, are transferred using CDNDT in the same manner as the NCP.

The smaller modules, such as the USS tables, and the RRT if network capacity exists, are better transferred using FTP with PNET (or JEP).

VTAMLST DEFINITIONS

FTP is used with JEP or preferably the newer PNET to transfer this data and involves no special processing.

DUMP AND TRACE FILE HANDLING

Physical transfer of the dump/trace dataset to the host is required if extensive problem determination is needed or if the volume is very large. If physical transfer is not required, then ICCF is used directly on the sub-host for problem determination.

Creating Dump/Trace Files

NCCF and/or OCCF is used to start the appropriate trace or dump.

File Transfer

RISC recommends that this type of file be transferred to the host for analysis and archiving in all but the most trivial cases. It is very easy to print files at a remote host with incorrect print options, and then to overwrite the file before this can be corrected.

CDNDT is the best way to move voluminous files through the network. FTP with PNET (or JEP) is an alternative, but is less efficient.

If the printouts are small and the print options well understood, then PNET may be used by itself to transfer the formatted output.

RELATED RISC IBM WORLD TRADE SYSTEMS CENTRE PUBLICATIONS

World Trade Corporation Technical Papers

Network Management

GG24-1539-0
Communication Network Management/
Managing Interconnected Systems

This document summarizes the results of a project in which central site management of distributed processing systems were examined. Situations were examined that included either a OS/MVS system or a DSO/VSE system as central host. The requirements for controlling these situations from a central site fell broadly into three areas: Network Operation, Program Maintenance and Batch Data Transfer, and Problem Determination.

GG24-1540-0
Communication Network Management/
NCCF Terminal Access Feature

This document contains an overview of the Terminal Access Facility of NCCF. The document was produced as a by-product of early tests of the product and provides useful scenarios on how the product can be used.

GG24-1546-0
Communication Network Management/
Using Information/Management

The intent of this paper is to ease the initial use of some functions of Information/Management (INFO/MGMT) and its interface to NPDA. It presents examples on defining a network containing multiple systems.

GG24-1554-0
Communication Network Management/
Customizing NCCF

This document is intended to supplement the NCCF Customization Manual (SC27-0433) with further hints, comments and examples on writing CLISTs, Command Processors and User Exits for NCCF. It should be read in conjunction with the NCCF Customization Manual.

GG24-1558
Communication Network Management/
Central Site Operation

This paper describes the specialties of central operation and how they are managed by means of Communications Network Management products. It further shows samples of command lists, procedures, routines, etc. as a help to introduce the concept of centralized network and system operation in a system.

GG24-1561
Communication Network Management/
Using the CNM-TOOLS

This paper discusses what the different network management products can do for the help desk and the operator when they face a problem. Well-known problem areas are analyzed and the use of the tools to treat the problems are discussed. It also discusses the benefits of online operator support material.

Installation Support

GG24-1547-0
Advanced Communications
Function Primer

This document provides overviews many of the SNA products and expands on the examples in the ACF Product Installation Guide (GG24-1557).

GG24-1557-0
Advanced Communications Function
Products Installation Guide

The purpose of this guide is to provide information that may help in installing SNA products on either a DOS/VSE or OS/VS operating system using MVS. This guide supports ACF/VTAM V1R3 and V2R1. It supports ACF/NCP V1R3 and V2. The samples in this guide will support the following products: IMS/VS, CICS/VS, TSO, JES2(MVS), ACF/VTAM, ACF/NCP/VS, NCCF, NPDA, VSE, POWER, FTP, JEP, and VSE/OCCF.

GG24-1509-0
SNA Product Installation Guide/
ACF/VTAM Release 2

The purpose of this guide is to provide information that may help in installing SNA products on either a DOS/VSE or OS/VS operating system using MVS. This guide supports ACF/VTAM V1R2 and ACF/NCP V1.R2 and V1R3. 1.2 and 1.3. The samples in this guide will support the following products: IMS/VS, CICS/VS, TSO, JES2(MVS), ACF/VTAM, ACF/NCP/VS, NCCF, and NPDA.

GG24-1519-0
Small Communications Systems
Installation Primer
IBM 4331/ACF/VTAME

This publication contains basic information needed to assist the user in adding the telecommunications capability to an IBM 4331 DOS/VSE System. It is specifically directed to the installation of IBM 3270, ACF/VTAME, and CICS/VS systems.

GG24-1552-0
Small Communications Systems
Installation Primer
VSE System IPO/E & IBM 3705-80

The purpose of this quide is to assist the user in the installation of a telecomunications system based on
- IBM Systems Network Architecture (SNA)
- An IBM 4300 Processor
- VSE System IPO/Extended
- CICS/VS
- An IBM 3705-80 Communication Controller
- IBM 3270 Information Display System

Problem Determination

GG24-1514-0
SNA Problem Determination Guide/
ACF R3 Volume 1

This paper is part of a two volume series dealing with system problem determination in a ACF/VTAM environment. It discusses and illustrates problem determination techniques and tools.

GG24-1523-0
SNA Problem Determination Guide/
ACF R3 Volume 2

Automatic Distribution of System Center Bulletins

In order to provide automatic distribution of the communication based system center bulletins to customers, a special procedure has been established using System Library Subscription Service (SLSS). To receive bulletins of interest automatically when they are released, the following bill of form number should be added to the customer SLSS subscription : GBOF-2206.

RELATED BOEBLINGEN IBM WORLD TRADE SYSTEMS CENTRE PUBLICATION

GG24-1570-0
VSE/POWER Version 2
Networking Design Guide

This guide contains many examples of the uses of PNET alone and with FTP, to communicate VSE to VSE and MVS to VSE. Differences to JEP are described, and comparisions to other products such as CDNDT are made.

RELATED IBM WASHINGTON SYSTEMS CENTRE PUBLICATIONS

GG22-9286-0
4331 Distributed Data Processing
Network Implementation

This guide uses a live MVS host with distributed 4331 sub-hosts network as an example of remote maintenance. It is very comprehensive, dealing with all aspects of implementation and maintenance encountered during the installation of the system. The products used have been superceded in some instances, notably JEP by PNET, but the approaches taken are still very valid.

Type of resource			Name	Meaning of Symbols. Capital letters are constants, lower case are variables as described below.
Application program major node			Assv....	cuu = 3 char physical address of the connection for local devices and clusters. g = group sequence: A-Z/1-9 lia = 3 char physical addr of the conn for line internal attachment p = PU sequence: A-Z/1-9 ss = 2 char subarea in this domain t = LU sequence: A-Z/0-9 v = variations within the same suba definition (for example, lines originally active (A) or inactive (I) xx = 2 char suba number in other domain yy = 2 char adj NCP suba number . = filler char
Application program minor node	General		Ass.....	
	CICS		AssCICSv	
	IMS		AssIMSv.	
	NCCF		AssNCFv.	
	TSO		AssTSOv.	
CDRM major node			M00v....	
CDRM minor node	own domain		Mssv.	
	other domain		Mxxv.	
CDRSC major node consisting of:	Application programs		RxxAv..	
	CICS		RxxACICS	
	TSO		RxxATSO.	
	Logical Units defined under a	Group	RxxGg.	
		Line	RxxLlia	
		PU	RxxPliap	
		NCP	RxxNyyv	
		LOCAL non-sna	RxxHLv	
		sna	RxxHSv	
CDRSC minor node			Name of original definition statement	

Type of resource		Name	Meaning of Symbols. Capital letters are constants, lower case are variables as described below.
Component		Cssliapt	cuu = 3 char physical address of the connection for local devices and clusters. g = group type: B = BSC P = S/S S = SDLC X = X-D LINK lia = 3 char physical addr of the conn for line internal attachment p = PU sequence: A-Z/1-9 ss = 2 char subarea in this domain t = LU sequence: 1-9/A-Z v = variations within the same suba definition (for example, lines originally active (A) or inactive (I) xx = 2 char suba number in other domain yy = 2 char adj NCP suba number . = filler char uu = channel/link address most often used for loading *p = CTRL address X'40',A-Z
Group		Gssg..	
Line		Lsslia	
Local Non-SNA	Major node Minor node	HssLv... HssLcuu	
Local S N A	Major node Cluster Terminal	HssSv... HsscuuP Hsscuutt	
LU/Terminal (Optional except for the following group of terminals)	Terminals LOCADDR 1-35	Tssliapt	
	or whatever is acceptable by the system support staff, the operations staff, or the end users.		
First LU or terminal specified to SSS for a PU or Control Unit	3631	FAssliap	
	3614	FCssliap	
	3650	QEssliap	
	3663	QDssliap	
	3790	INssliap	
NCP major node		Nssuu..	
Path	Major node	DssPATH.	
	Minor node	no name	
PU/Control Unit SDLC		Pssliap	
PU/Control Unit BSC		Bssliap*	

APPENDIX B. CDNDT VTAM DEFINITION EXAMPLES.

In the following examples the numbers indicate the communicating sub-area numbers, and the imbedded letters 'S' and 'R' indicate 'send' and 'receive' respectively.

CDNDT APPL DEFINITIONS

```
A10CDN VBUILD TYPE=APPL
CDN10S11  APPL AUTH=(ACQ)
CDN10R11  APPL AUTH=(ACQ),EAS=1,VPACING=10
```

Figure 33. Example of MVS APPL for CDNDT transfer.: This member is placed in the VTAMLST dataset on the MVS system sub-area 10 for two way transfer to MVS sub-area 11.

```
A11CDN VBUILD TYPE=APPL
CDN11S12  APPL AUTH=(ACQ)
CDN11R12  APPL AUTH=(ACQ),EAS=1,VPACING=10
CDN11S10  APPL AUTH=(ACQ)
CDN11R10  APPL AUTH=(ACQ),EAS=1,VPACING=10
```

Figure 34. Example of MVS APPL for CDNDT transfer.: This member is placed in the VTAMLST dataset on the MVS system sub-area 11 for two way transfer to MVS sub-area 10 and VSE sub-area 12.

```
A12CDN VBUILD TYPE=APPL
CDN12S11  APPL AUTH=(ACQ)
CDN12R11  APPL AUTH=(ACQ),EAS=1,VPACING=10
```

Figure 35. Example of VSE APPL for CDNDT transfer.: This member is placed in the VTAM B.source book on the VSE system sub-area 12 for two way transfer to MVS sub-area 11.

CDNDT CDRSC DEFINITIONS

```
R10CDN VBUILD  TYPE=CDRSC
CDN10S11 CDRSC  CDRM=M10
CDN10R11 CDRSC  CDRM=M10
```

Figure 36. Example of MVS CDRSC for CDNDT: This member is placed in the MVS VTAMLST for sub-area 11. It refers to the MVS sub-area 12.

```
R11CDN VBUILD  TYPE=CDRSC
CDN11S10 CDRSC  CDRM=M11
CDN11R10 CDRSC  CDRM=M11
CDN11S12 CDRSC  CDRM=M11
CDN11R12 CDRSC  CDRM=M11
```

Figure 37. Example of sub-host CDRSC for CDNDT: This member is placed in the VSE VTAM B.source book for sub-area 12 and MVS VTAMLST for sub-area 10. Both sub-area CDRSCs are included in one member for ease of maintenance.

```
R12CDN VBUILD  TYPE=CDRSC
CDN12S11 CDRSC  CDRM=M12
CDN12R11 CDRSC  CDRM=M12
```

Figure 38. Example of MVS CDRSC for CDNDT: This member is placed in the MVS VTAMLST for sub-area 11. It refers to the VSE sub-area 12.

APPENDIX C. CONVERSION PROGRAM FOR MVS TO VSE LOAD MODULES.

The listed program was used to take load modules directly from the MVS load libraries and create VSE CSERV compatible output.

This listing is purely for illustrative purposes.

```
         TITLE  'BLDTEXT - JOB TO CONVERT AN OS LOADMOD TO VSE'          00170008
*****************************************************************      00180008
* BLDTEXT  PROGRAM TO TAKE A COPY OF OS LOAD MODULE AND PUNCH INTO      00190026
*           VSE FORMAT ESD,TXT RECORDS.                                 00200026
*                                                                       00210026
* JCL      SYSUT1 DEFINES INPUT PDS.                                    00220026
*          SYSUT2 DEFINES OUTPUT SEQUENTIAL FILE ON OLRSCH(80 BYTE).    00230026
*          SYSIN INPUT CARD SPECIFIES LOAD MODULE/S IN THE FORMAT       00240026
*                LOAD LOADMOD=MEMBER1,(MEMBER2,....MEMBER8)             00250026
*                MEMBERNAMES MUST BE IN ASCENDING COLLATING SEQUENCE.   00260026
*                UP TO 8 MEMBERS MAY BE SPECIFIED IN ANY ONE RUN FOR    00270026
*                  SAME PDS.                                            00280026
*                                                                       00290026
* RESTRICTIONS -ASSUMES MODULE LOAD ADDRESS IS ZERO.                    00300026
*              -MODULE CSECT NAME IS SAME AS MEMBER NAME.               00310026
*              -VSE PHASENAME WILL BE SAME AS OS LOAD MODULE NAME.      00320026
*              -NO RELOCATION OF RESOLVED ADDRESSES.                    00330026
*                                                                       00340026
* TO RUN JOBS -MVS -EDIT MEMBER JOBLDTXT IN PDS CARD AND SETUP JCL.     00350026
*                  -SUBMIT JOB FOR EXECUTION.                           00360026
*                                                                       00370026
*             -VMVSE -JOBS ON OL4106.                                   00380026
*                    -RUN XFRIN CARD VSETEXT.                           00390026
*                    -SUBMIT FILE MVSNCP CATAL FOR BG EXECUTION TO      00400026
*                      CATALOGUE PHASE/S IN CIL.                        00410026
*                  VSE INPUT FILE CONTAINS PHASE,ESD,TXT,END PER PHASE. 00420026
*                  FILE ENDS WITH /*                                    00430026
*****************************************************************      00440026
*                                                                       00450026
*****************************************************************      00460026
* FUNCTION/OPERATION                                            *       00470008
*         THIS MODULE RETRIEVES RECORDS FROM LOADMOD DATA SET    *      00480008
*         (SYSUT1) AND CREATES VSE OBJECT MODULE RECORDS FOR     *      00490008
*         VSE IN A SEQ. FILE (SYSUT2).                          *       00500008
*         AN INPUT CONTROL CARD SPECIFIES THE MODULES TO BE      *      00510008
*         LOADED, UP TO EIGHT ON ONE CONTROL CARD.              *       00520008
*         THE L.M. INPUT RECORDS ARE SEARCHED FOR A CONTROL     *       00530008
*         RECORD. THIS INDICATES A TEXT RECORD FOLLOWS, AND     *       00540008
*         THE COUNT AND RELATIVE RECORD ADDRESS IS SAVED.       *       00550008
*         THE FOLLOWING TEXT RECORD IS THEN CHECKED (DOUBLE     *       00560008
*         BUFFERING) AND VSE OBJ MOD. TXT RECORDS ARE CREATED.  *       00570008
*         A CONTROL RECORD INDICATING LAST TEXT IS LOOKED FOR AND *     00580008
*         A LAST SWITCH IS SET.                                 *       00590008
*                                                               *       00600008
*****************************************************************      00610008
       SPACE 4                                                          00620012
BLDTEXT CSECT                                                           00630012
***                                                                     00640008
***            REGISTER EQUATES                                         00650005
***                                                                     00660005
R0       EQU   0        NOT USED                                       00670008
R1       EQU   1        WORK                                           00680008
R2       EQU   2        DCB POINTER                                    00690008
R3       EQU   3        WORK / TEXT COUNT                              00700008
R4       EQU   4        WORK / TEXT START ADDRESS                      00710008
R5       EQU   5        INPUT RECORD DSECT                             00720008
R6       EQU   6        WORK                                           00730008
R7       EQU   7        WORK                                           00740008
R8       EQU   8        DECB INPUT REG                                 00750008
R9       EQU   9        DECB INPUT REG                                 00760008
R10      EQU   10       TEXT WORK                                      00770008
R11      EQU   11       TEXT INPUT POINTER                             00780008
R12      EQU   12       BASE                                           00790008
R13      EQU   13       SAVE AREA POINTER                              00800008
R14      EQU   14       NOT USED BY APPLN                              00810008
```

```
R15      EQU   15       USER ERROR RETURN CODE                          00820008
         EJECT                                                         00830005
         SAVE  (14,12),,*                                            00840017
         LR    R12,R15                                               00850000
         USING BLDTEXT,R12                                           00860006
         ST    R13,SAVEAREA+4                                        00870000
         LR    R2,R13                                                00880000
         LA    R13,SAVEAREA                                          00890000
         ST    R13,8(R2)                                             00900000
*                                                                    00910000
***  OPEN STATIC DATA SETS - SYSPRINT AND SYSIN                      00920000
*                                                                    00930000
         USING IHADCB,R2                                             00940006
         OPEN  (DCBSIN,,DCBMSG,OUTPUT)                               00950009
         LA    R2,DCBMSG                                             00960000
         TM    DCBOFLGS,DCBOFOPN  SYSPRINT OPEN OK?                  00970008
         BO    INIT10             -YES-                              00980000
         LA    R15,RC12           NO-SET ERROR RETURN CODE           00990000
         B     ERROR                                                 01000000
*                                                                    01010000
INIT10   EQU   *                                                     01020000
         LA    R2,HEADMSG         PUT HEADING MSG TO SYSPRINT        01030007
         PUT   DCBMSG,(R2)                                           01040001
         LA    R2,DCBSIN          DID SYSIN OPEN OK?                 01050001
         TM    DCBOFLGS,DCBOFOPN                                     01060008
         BO    INIT12             -YES- CONTINUE                     01070001
         LA    R15,RC04           NO - SET ERROR CODE                01080001
         B     ERROR              AND GO TO ERROR EXIT               01090001
*                                                                    01100001
INIT12   EQU   *                  GET THE INPUT CONTROL CARD         01110001
         GET   DCBSIN                                                01120001
         MVC   CARD(80),0(R1)     MOVE TO BUFFER                     01130001
         PUT   DCBMSG,CARD1       AND PRINT THE CONTROL CARD         01140001
*                                                                    01150001
***  PROCESS THE CONTROL CARD                                        01160001
*                                                                    01170001
         LA    R1,CARD                                               01180001
         LA    R3,CARD            INITIALIZE SCAN REGS               01190001
         LA    R4,LNGTH67         SET FOR TRANSLATE                  01200006
INIT25   EQU   *                  SCAN THE CARD FOR LOAD PARMS.      01210001
         EX    R4,TRANS                                              01220001
         BC    10,SYNTAX          BLANK CARD WAS READ                01230001
         TM    SW1,ON1            IS THIS THE FIRST TIME?            01240006
         BO    INIT30             NO.. CHECK THE OPERANDS            01250001
         OI    SW1,ON1            INDICATE FIRST TIME                01260001
         CLC   LOAD,0(R1)         OPERATOR SHOULD BE 'LOAD '         01270001
         BNE   SYNTAX             IF NOT INDICATE BAD SYNTAX         01280001
         LA    R1,FIVE(0,R1)        INCREMENT PAST OPERATOR          01290001
         SR    R3,R1              ADJ LENGTH FOR REMAINDER           01300001
         AR    R4,R3              OF THE CARD IMAGE                  01310001
         B     INIT25             GO FIND THE OPERANDS               01320001
INIT30   EQU   *                  .....ANALYSE OPERANDS              01330001
         CLC   LOADM,0(R1)        IS THIS 'LOADMOD='                 01340001
         BNE   SYNTAX             NO THEN SYNTAX ERROR               01350001
         LA    R1,EIGHT(R1)       INCREMENT PAST KEYWORD             01360001
         LA    R5,EIGHT           SET MOVE COUNT                     01370001
         LA    R6,MEMBER1         SET FOR MOVE                       01380001
         LR    R8,R6              SAVE START OF THIS ENTRY           01390016
         LA    R7,1               SET MEMBER COUNT                   01400001
INIT31   EQU   *                 READY TO MOVE NAME                  01410001
         MVC   ZERO(ONE,R6),ZERO(R1) MVE ONE CHAR.                   01420012
         LA    R1,ONE(R1)         INCREMENT TO NEXT                  01430001
         LA    R6,ONE(R6)                                            01440001
         CLI   ZERO(R1),COMMA     IS NEXT A COMMA?                   01450001
         BE    INIT38             - YES - SET UP FOR NEXT MEMBER NAME 01460001
         CLI   ZERO(R1),BLANK     IS NEXT A BLANK                    01470001
         BE    DONE               - YES - ALL DONE                   01480001
         BCT   R5,INIT31          COUNT 8 MOVES                      01490001
         B     SYNTAX             IF NOT END THEN SYNTAX ERROR       01500001
***                                                                  01510001
INIT38   EQU   *                                                     01520001
         LA    R1,ONE(R1)         INCREMENT PAST COMMA               01530001
         LA    R5,EIGHT           SET MEMBER NAME LENGTH             01540001
         AH    R8,LENTRY          POINT TO NEXT ENTRY IN TABLE       01550016
```

```
         LR       R6,R8                                                  01560016
         LA       R7,ONE(R7)          ADD ONE TO ENTRY COUNT             01570001
         B        INIT31              GO BACK AND DO NEXT NAME           01580001
***                                                                      01590001
SYNTAX EQU        *                                                      01600001
         LA       R15,RC16            INDICATE SYNTAX ERROR              01610001
         B        ERROR               GO TO ERROR ROUTINE                01620001
***                                                                      01630001
***                                                                      01640001
DONE     EQU      *                                                     01650016
          LA      R6,MAXMEMBR         CHECK NO OF MEMBERS IN LIST        01660016
          CR      R6,R7                                                  01670016
          BL      SYNTAX              ERROR IF MORE THAN MAX. ALLOWED    01680016
*                                     VALID CONTROL CARD RECEIVED        01690016
          STH     R7,NENTRY           SET NUMBER OF ENTRIES IN THIS LIST 01700012
          LA      R6,BLDLIST          SET UP POINTER TO BLDL LIST        01710013
*  OPEN SYSUT1 DATA SET FOR LOAD MODULES                                 01720009
          OPEN    DCBUT1                                                 01730009
          LA      R2,DCBUT1                                              01740003
          TM      DCBOFLGS,DCBOFOPN   DID IT OPEN?                       01750008
          BO      INIT45A             YES - CONTINUE                     01760014
          LA      R15,RC08            NO- SET ERROR RETURN CODE          01770003
          B       ERROR                                                  01780003
*                                                                        01790014
INIT45A   OPEN (DCBUT2,OUTPUT)      OPEN THE OUTPUT DATA SET             01800014
          LA      R2,DCBUT2                                              01810014
          TM      DCBOFLGS,DCBOFOPN   TEST IS OPEN IS OK                 01820014
          BO      INIT45              YES                                01830014
          LA      R15,RC20            ELSE SET ERROR CODE                01840014
          B       ERROR                                                  01850014
***                                                                      01860001
INIT45   EQU      *                DO BLDL AND FIND FOR APPROPRIATE MEMBER 01870003
          LA      R5,DCBUT1                                              01880003
          BLDL    (R5),BLDLIST                                           01890003
          LTR     R15,R15             WAS BLDL SUCCESSFUL                01900003
          BZ      INPUT46             YES- CONTINUE                      01910003
          LA      R15,RC28            NO- SET ERROR CODE                 01920003
          B       ERROR                                                  01930003
***                                                                      01940001
INPUT46 EQU    *                                                         01950001
          LA      R8,RALTTRK1-BLDLIST(R6)                                01960013
          FIND    DCBUT1,(R8),C                                          01970013
*******   ST      R5,DECBIN1+EIGHT    SET UP FOR DECB SWAPPING           01980012
*******   ST      R5,DECBIN2+EIGHT    ***** NOT NEEDED *******           01990012
          LA      R8,DECBIN1          DECB ADDRESSES IN REGS 8 AND 9     02000003
          LA      R9,DECBIN2                                             02010012
READ      EQU     *                   READ RECORDS FROM LOAD MODULE      02020003
          READ    (R8),SF,MF=E                                           02030003
SWAP      XR      R8,R9               SWAP DECB REGS                     02040003
          XR      R9,R8               FOR FOLLOWING CHECK                02050003
          XR      R8,R9               OR BUFFER PRIME                    02060003
          TM      SW1,BUFSW           BUFFERS NEED PRIMED?               02070003
          BO      INPUT10             NO- CONTINUE                       02080003
          OI      SW1,BUFSW           YES- INDICATE PRIMED               02090003
          B       READ                AND GO BACK TO PRIME SECOND        02100003
INPUT10 EQU     *                                                        02110001
          CHECK (R8)                  CHECK FOR EARLIEST READ            02120003
** LOAD MODULE RECORD IN BUFFER POINTED TO BY R8                         02130001
          USING INPUTDS,R5                                               02140003
          L       R5,X'0C'(R8)      SET UP ADDRESSAABILITY ON BUFFR      02150007
*****                                                                    02160001
*****                                                                    02170001
************************************************************************ 02180003
************************************************************************ 02190003
          LA      R11,INPUTDS         AND POINT TO START OF TEXT AREA    02200018
          TM      TXTSW,ONTXT         IS THERE A TEXT RECORD FOLLOWING ? 02210007
          BO      INPUT29             YES- SEND BUFFER TO OUTPUT         02220003
          TM      LMTYPE,CESD         IS THIS A CESD RECORD ?            02230003
          BO      CESD00              YES- GO PROCESS IT                 02240003
          TM      TXTSW,ONESD         HAS AN ESD BEEN PROCESSED ?        02250021
          BO      OUTPT01             YES - THEN PUT OUT PHASE/ESD RECORD 02260021
TSTCNTRL  TM      LMTYPE,CONTROL      DOES TEXT FOLLOW ?                 02270021
          BO      CNTRL01             YES- GO PROCESS IT                 02280003
          B       READ                ELSE GO BACK AND READ NEXT         02290003
```

```
**                                                                      02300003
**                                                                      02310003
CESD00   EQU   *                 PROCESS THE ESD RECORD               02320021
         OI    TXTSW,ONESD       INDICATE ESD RECORD                  02330021
         SR    R3,R3                                                  02340021
         ICM   R3,3,IESDLEN      PICK UP LENGTH OF THIS RECORD        02350021
         LA    R3,IESD(R3)       POINT TO END OF DATA                 02360021
         LA    R4,IESD           POINT TO START OF DATA               02370021
TESTYPE  TM    8(R4),X'0F'       TEST IF CSECT TYPE                   02380021
         BNZ   UPOINTER          BR IF NOT                            02390021
         SR    R11,R11                                                02400021
         ICM   R11,7,9(R4)       PICK UP CSECT START ADDR             02410024
         C     R11,LMODLOA       AND TEST IF LOWER THAN PREV SAVED    02420024
         BNL   CHEKHIAD          BR IF NOT...ELSE                     02430024
         ST    R11,LMODLOA       STORE LO ADDRESS                     02440024
CHEKHIAD EQU   *                                                      02450024
         C     R11,LMODHIA       AND TEST IF GT PREV. SAVED           02460024
         BL    UPOINTER          BR IF NOT HIGHEST ADDRESS            02470025
         ST    R11,LMODHIA       STORE HI ADDRESS                     02480024
         SR    R10,R10                                                02490024
         ICM   R10,7,13(R4)      PICK UP CSECT LENGTH                 02500024
         AR    R10,R11           ADD TO ACCUMULATED LENGTH            02510024
         LA    R10,7(R10)        ROUND UP TO NEXT F/W                 02520023
         N     R10,ROUNDMSK                                           02530023
         ST    R10,LMODLEN       AND STORE IT                         02540021
UPOINTER EQU   *                                                      02550021
         LA    R4,16(R4)         POINT TO NEXT ENTRY IN RECORD        02560021
         CR    R4,R3             TEST IF END REACHED                  02570021
         BL    TESTYPE           CONTINUE LOOP IF NOT                 02580021
         B     READ              ELSE GET ANOTHER RECORD              02590021
**                                                                      02600021
**                                                                      02610021
OUTPT01  EQU   *                 SET UP O/PUT PHASE,ESD CARDS         02620024
         NI    TXTSW,255-ONESD   INDICATE ESD PROCESSED               02630021
         MVC   DPHASENM,MEMBER1-BLDLIST(R6)   MOVE IN PHASE NAME      02640013
         LA    R10,DPHASENM+7    DROP OUT TRAILING BLANKS             02650007
LOOP1    CLI   0(R10),BLANK                                           02660003
         BNE   OUTPT02                                                02670003
         BCT   R10,LOOP1                                              02680003
*                                                                     02690003
OUTPT02  EQU   *                                                      02700003
         MVC   1(3,R10),PLUSZRO  MOVE IN START LOC ADDR               02710003
         PUT   DCBUT2,DPHASE     PUT OUT PHASE CARD                   02720004
         MVC   DESDNAM,MEMBER1-BLDLIST(R6)    MOVE IN ESD NAME        02730013
         L     R10,LMODLEN       PICK UP LOAD MODULE LENGTH           02740021
         STCM  R10,7,DESDLEN     STORE MODULE LENGTH                  02750021
         SR    R10,R10                                                02760021
         ST    R10,LMODLEN       RESET LENGTH SAVE AREA               02770021
         ST    R10,LMODLOA       RESET L.M. LO STORAGE ADDR.          02780024
         ST    R10,LMODHIA       RESET L.M. HI STORAGE ADDR.          02790024
         PUT   DCBUT2,DESD       PUT OUT ESD CARD                     02800007
         NI    TXTSW,255-ONTXT   TURN OFF TEXT SW                     02810003
         B     TSTCNTRL          GO PROCESS THE CURRENT RECORD        02820021
****                                                                  02830003
****                                                                  02840003
CNTRL01  EQU   *                 PROCESS THE CONTROL CARD             02850006
         LH    R3,COUNT          SAVE CONTORL INFO - COUNT            02860008
         SR    R4,R4                                                  02870008
         ICM   R4,7,INADDR                          - START ADDRESS   02880008
         OI    TXTSW,ONTXT       INDICATE NEXT IS TEXT                02890003
         TM    LMTYPE,ENDOF      IF NOT END OF LOAD MODULE            02900003
         BNO   READ              GO AND GET NEXT INPUT                02910003
         OI    TXTSW,ONLAST      OTHERWISE INDICATE LAST              02920003
         B     SWAP              AND CHECK LAST RECORD                02930003
****                                                                  02940003
****                                                                  02950003
INPUT29  EQU   *                 PROCESS THE INPUT TEXT RECORD        02960003
         LA    R10,MAXTXT        TEST FOR MORE THAN 1 VSE RECORD      02970003
         CR    R3,R10                                                 02980008
         BNL   MVETXT            USE MAX IF MORE THAN ONE             02990003
         LR    R10,R3            OTHERWISE USE REMAINDER              03000008
MVETXT   STH   R10,DTXTLEN       SET TXT LENGTH                       03010007
         STCM  R4,7,DTXTRAD      AND START ADDRESS                    03020008
         MVI   DTXTINF,BLANK     CLEAR TEXT FIELD                     03030003
```

```
         MVC   DTXTINF+1(L'DTXTINF-1),DTXTINF                          03040003
         BCTR  R10,0                                                   03050003
         EX    R10,MVETXTIN        MOVE IN TEXT INFO                   03060003
         PUT   DCBUT2,DTXT         PUT OUT TXT RECORD                  03070004
         LA    R4,1(R10,R4)       ADJUST COUNTS                        03080008
         LA    R11,1(R10,R11)      AND POINTERS                        03090003
         LA    R10,1(R10)                                              03100003
         SR    R3,R10                                                  03110008
         BP    INPUT29             REDO IF MORE TEXT                   03120012
         NI    TXTSW,255-ONTXT     ELSE INDICATE NEXT NOT TEXT         03130003
         TM    TXTSW,ONLAST        TEST FOR LAST TEXT                  03140003
         BO    INPUTEOF            FINISH OFF IF LAST                  03150003
         B     READ                OTHERWISE GO AND GET MORE IN        03160003
****                                                                    03170003
****                                                                    03180003
MVETXTIN MVC   DTXTINF(1),0(R11)                                        03190007
****                                                                    03200003
         EJECT                                                         03210003
ENDFILE  EQU   *                   EOF ON CARD INPUT FILE              03220004
         LA    R15,RC24            SET ERROR CODE.. NO LOADMOD CARD    03230004
         B     ERROR                                                   03240004
***                                                                     03250004
***                                                                     03260004
INPUTEOF EQU   *                   EOF ON LOAD MODULE INPUT            03270004
         TM    C-BLDLIST(R6),ALIASIND  IS THIS AN ALIAS?               03280018
         BNO   NORMAL                  NO - NORMAL                     03290018
         TM    ATTRIB-BLDLIST(R6),RENREUS  IS ALIAS REENT/REUSE?       03300018
         BZ    NORMAL                  NO -                            03310018
         MVC   DENDNTRY,EPAALS-BLDLIST(R6) ELSE USE ALIAS ENTRY PT     03320018
         B     PUTEND                  AND CONTINUE                    03330018
NORMAL   EQU   *                                                       03340018
         MVC   DENDNTRY,EPAMEM-BLDLIST(R6) SET NORMAL ENTRY PT.        03350018
PUTEND   PUT   DCBUT2,DEND         FINISH UP O/P MODULE                03360018
         MVI   TXTSW,0             RESET SWITCHES                      03370014
         NI    SW1,255-BUFSW                                           03380014
         MVC   DPHASEBL(8),BLANKS AND OTHER FIELDS                     03390014
         AH    R6,LENTRY           POINT TO NEXT ENTRY IN LIST         03400014
         LH    R1,NENTRY           THEN TEST IF ALL                    03410014
         BCTR  R1,0                ENTRIES IN LIST                     03420014
         STH   R1,NENTRY           HAVE BEEN PROCESSED                 03430014
         LTR   R1,R1                                                   03440014
         BNZ   INPUT46             IF NOT THEN PROCESS NEXT            03450014
         PUT   DCBUT2,DSLASHAS     FINISH UP O/P FILE                  03460013
         PUT   DCBMSG,ENDMSG       MESSAGE ALL DONE                    03470004
         CLOSE (DCBSIN,,DCBMSG,)   CLOSE ALL FILES                     03480004
         CLOSE (DCBUT1,,DCBUT2,)                                       03490004
         L     R13,4(R13)          AND RETURN                          03500004
         RETURN (14,12),T,RC=0                                         03510017
         SPACE 4                                                       03520004
****                                                                    03530004
****     ERROR ROUTINE -- ABEND WITH USER CODE                          03540004
***                                                                     03550004
ERROR    EQU   *                                                       03560004
         LR    R5,R15                                                  03570008
         ABEND (5),,STEP                                               03580008
         EJECT                                                         03590004
*****  PROGRAM DEFINITIONS AND DSECTS                                   03600003
*****                                                                   03610001
SAVEAREA DC    18F'0'              REGISTER SAVE AREA                  03620001
RC04     EQU   4                   SYSIN NOT OPEN OK                   03630007
RC08     EQU   8                   SYSUT1 NOT OPEN OK                  03640007
RC12     EQU   12                  SYSPRINT NOT OPEN OK                03650006
RC16     EQU   16                  SYNTAX ERROR ON CONTROL CARD        03660006
RC20     EQU   20                  SYSUT2 NOT OPEN OK                  03670006
RC24     EQU   24                  NO INPUT CONTROL CARD               03680006
RC28     EQU   28                  BLDL ERROR                          03690006
         SPACE 2                                                       03700006
CARD1    DC    X'F0'                                                   03710009
         DC    CL12' '                                                 03720003
CARD     DC    CL120' '                                                03730012
TRANS    TRT   0(1,R1),TRTABLE                                         03740012
LNGTH67  EQU   67                  MAX LENGTH FOR TRANSLATE            03750006
SW1      DC    X'00'                                                   03760003
ON1      EQU   X'80'                                                   03770003
```

```
BUFSW    EQU   X'40'                                                    03780003
LOAD     DC    C'LOAD '                                                 03790003
LOADM    DC    CL8'LOADMOD='                                            03800003
BLANKS   DC    CL8' '                                                   03810003
TRTABLE  DC    64X'FF'           TRT TABLE FOR BLANK RECORD SCAN        03820007
         DC    X'00'                                                    03830007
         DC    191X'FF'                                                 03840007
ZERO     EQU   0                                                        03850003
ONE      EQU   1                                                        03860003
FIVE     EQU   5                                                        03870003
EIGHT    EQU   8                                                        03880003
COMMA    EQU   C','                                                     03890003
BLANK    EQU   C' '                                                     03900004
TXTSW    DC    X'00'                                                    03910003
ONTXT    EQU   X'40'                                                    03920003
FIRSTXT  EQU   X'80'                                                    03930003
ONESD    EQU   X'20'                                                    03940003
ONLAST   EQU   X'10'                                                    03950007
PLUSZRO  DC    C',+0'                                                   03960003
ENDMSG   DC    X'F0'               PRINT CONTROL                        03970009
         DC    CL120'    -- JOB SUCESSFULLY COMPLETED --'               03980003
HEADMSG  DC    X'F0'                                                    03990009
         DC    CL120'    -- GENERATE VSE OBJECT MODULES --'             04000003
*****                                                                   04010004
LMODLEN  DC    F'0'              AREA TO ACCUM INPUT MODULE LENGTH      04020021
LMODLOA  DC    F'0'              LOAD MODULE LO STORAGE ADDRESS         04030024
LMODHIA  DC    F'0'              LOAD MODULE HI STORAGE ADDRESS         04040024
ROUNDMSK DC    X'FFFFFFF8'       MASK TO ROUND TO NEXT F/W              04050022
****                                                                    04060021
DPHASE   DC    CL10' '           VSE PHASE CARD                         04070004
         DC    C'PHASE   '                                              04080004
DPHASENM DC    CL8' '                                                   04090007
DPHASEBL DC    CL54' '                                                  04100014
**                                                                      04110004
DESD     DC    X'02'          COLS  1    12.2.9 PUNCH  VSE ESD CARD    04120004
         DC    C'ESD'               2-4   ESD                          04130004
         DC    CL6' '               5-10  BLANK                        04140004
         DC    X'0010'              11-12 VAR. FLD COUNT               04150004
         DC    CL2' '               13-14 BLANK                        04160004
         DC    X'0001'              15-16 ESID OF SD                   04170004
DESDNAM  DC    CL8' '               17-36 .. NAME                      04180018
         DC    X'00000000'                .. ESD TYPE, ORIGIN          04190018
         DC    C' '                       .. BLANK                     04200018
DESDLEN  DC    X'000000'                  .. LENGTH                    04210018
         DC    CL50' '              37-80 BLANK                        04220018
**                                                                      04230004
DTXT     DC    X'02'             COLS 1      12.2.9 PUNCH             04240004
         DC    C'TXT'                 2-4    TXT                      04250004
         DC    C' '                   5      BLANK                    04260004
DTXTRAD  DC    X'000000'              6-8    RELATIVE ADDRES          04270004
         DC    CL2' '                 9-10   BLANKS                   04280020
DTXTLEN  DC    X'0000'                11-12  BYTE COUNT               04290004
         DC    CL2' '                 13-14  BLANK                    04300004
         DC    X'0001'                15-16  ESID                     04310004
DTXTINF  DC    CL56' '                17-72  TEXT INFO                04320004
MAXTXT   EQU     56                                                    04330007
         DC    CL8' '                 73-80  BLANKS                   04340004
**                                                                      04350004
DEND     DC    X'02'             VSE END CARD                         04360004
         DC    CL4'END '                                              04370018
DENDNTRY DC    X'000000'               ADDRESS OF ENTRY POINT         04380018
         DC    CL6' '                  BLANKS                         04390018
         DC    X'0001'                 ESID NO.                       04400018
         DC    CL65' '                 ESID NO.                       04410018
**                                                                      04420004
DSLASHAS DC    CL80'/* '                                              04430004
         EJECT                                                        04440004
***                                                                     04450004
***      DCB'S FOR ALL DATA SETS                                       04460004
***                                                                     04470004
DCBSIN   DCB   DDNAME=SYSIN,DSORG=PS,EROPT=ABE,MACRF=(GL),RECFM=FB,    *04480004
               EODAD=ENDFILE                                           04490004
         SPACE 2                                                      04500004
DCBMSG   DCB   DDNAME=SYSPRINT,DSORG=PS,RECFM=FA,MACRF=(PM),DEVD=DA,   *04510004
```

```
                BLKSIZE=121,LRECL=121                                   04520004
          SPACE 2                                                       04530004
DCBUT1    DCB   BLKSIZE=1028,EODAD=INPUTEOF,DDNAME=SYSUT1,DEVD=DA,      *04540004
                DSORG=PO,MACRF=(R),NCP=2,RECFM=U                        04550004
          SPACE 2                                                       04560004
DCBUT2    DCB   BLKSIZE=80,DDNAME=SYSUT2,DEVD=DA,DSORG=PS,MACRF=(PM),   *04570007
                RECFM=FB,LRECL=80                                       04580004
          SPACE 2                                                       04590004
**                                                                      04600004
          READ  DECBIN1,SF,DCBUT1,INBF1V,'S',MF=L                       04610008
          READ  DECBIN2,SF,DCBUT1,INBF2V,'S',MF=L                       04620008
*****                                                                   04630004
*****     BLDL LIST FOR LOAD MODULE DATA SET                            04640004
*****                                                                   04650004
BLDLIST   DS    0H                                                      04660004
NENTRY    DC    H'1'              NO.OF ENTRIES THIS LIST               04670012
LENTRY    DC    H'58'             EACH ENTRY 58 BYTES LONG              04680006
MEMBER1   DC    CL8' '            MEMBER NAME -- INITIALLY BLANK        04690004
RALTTRK1  DC    4X'00'            USED IN FIND                          04700004
Z         DC    X'00'             FLAG BYTE                             04710004
C         DC    X'00'             FLAG BYTE                             04720004
          ORG   MEMBER1+22                                              04730004
ATTRIB    EQU   *                 ATTRIBUTE FIELD                       04740004
          ORG   MEMBER1+29                                              04750004
EPAMEM    EQU   *                 ENTRY POINT IF MEMBER DIR. ENTRY      04760004
          ORG   MEMBER1+43                                              04770004
EPAALS    EQU   *                 ENTRY POINT IF ALIAS DIR. ENTRY       04780004
          ORG   MEMBER1+58                                              04790004
MEMBER2   DC    CL8' '                                                  04800004
          DC    XL50'00'                                                04810004
MEMBER3   DC    CL8' '                                                  04820016
          DC    XL50'00'                                                04830016
MEMBER4   DC    CL8' '                                                  04840016
          DC    XL50'00'                                                04850016
MEMBER5   DC    CL8' '                                                  04860016
          DC    XL50'00'                                                04870016
MEMBER6   DC    CL8' '                                                  04880016
          DC    XL50'00'                                                04890016
MEMBER7   DC    CL8' '                                                  04900016
          DC    XL50'00'                                                04910016
MEMBER8   DC    CL8' '                                                  04920016
          DC    XL50'00'                                                04930016
MAXMEMBR  EQU   8               MAX. NO OF ENTRIES IN BLDL LIST         04940016
ALIASIND  EQU   X'80'            INDICATES ALIAS MODULE                 04950018
RENREUS   EQU   X'C0'            REENTERABLE/REUSABLE LOAD MODULE       04960018
***                                                                     04970004
          SPACE 2                                                       04980008
INBF1A    DC    A(INBF1V)                                               04990008
INBF2A    DC    A(INBF2V)                                               05000008
          LTORG                                                         05010008
          DS    0D                                                      05020008
INBF1V    DS    2000C                                                   05030015
INBF2V    DS    2000C                                                   05040015
          EJECT                                                         05050004
***                                                                     05060004
***     DSECTS                                                          05070004
***                                                                     05080004
INPUTDS   DSECT                   DSECT FOR LOAD MODULE                 05090004
LMTYPE    DC    AL1(0)            TYPE INDICATOR FOR LOAD               05100004
*                                 MODULE RECORD.                        05110004
CONTROL   EQU   X'01'            CONTROL RECORD INDICATOR               05120004
ENDOF     EQU   X'0C'            END OF LOAD MODULE INDICATOR           05130004
CESD      EQU   X'20'            CESD RECORD INDICATOR                  05140004
RLD       EQU   X'02'            RLD RECORD INDICATOR                   05150004
          ORG   *+8                                                     05160004
INADDR    DC    AL3(0)            RELATIVE ADDR. OF FOLLOWING TEXT REC. 05170004
          ORG   *+2                                                     05180004
COUNT     DC    AL2(0)            NO.OF BYTES IN FOLLOWING TEXT RECORD  05190004
          ORG   LMTYPE+6                                                05200021
IESDLEN   DC    AL2(0)            ESD RECORD LENGTH                     05210021
IESD      EQU   *                 START OF ESD INFO                     05220021
          ORG   ,                                                       05230021
          SPACE 6                                                       05240004
```

```
DCBD  DSORG=PS           DSECT FOR DCB'S                        05250008
END   BLDTEXT                                                   05260004
```

APPENDIX D. POWER VERSION 2 NETWORKING DEFINITIONS

The tests described in the body of this document are based on the coding which follows. For a fuller description of each parameter refer to the appropriate product description manual.

```
POWERV2  POWER                                                          *
               DBLK=0,                                                  *
               TRACKGP=0,                                               *
               BLOCKGP=0,                                               *
               LTAB=(10,00,05,10,15,20,25,30,35,40,45,50,56),           *
               PRI=3,                                                   *
               SUBLIB=S,                                                *
               ACCOUNT=YES,                                             *
               STDLINE=(0,0),                                           *
               STDCARD=(0,0),                                           *
               JLOG=YES,                                                *
               JSEP=(0,0),                                              *
               RBS=(0,0),                                               *
               RDREXIT=NO,                                              *
               PAUSE=NO,                                                *
               SPOOL=YES,                                               *
               SNA=(8,,RALVSE3),  <------------------                   *
               FEED=NO,                                                 *
               MULT12=NO,                                               *
               COPYSEP=YES,                                             *
               CLRPRT=YES,                                              *
               MRKFRM=YES,                                              *
               SHARED=NO,                                               *
               PNET=POWRJE3 <--------------------------
         END
```

Figure 39. Example of POWER Version 2 macro coding for sub-area 12: The SNA parameter has been changed to reflect a new APPLID and a new parameter, PNET, has been added.

```
POWRJE3  PNODE NODE=RALVSE3,LOCAL=YES,APPLID=RALVSE3,AUTH=NET
         PNODE NODE=RALVSMV3,APPLID=RALVSMV3,AUTH=NET
         PNODE NODE=RALYDPD3,AUTH=NET,ROUTE1=RALVSMV3
         END
```

Figure 40. Example of PNET macro coding for sub-area 12: The macro defines the adjacent node RALVSMV3 sub-area 11, and m a further node off sub-area 11 which is VM via a virtual channel to channel.

```
RALVSE3  APPL AUTH=(ACQ,PASS),MODETAB=MTPNET,VPACING=3
 BKEND
```

Figure 41. Example of APPL statement for sub-area 12 POWER networking: This statement is included in a B.source member accessible to m VTAM.

```
**************RMT12 IS JOB ENTRY PROGRAM.
RMT12 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22A11
R12.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R12.RD1
R12.PU1 START,NOSEP
**************RMT13 IS JOB ENTRY PROGRAM.
RMT13 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22B11
R13.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP,UCS=PN
R13.RD1
R13.PU1 NOSEP
**************RMT14 IS JOB ENTRY PROGRAM
RMT14 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22C11
R14.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP,UCS=PN
R14.RD1
R14.PU1 NOSEP
**************RMT15 IS JOB ENTRY PROGRAM.
RMT15 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22D11
R15.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R15.RD1
R15.PU1 NOSEP
**************RMT16 IS JOB ENTRY PROGRAM.
RMT16 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22E11
R16.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R16.RD1
R16.PU1 NOSEP
**************RMT17 IS JOB ENTRY PROGRAM
RMT17 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22F11
R17.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R17.RD1
R17.PU1 NOSEP
```

Figure 42. Excerpt of NJE-JES2 start-up list for JEP

```
*     NJE DEFINITION PARAMETER          *
*************************************
&NUMTPBF=150
&NUMNODE=99
&NUMNAT=256
&NUMNJR=3
&NUMNJT=3
&NUMNSR=3
&NUMNST=3
&NUMPATH=8
&NUMLNES=20
&NUMRJE=110
&NETLNES=20
&OWNNODE=11
*MLBFSIZ=300
&MLBFSIZ=512
N1      NAME=RALYDPD,NETAUTH,SNA
N2      NAME=RALYDPD2,NETAUTH,SNA
N3      NAME=RALYDPD3,NETAUTH
N4      NAME=RALYDPD4,NETAUTH
N5      NAME=RALYDPD5,NETAUTH
N8      NAME=RALVSMV8,SNA,NETAUTH
N11     NAME=RALVSMV3,SNA,NETAUTH
N12     NAME=RALVSE3,SNA,NETAUTH
N19     NAME=REMJES19,SNA
N21     NAME=RALVSMV1,SNA,NETAUTH
N26     NAME=RALVSMV4,SNA,NETAUTH
LINE1   UNIT=SNA                                                    *
LINE2   UNIT=SNA                                                    *
LINE3   UNIT=SNA                                                    *
LINE4   UNIT=SNA                                                    *
LINE5   UNIT=SNA                                                    *
LINE6   UNIT=SNA                                                    *
LINE7   UNIT=SNA                                                    *
LINE8   UNIT=SNA                                                    *
LINE9   UNIT=SNA                                                    *
LINE10  UNIT=SNA                                                    *
LINE12  UNIT=310,TRANSP,HISPEED,FDUPLEX                             *
LINE13  UNIT=410,TRANSP,HISPEED,FDUPLEX                             *
LINE14  UNIT=510,TRANSP,HISPEED,FDUPLEX                             *
LINE15  UNIT=070,TRANSP                                             *
LINE16  UNIT=069,TRANSP                                             *
LINE17  UNIT=072,TRANSP,FDUPLEX
CONNECT NODEA=11,MEMBA=1,NODEB=08,MEMBB=1,REST=2
CONNECT NODEA=11,MEMBA=1,NODEB=03,MEMBB=1,REST=2
CONNECT NODEA=11,MEMBA=1,NODEB=02,MEMBB=1,REST=2
CONNECT NODEA=11,MEMBA=1,NODEB=12,MEMBB=1,REST=2
CONNECT NODEA=03,MEMBA=1,NODEB=01,MEMBB=1,REST=2
CONNECT NODEA=03,MEMBA=1,NODEB=05,MEMBB=1,REST=2
CONNECT NODEA=03,MEMBA=1,NODEB=21,MEMBB=1,REST=2
CONNECT NODEA=03,MEMBA=1,NODEB=04,MEMBB=1,REST=2
```

Figure 43. Excerpt of NJE-JES2 start-up list for PNET

```
          VBUILD TYPE=CDRSC
RALVSE3   CDRSC CDRM=M12
```

Figure 44. CDRSC for NJE-PNET

```
         VBUILD TYPE=APPL
RALVSMV3 APPL  AUTH=(ACQ),EAS=(5),ACBNAME=RALVSMV3,VPACING=7,          X
               MODETAB=MODENJE,DLOGMOD=MTNJE72
```

Figure 45. APPL for NJE-PNET

```
         PRINT NOGEN
MODENJE  MODETAB
         MODEENT LOGMODE=MTNJE72,COS=NJE,                              X
               FMPROF=X'03',                                           X
               TSPROF=X'03',                                           X
               PRIPROT=X'72',                                          X
               SECPROT=X'72',                                          X
               COMPROT=X'4020',                                        X
               RUSIZES=X'8686'
         MODEEND
         END
```

Figure 46. MODETABLE for NJE-PNET

APPENDIX F. JEP RELATED DEFINITIONS

The runs involving JEP as a VSE VTAM data transfer program were carried out on a different network configuration. This configuration shown in Figure 47, was replaced during the writing of this guide by that used in the rest of this book. This older network had different sub-area and system numbers, but used basically the same operating systems as the new network.

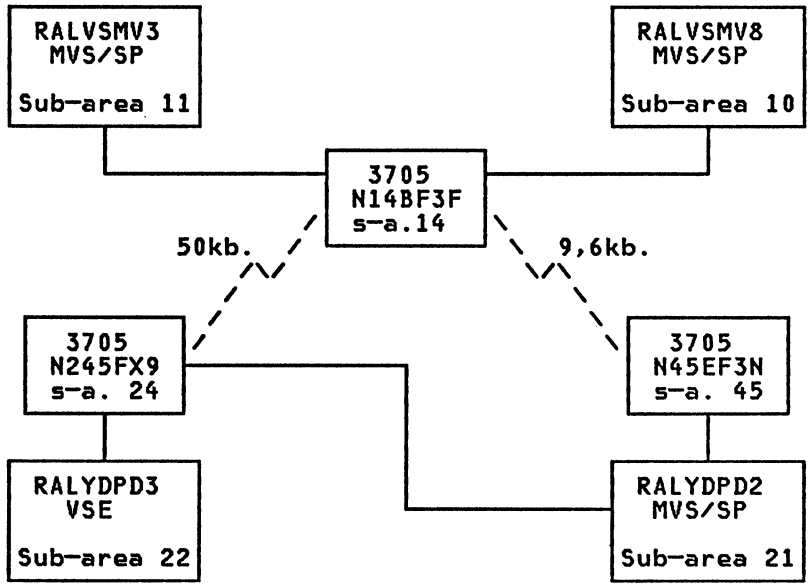

Figure 47. Network Overview: Diagram of a section of the network used for testing jobs described in this guide

Some of the relevant definitions used in the MVS/VSE tests follow.

For a more detailed discussion of JEP refer to the IBM WTSC publication CNM/Managing Interconnected Systems, as listed in "Chapter 8. Bibliography" on page 43.

JEP TABLE

```
PBESSY     MACRF=START,                                          *
      PHASE=JEPV2A,                                              *
      DUMMY=DUMMY
PBESSY     MACRF=JEP,                                            *
      JEPAPPL=(JEP22A11,JEP22B11,JEP22C11,JEP22D11,              *
      JEP22E11,JEP22F11,                                         *
      JEP22A01,JEP22B01,JEP22C01,                                *
      JEP22D01,JEP22E01,JEP22F01,                                *
      JEP22A21,JEP22B21,JEP22C21,                                *
      JEP22D21,JEP22E21,JEP22F21),                               *
      PSWRD=DOSJEP,                                              *
      DUMMY=DUMMY
PBESSY     MACRF=HOST,                                           *
      HSTAPPL=RALVSMV3,                                          *
      HSTTYPE=JES2,                                              *
      REMOTE=011,                                                *
      DUMMY=DUMMY
PBESSY     MACRF=ID,                                             *
      ID=1,                                                      *
      JEPAPPL=(JEP22A11,JEP22B11,JEP22C11,                       *
      JEP22D11,JEP22E11,JEP22F11),                               *
      HSTAPPL=RALVSMV3,                                          *
      AUTOLOG=YES,                                               *
      LOGMODE=LGJEPJES,                                          *
      DUMMY=DUMMY
PBESSY     MACRF=END
END
```

Figure 48. JEP macro for VSE POWER version 1: The assembled definition is cataloged into a core image library accessible to POWER.

JEP VTAM DEFINITIONS

```
R22AJEP VBUILD  TYPE=CDRSC
JEP22A11 CDRSC  CDRM=M22
JEP22B11 CDRSC  CDRM=M22
JEP22C11 CDRSC  CDRM=M22
JEP22D11 CDRSC  CDRM=M22
JEP22E11 CDRSC  CDRM=M22
JEP22F11 CDRSC  CDRM=M22
```

Figure 49. JEP CDRSCs VSE POWER Version 1: The CDRSCs are placed in the B.source library for VSE VTAM.

```
A22JEP   VBUILD TYPE=APPL
POWER    APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22A11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22B11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22C11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22D11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22E11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22F11 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22A01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22B01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22C01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22D01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22E01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22F01 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22A21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22B21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22C21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22D21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22E21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
JEP22F21 APPL  MODETAB=LGJEPJES,VPACING=7,EAS=1
```

Figure 50. JEP APPLS: The APPLS are placed in the B.source library for VSE VTAM.

```
LGJEPJES MODETAB
         MODEENT    LOGMODE=LGJEPJES,FMPROF=X'03',TSPROF=X'03',        C
               PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7080',             C
               PSNDPAC=X'00',SRCVPAC=X'00',SSNDPAC=X'01',               C
               RUSIZES=X'8585',PSERVIC=X'01102000F100C00000010060'
         MODEEND
         END
```

Figure 51. JEP mode table: The assembled mode table is placed in a VSE core image library accessible to VTAM.

POWER (VERSION 1) FOR JEP

```
POWERTST POWER                                                          *
               DBLK=0,                                                  *
               TRACKGP=0,                                               *
               BLOCKGP=0,                                               *
               LTAB=(10,00,05,10,15,20,25,30,35,40,45,50,56),           *
               PRI=3,                                                   *
               SUBLIB=P,                                                *
               ACCOUNT=NO,                                              *
               STDLINE=(0,0),                                           *
               STDCARD=(0,0),                                           *
               JLOG=YES,                                                *
               JSEP=(0,0),                                              *
               RBS=(0,0),                                               *
               RDREXIT=NO,                                              *
               PAUSE=NO,                                                *
               SPOOL=YES,                                               *
               SNA=(6),                                                 *
               FEED=NO,                                                 *
               MULT12=NO,                                               *
               COPYSEP=YES,                                             *
               CLRPRT=YES,                                              *
               MRKFRM=YES,                                              *
               SHARED=NO,                                               *
               JEP=70
         END
```

Figure 52. POWER parameters used with JEP: The last parameter is the only addition to this otherwise standard POWER Version 1 list.

NJE FOR JEP

```
**************RMT12 IS JOB ENTRY PROGRAM.
RMT12 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22A11
R12.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R12.RD1
R12.PU1 START,NOSEP
**************RMT13 IS JOB ENTRY PROGRAM.
RMT13 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22B11
R13.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP,UCS=PN
R13.RD1
R13.PU1 NOSEP
**************RMT14 IS JOB ENTRY PROGRAM
RMT14 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22C11
R14.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP,UCS=PN
R14.RD1
R14.PU1 NOSEP
**************RMT15 IS JOB ENTRY PROGRAM.
RMT15 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22D11
R15.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R15.RD1
R15.PU1 NOSEP
**************RMT16 IS JOB ENTRY PROGRAM.
RMT16 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22E11
R16.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R16.RD1
R16.PU1 NOSEP
**************RMT17 IS JOB ENTRY PROGRAM
RMT17 LUTYPE1,BUFSIZE=256,COMP,CONSOLE,NUMPR=1,NUMPU=1,                C
      SETUPHDR,DISCINTV=0,VARIABLE,WAITIME=1,LUNAME=JEP22F11
R17.PR1 START,PRWIDTH=132,CLASS=JA,NOSEP
R17.RD1
R17.PU1 NOSEP
```

Figure 53. NJE parameters used with JEP: This is an excerpt from the JES2 start list member.

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