VM/Pass-Through Facility

SC24-5710-01

TCP/IP Line Drive Support

Version 2 Release 1.1

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Note:

Before using this information and the product it supports, read the information in “Notices” on page 29.

Second Edition (January 2020)

This edition applies to the VM/Pass-Through Facility (PVM) Version 2 Release 1.1, program number 5684-100, and to all subsequent releases and modifications until otherwise in new editions.

Last updated: December 9, 2019

Contents

Preface

This book describes the configuration procedures needed for VM/Pass-Through Facility (PVM) peer to peer Transmission Control Protocol/Internet Protocol (TCP/IP) support. It also describes support for a new sample S3270 Line Driver that is used to control terminals connected to a control unit using SNA protocols.

Audience

This document is for system administrators responsible for maintaining computer networks using PVM on a z/VM® system. It supplements the existing information contained in the Version 2 *VM/Pass-Through Facility Administration and Operation* and *VM/Pass-Through Facility Messages* books.

Where To Find More Information

This book documents only changes and additions that pertain to PVM TCP/IP support. You will need to refer to the *VM/Pass-Through Facility Administration and Operation* book for additional information about PVM. You should also be familiar with the following TCP/IP books:

- *z/VM: TCP/IP Programmer's Reference*, SC24-6332
- *z/VM: TCP/IP Planning and Customization*, SC24-6331
- *z/VM: TCP/IP Messages and Codes*, GC24-6330
- *z/VM: TCP/IP User's Guide*, SC24-6333
- *z/OS Cryptographic Services System Secure Sockets Layer Programming*, SC14-7495

Ordering, Installation, and Service

The PVM TCP/IP line driver support can be ordered as Program Temporary Fix (PTF) number UV90727 for APAR VM57537 for VM/Pass-Through Facility Version 2 Release 1.1. This PTF is installed using the servicing capabilities of VMSES/E. This PTF will also be available on any future Recommended Service Upgrade (RSU).

How To Send Comments

We appreciate your input on this publication. Feel free to comment on the clarity, accuracy, and completeness of the information or give us any other feedback that you might have.

To send us your comments, go to z/VM Reader's Comment Form (www.ibm.com/systems/campaignmail/z/zvm/zvm-comments) and complete the form.

If You Have a Technical Problem

Do not use the feedback method. Instead, do one of the following:

- Contact your IBM® service representative.
- Contact IBM technical support.
- See IBM z/VM Support Resources (www.ibm.com/vm/service).
- Go to IBM Support Portal (www.ibm.com/support/entry/portal/Overview).

Summary of Changes

This information includes terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations for the current edition are indicated by a vertical line to the left of the change.

SC24-5710-01, PVM Version 2 Release 1.1 (December 2019)

This edition includes changes to support the general availability of VM/Pass-Through Facility Version 2 Release 1.1.

The supported product changes include:

A TLSLABEL is added to the LINK configuration record and DEFINE command for TCPIP links to establish secure connectivity.

SC24-5710-00, PVM Version 2 Release 1.1 (April 1994)

This edition includes changes to supportproduct changes provided or announced after the general availability of VM/Pass-Through Facility Version 2 Release 1.1.

The supported product changes include:

PVM TCP/IP Support

The following additions and changes were made to PVM for TCP/IP communications support:

- A TCP/IP line driver task is provided for communicating with a remote PVM node over a TCP/IP network.
- A TCP/IP redirector task is provided to process a remote node's TCP/IP connect request.
- A new TCP configuration record is added to support the TCP/IP redirector task.
- New operands are added to the LINK configuration record for defining a link to a remote PVM system over a TCP/IP network.
- A new TCP command is added to control starting, stopping, and tracing of the TCP/IP redirector task's connection with VM TCP/IP.
- The TCP operand is added to the QUERY command to display the virtual machine running VM TCP/IP, the TCP port number used by the local PVM virtual machine, and the status of the redirector task.
- New operands are added to the DEFINE command to add a link to a remote PVM system over a TCP/IP network.
- Some existing PVM messages were changed and new messages were added for TCP/IP line driver support.

Sample S3270 Line Driver

The following additions and changes were made to PVM to support the sample S3270 line driver:

- A sample line driver (S3270) is provided for terminal support using SNA protocols.
- A new operand was added to the TRACE command to show the status of the S3270 line driver tracing and the status of each active terminal.
- A new operand was added to the VARY command to restart a port on a S3270 controlled control unit.

In addition to the above technical changes, other minor changes occur to command and record descriptions. Except for the information contained in this book, all other PVM support remains unchanged. Be sure to use this book in conjunction with the *VM/Pass-Through Facility Administration and Operation* and *VM/Pass-Through Messages* books.

TCP/IP Line Driver Overview

VM/Pass-Through Facility (PVM) Transmission Control Protocol/Internet Protocol (TCP/IP) provides a PVM peer-to-peer line driver using a TCP/IP network as the transport medium. This line driver takes advantage of the high speed capabilities of an internet network, providing VM users with fast, reliable access to applications available from a remote PVM node.

A PVM TCP/IP line driver communicates with another PVM TCP/IP line driver at a different VM node in a peer-to-peer environment. Neither side acts as a client nor a server. Once a connection is established between two nodes, this is not a problem. However, to establish the connection, there needs to be a client and server relationship between the two nodes when PVM is initialized. The PVM TCP/IP redirector task solves this problem by acting as a server waiting for a connect request from the other node. The PVM TCP/IP line driver task from the other node acts as the client by sending the connect request. The redirector task at the receiving node intercepts the connect request, verifies that the request is valid, and passes the request to the local TCP/IP line driver task, establishing the local node's receive path. When both nodes issue and complete connect requests with the opposite node, communications are established between the nodes.

Figure 1 graphically illustrates this client and server relationship between two nodes during PVM initialization.

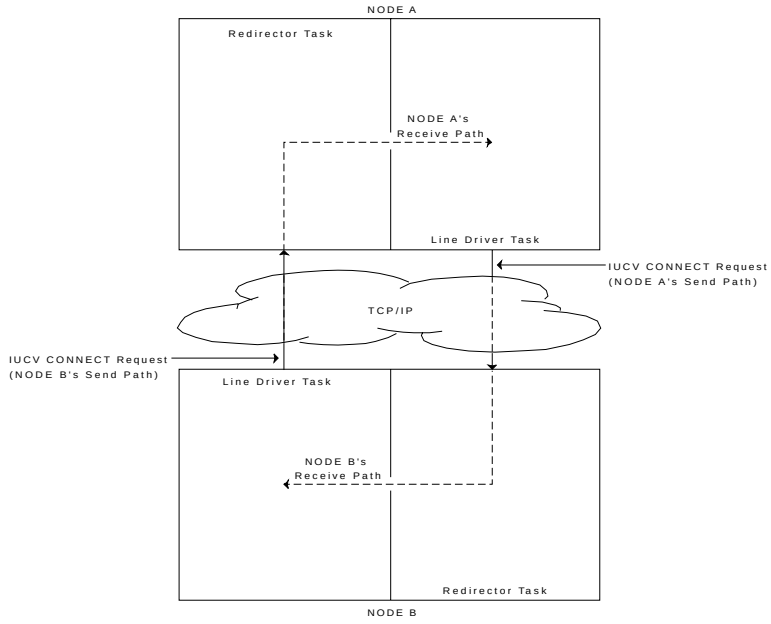


Figure 1. PVM TCP/IP Client-Server Relationship

The PVM TCP/IP Redirector Task

NOT-PI

The redirector task's function is to listen for a connect request to the local node over a TCP/IP network. The redirector task takes the information from the requesting node and checks to see if there is a link defined for the requesting node. If not, the redirector task sends a message back to the requester indicating that there is no link defined and waits for another request to come in. If there is a link defined, the redirector task informs the TCP/IP line driver task that a valid node is requesting a connection with this

node. The redirector task makes the interface available to the TCP/IP line driver task and then waits for another request to come in.

Redirector Task Error Processing

If the redirector task encounters an error, based on the type of error, one of the following error procedures is initiated:

- If an IUCV SEVER occurs, then the redirector task waits 5 minutes and attempts to re-establish communications with VM TCP/IP.
- If VM TCP/IP returns a return code of -1, and if it is during a CONNECT socket request, then the new socket is closed and the redirector task issues another LISTEN socket request to VM TCP/IP. Otherwise, the redirector task ends.
- If the redirector encounters an IUCV error, the redirector task ends.
- If an End-of-File indication is received on a READ, the new socket is closed and another LISTEN socket request is issued to VM TCP/IP.

In all cases, appropriate error messages are issued.

The PVM TCP/IP Line Driver Task

The TCP/IP line driver task issues a TCP/IP SOCKET CONNECT to the remote PVM node using the defined IP address and port number of the remote node. This SOCKET will become the local node's send path. The TCP/IP line drive then waits for a GIVESOCKET from the local redirector task, created from the remote node's CONNECT request. This SOCKET will become the local node's receive path. Once the SOCKETs are established, the communication link is connected and normal PVM packets can be exchanged.

When a TLSLABEL has been defined, a secure connection with the TLS/SSL server is established during socket connect processing.

PVM TCP/IP Line Driver Error Processing

If the VM TCP/IP line driver task encounters an error, based upon the type of error, one of the following error procedures is initiated:

- If an IUCV SEVER occurs during initial connect processing, the TCP/IP line driver task waits 5 minutes, then attempts to re-establish communications with VM TCP/IP. Otherwise, the TCP/IP line driver task ends and the network manager restarts the line driver.
- If VM TCP/IP returns a return code of -1, the line driver task ends. It will be restarted again by the network manager only if communications with the remote node had been established.
- If the TCP/IP line driver receives an End-of-File indication on a READ, and the TCP/IP line driver has established communications with the remote node, the line driver task ends and is restarted by the network manager. Otherwise, the CONNECT socket request is retried in 5 minutes
- If an IUCV error is encountered, the line driver task ends. It will be restarted by the network manager only if communications with the remote node had been established.
- If a CONNECT socket request completes but a GIVESOCKET does not arrive from the redirector task from the remote node's CONNECT request within 5 minutes, the socket is closed and a CONNECT socket request is issued again in 5 minutes.

- If a secure connectivity mismatch is encountered for which one side is configured with a TLSLABEL and the other side is not, an error message is issued.

In all cases, appropriate error messages are issued.

NOT-PI end

A Word About Sockets

Both the PVM TCP/IP redirector task and the PVM TCP/IP line driver use TCP/IP sockets to interface with TCP/IP. Once these sockets are established, a user can communicate across networks with remote applications. From the line driver and the redirector's perspective, a socket is a resource allocated by the TCP/IP virtual machine. The TCP/IP socket interface provides applications with a network interface that hides the details of the physical network.

For more information about TCP/IP sockets, you should refer to the *z/VM: TCP/IP Programmer's Reference*.

Tracing Considerations

PVM TCP/IP line driver tracing support is provided similar to current line driver tracing support. I/O tracing for the redirector task is also supported. Refer to chapter 12 of the *VM/Pass-Through Facility Administration and Operation* book for tracing information.

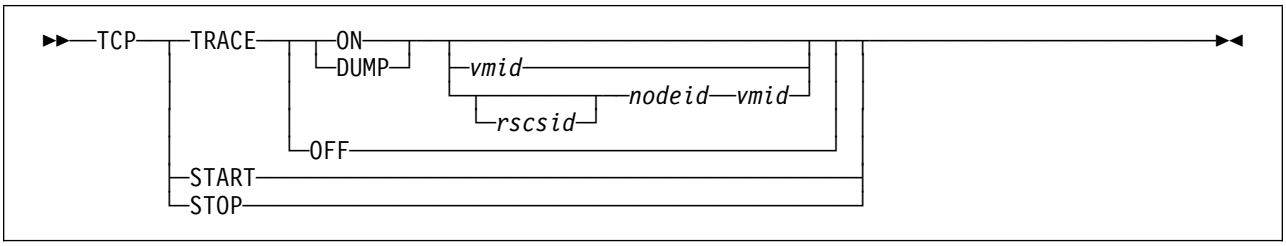
PVM Commands

The following PVM commands are new or have changed to support PVM TCP/IP transmissions:

New	Changed
TCP	QUERY
	DEFINE

With the exception of the changes noted here, all information concerning PVM commands described in Appendix C of the *VM/Pass-Through Facility Administration and Operation* book still apply.

TCP



Purpose

Use the TCP command to start or stop the TCP/IP redirector task and to control the tracing facility of the TCP/IP redirector task's connection with VM TCP/IP.

Parameters

TRACE
starts or stops the redirector task tracing facility

ON
starts the trace

OFF
stops the trace

DUMP
causes the redirector task to dump it's control blocks and trace tables

rscsid nodeid vmid
issues a CP SPOOL command and a CP TAG command to send the output over the RSCS network (*rscsid*) to the reader (*vmid*) at the specified node (*nodeid*). If you do not specify *rscsid*, it defaults to RSCS.

START
starts the TCP/IP redirector task.

STOP
stops the TCP/IP redirector task.

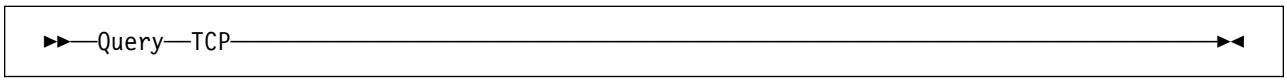
Usage

1. This command is restricted to the PVM operator or an alternate operator specified on an AUTHORIZ record in the PVM configuration file.
2. The TRACE operand is initially set to OFF.
3. When issued from another virtual machine using SMSG, you can use a command prefix with this command to tell PVM how to respond to the command. See "Using Command Prefixes" section of chapter 15 in the *VM/Pass-Through Administration and Operation*, manual SC24-5557, for more information about command prefixes.

QUERY

The format of the QUERY command below only shows the information required for obtaining the user ID and port number of the virtual machine running VM TCP/IP, and status of the redirector task.

Refer to Appendix C of the *VM/Pass-Through Facility Administration and Operation* for additional information about the QUERY command.



Parameters

TCP

display the defined virtual machine running VM TCP/IP, the defined TCP/IP port number of the local PVM machine, and the status of the redirector task. The status is displayed as one of the following:

DOWN
: The PVM TCP/IP redirector task has not started, or it has ended because it encountered an error.

WAITING
: The redirector task is in the process of connecting with VM TCP/IP.

CONNECT
: The redirector task has connected with VM TCP/IP and is currently sending the initial data string.

ISEND
: The initial data string has been sent and the redirector task is currently issuing a SOCKET socket request to VM TCP/IP.

SOCKET
: The SOCKET request has been accepted by VM TCP/IP and the redirector task is currently issuing a BIND socket request to VM TCP/IP.

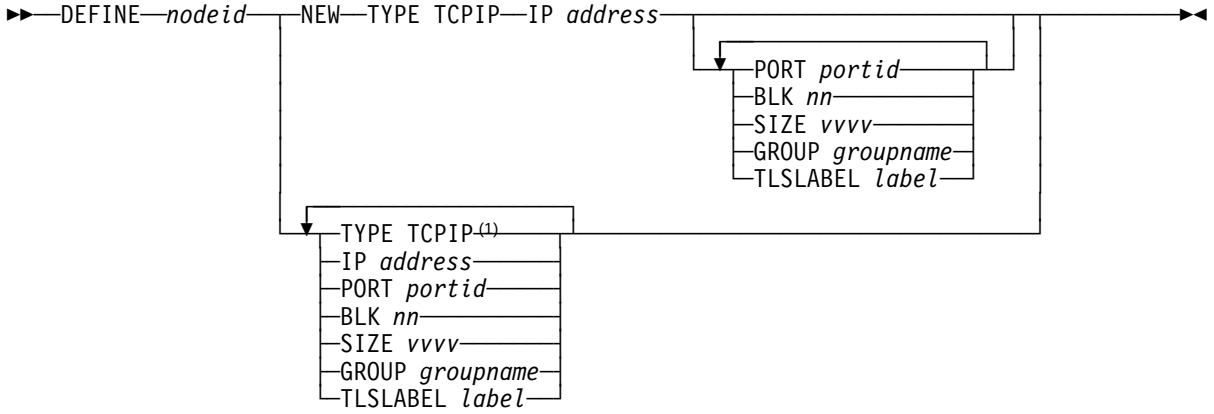
BOUND
: VM TCP/IP has accepted the BIND request and the redirector task is currently issuing a LISTEN socket request to VM TCP/IP.

LISTEN
: VM TCP/IP has accepted the LISTEN socket request. The redirector task is either blocked on an ACCEPT socket request to VM TCP/IP, or is processing a remote node's connect request.

DEFINE

The format of the DEFINE command below only shows the information required for adding or modifying a PVM link to a TCP/IP redirector task.

Refer to Appendix C of the *VM/Pass-Through Facility Administration and Operation* for additional information about the DEFINE command.



Note:
[1] If the TYPE *tcpip* keyword/variable pair is selected from the options, it must immediately follow the *nodeid* parameter.

Parameters

nodeid
is the node name of the node on the remote end of this link if this link does not belong to a line group. If this link is part of a line group, the node name cannot be the same as any PVM network node.

NEW
adds a new link. It must immediately follow the *nodeid*

TYPE TCPIP
assigns a new link type indicating that the link type to another PVM node is made over a TCP/IP network.

IP *address*
indicates the internet address of the remote PVM node. Since an IP address is a 4-level address, each level being a value from 1 to 255, *address* is specified as two fields. The first field contains the first two levels separated by a period, and the second field contains the second two levels separated by a period. An example of *address* would be 9.130 25.200. The IP keyword is only valid for TCPIP type links.

PORT *portid*
indicates the port number of the PVM machine at the remote node in the range 10-65534. If not specified, then the port number will default to the one used on the TCP record within the PVM configuration file. The PORT keyword is only valid for TCPIP type links.

BLK *nn*
indicates the number of 4K areas that are tied together for the output transmission block. The value of *nn* for TCPIP type links ranges from 1 to 8, and for 3088 type links from 2 to 16. The default value is 3.

SIZE *vvvv*
indicates the *threshold block size* for this link. The default value is 4096 for IUCV, CTCA, APPC, 3088, and TCPIP, and 1000 for any other types. The value of *vvvv* ranges from 200 to 4096.

GROUP *groupname*
indicates that *nodeid* is part of the group *groupname*. The specified group must already be defined in PVM.

Note: Only one TCPIP and APPC type link can be in each group.

TLSLABEL *label*
specifies the 1- to 8-character label of an x.509 digital certificate that will be used to encrypt/decrypt all data flowing over the link using TLS protocols. The specified certificate and its corresponding TLSLABEL must exist in the TLS/SSL Server certificate database. For additional information on the TLS/SSL Server and managing its certificate database, see *z/VM: TCP/IP User's Guide* and *z/VM: TCP/IP Planning and Customization*. The TLSLABEL keyword is only valid for TCPIP type links.

SET RESERVE (CP command)

The SET RESERVE calculation in Chapter 13 of the *VM/Pass-Through Facility Administration and Operation* includes the equation of `5(TCPIP)` for the TCP/IP line driver. The complete formula is:

```
RES = 8 + 4(EMUL) + 3(BSCA) + 2(CTCA) + 7(R3270) + 5(APPC) + 2(IUCV)
      + 3(DIAL) + 2(PRT) + 2(PASS) + 2(APP) + 3(ROCF) + 2(PCCF) + 3(MPVM)
      + 5(TCPIP)
```

`TCPIP` is 1 if any TCPIP line drivers are active.

Refer to Chapter 13 of the *VM/Pass-Through Facility Administration and Operation* for an explanation of the components used in the calculation. Refer to the *VM/ESA CP Command and Utility Reference* for a description of the CP SET RESERVE command.

Other Command Changes

The PVM TCP/IP line driver will respond to the DROP node, QUERY node, QUIESCE node, RESUME node, START node, and TRACE node commands in the same way as other PVM line drivers.

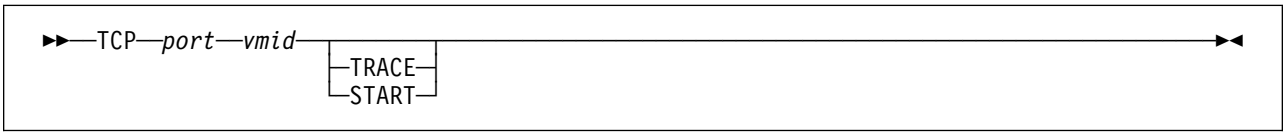
PVM Configuration Records

The following configuration records are new or have changed to support PVM TCP/IP transmissions:

New	Changed
TCP	LINK
	BUFFERS
	EXT
	GROUP

With the exception of the changes noted here, all information concerning PVM configuration records described in Appendix D of the *VM/Pass-Through Facility Administration and Operation* book still apply.

TCP



Purpose

Use the TCP record to define information about an installation's site TCP/IP configuration to the PVM machine.

All LOCAL, LINK, PORT, CLUSTER, CLPORT, GROUP, ROUTE, or AUTHORIZ records must precede this record. If you enter more than one TCP record in the configuration file, only the last TCP record in the list is accepted. PVM ignores the other TCP records.

Parameters

port
defines the TCP/IP port number for the local PVM machine in the range 10-65534. The default port number value is 999.

vmid
defines the virtual machine ID running VM TCP/IP. The default user ID is TCPIP.

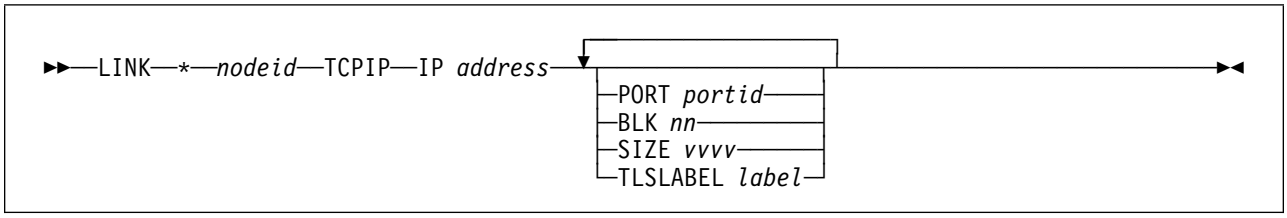
TRACE
start an I/O trace of the TCP/IP redirector task's connection with VM TCP/IP.

START
automatically start the TCP/IP redirector task during PVM initialization.

LINK

The format of the LINK record below only shows the subset of information required for establishing TCP/IP links.

Refer to Appendix D of the *VM/Pass-Through Facility Administration and Operation* for additional information about the LINK configuration record.



Parameters

***** indicates that a line address is not provided. This parameter is only valid and is required for TCPIP or IUCV type links.

nodeid
is the node name of the node on the remote end of this link if this link does not belong to a line group. If this link is part of a line group, the node name cannot be the same as any PVM network node.

TCPIP
indicates that the link type to another PVM node is made over a TCP/IP network.

IP *address*
indicates the internet address of the remote PVM node. Because an IP address is a 4-level address, each level being a value from 1 to 255, *address* is specified as two fields. The first field contains the first two levels separated by a period, and the second field contains the second two levels separated by a period. An example of *address* would be 9.130 25.200. The IP keyword is only valid, and required, for TCPIP type links.

PORT *portid*
indicates the port number of the PVM virtual machine at the remote node in the range 10-65534. If not specified, the port number will default to the one used in the TCP configuration file record. The PORT keyword is only valid for TCPIP type links.

BLK *nn*
indicates the number of 4K areas that are tied together for the output transmission block. The value of *nn* for TCPIP type links ranges from 1 to 8, and for 3088 type links from 2 to 16. The default value is 3.

SIZE *vvvv*
indicates the *threshold block size* for this link. The default value is 4096 for IUCV, CTCA, APPC, 3088, and TCPIP, and 1000 for any other types. The value of *vvvv* ranges from 200 to 4096.

TLSLABEL *label*
specifies the 1- to 8-character label of an x.509 digital certificate that will be used to encrypt/decrypt all data flowing over the link using TLS protocols. The

specified certificate and its corresponding TLSLABEL must exist in the TLS/SSL Server certificate database. For additional information on the TLS/SSL Server and managing its certificate database, see *z/VM: TCP/IP User's Guide* and *z/VM: TCP/IP Planning and Customization*. The TLSLABEL keyword is only valid for TCPIP type links.

BUFFERS

The CMAX value used in the formula for determining the number of pages to be allocated for internal data buffering now includes the maximum number of active 3088 *and TCPIP* type line drivers times the average number of buffer pages per driver. Refer to usage note 1 of the BUFFERS configuration record in Appendix D of the *VM/Pass-Through Facility Administration and Operation* when including the TCP/IP line driver in this calculation.

Refer to Appendix D of the *VM/Pass-Through Facility Administration and Operation* for additional information about the BUFFERS configuration record.

EXT

The formula for calculating the value of EXT includes the addition of the equation `2(TCPIP) + 1`. The complete formula is:

```
EXT = 3 + VMAX + 2(AMAX) + UMAX + CMAX + 2(MPVM) + IMAX + 2(TCPIP) + 1
```

`TCPIP` is the maximum number of active TCPIP line drivers.

Refer to usage note 1 of the EXT configuration record in Appendix D of the *VM/Pass-Through Facility Administration and Operation* for a description of the complete formula.

Refer to Appendix D of the *VM/Pass-Through Facility Administration and Operation* for additional information about the EXT configuration record.

GROUP

All descriptions that apply to APPC and APPC/VM links now apply to APPC *and TCPIP* type links.

Refer to Appendix D of the *VM/Pass-Through Facility Administration and Operation* for additional information about the GROUP configuration record.

Configuration File Example

To show how to specify the new configuration file records to produce a TCP/IP link between two PVM nodes, assume that NODEA will use TCP/IP port number 821 and has an IP address of 9.130.25.200. NODEB will use TCP/IP port number 823 and has an IP address of 9.82.1.101. The virtual machine ID running TCP/IP is TCPIP.

Figure 2 shows an example of how the configuration file for node NODEA would be specified:

```
************************************************************
*  Configuration file for node NODEA - NODEA CONFIG      *
************************************************************
LANG AMENG
  ⋮
LINK * NODEB TCPIP IP 9.82 1.101 PORT 823
  ⋮
TCP 821 TCPIP START
  ⋮
```

Figure 2. Sample PVM System Configuration File for NODEA -- NODEA CONFIG

Figure 3 shows an example of how the configuration file for node NODEB would be specified:

```
************************************************************
*  Configuration file for node NODEB - NODEB CONFIG      *
************************************************************
LANG AMENG
  ⋮
LINK * NODEA TCPIP IP 9.130 25.200 PORT 821
  ⋮
TCP 823 TCPIP START
  ⋮
```

Figure 3. Sample PVM System Configuration File for NODEB -- NODEB CONFIG

Figure 4 shows an example of how the configuration file for node NODEA would be specified when a secure link is desired:

```
************************************************************************
*  Configuration file for node NODEA when secure - NODEA CONFIG      *
************************************************************************
LANG AMENG
  ⋮
LINK * NODEB TCPIP IP 9.82 1.101 PORT 823 TLSLABEL MYCERT
  ⋮
TCP 821 TCPIP START
  ⋮
```

Figure 4. Sample PVM System Configuration File for NODEA as a secure link -- NODEA CONFIG

Figure 5 on page 15 shows an example of how the configuration file for node NODEB would be specified when a secure link is desired:

```
*************************************************************************
*  Configuration file for node NODEB when secure - NODEB CONFIG      *
*************************************************************************
LANG AMENG
  ⋮
LINK * NODEA TCPIP IP 9.130 25.200 PORT 821 TLSLABEL MYCERT
  ⋮
TCP 823 TCPIP START
  ⋮
```

Figure 5. Sample PVM System Configuration File for NODEB as a secure link -- NODEB CONFIG

If the two links will not connect, some possible reasons are:

- The redirector task is not started on one or both nodes
- The IP addresses are not correct for the opposite node
- The TCP/IP port number for the redirector task is already in use
- The IP address value was specified using the wrong format for PVM. The correct format for PVM is *www.xxx yyy.zzz* (a blank instead of a period is required by PVM between the second and third address fields).
- When a secure link is desired and the TLSLABEL parameter has not been defined on the link statement for both nodes.
- An error number of 1012 on an IOCTL socket request may indicate the SSL server is unavailable or the SSL server is unable to access the certificate database.
- The label name used on the TLSLABEL parameter does not point to a certificate which has been defined to the SSL server.

Sample S3270 Line Driver

Note

This between release support includes a sample S3270 Line Driver. This line driver is used for controlling terminals connected to a control unit using SNA protocols. This support is separate from, and not related to, TCP/IP support described elsewhere in this document.

This sample S3270 line driver can be used to control terminals connected to a control unit using SNA protocols. These terminals can be controlled directly by PVM. Because this sample line driver uses SNA protocols to communicate with the control unit, more than 32 terminals can be controlled by PVM from a single controller (that is, there can be multiple terminals per port on the control unit). No other SNA program, other than that required by the control unit, is necessary for PVM to control these terminals.

To configure this line driver, specify the following statement in the PVM CONFIG file:

```
LINK nnn nodeid S3270
```

where:

nnn is the line address

nodeid is the node name of the S3270 link

S3270 indicates the link type for controlling SNA terminals

The S3270 line driver will respond to the DROP node, QUERY node, (including ports), QUIESCE node, RESUME node, START node, and TRACE node (including data and I/O) commands in the same way as other PVM line drivers.

The TRACE and VARY commands have been modified to accept new parameters to support the sample S3270 line driver. This new support is described below.

TRACE

The STATUS parameter is added to the TRACE command to show the status of the line driver tracing and the status of each active terminal on the control unit.

The STATUS parameter is specified on the TRACE command as follows:

```
TRACE nodeid STATUS
```

Refer to Appendix C of the *VM/Pass-Through Facility Administration and Operation* for additional information about the TRACE command.

VARY

The RESTART parameter is added to the VARY command to restart a port on the control unit.

The RESTART parameter is specified on the VARY command as follows:

```
VARY nodeid PORT pp RESTART
```

Refer to Appendix C of the *VM/Pass-Through Facility Administration and Operation* for additional information about the VARY command.

New and Changed Messages

The PVM messages listed here are associated with PVM TCP/IP line driver support. Some messages are new, and some are revised editions of previously existing PVM messages. All new messages and changed sections of existing messages are identified by a "|" to the left of the new or changed text.

When using the PVM TCP/IP line driver support, refer to these messages first. If you cannot find a given message, then refer to the *VM/Pass-Through Facility Messages* book.

060E **Link** *linkid* **is already started**

CSE node *nodeid* **is already active**

System *sysid* **is already in use**

The TCP/IP redirector task is already started

Issuing Component: PVM

Explanation: The link specified on a START command has already been started or the CSE communications task is already active for the specified node or system, or the TCP/IP redirector task is already active.

System Action: The command is ignored.

User Action: Use the QUERY command to find which tasks are active and issue the START command again.

081I **Link** *linkid* **Type** *typeid* **Address** *addr* **Users** *nn status*

Link *linkid* **Type** *typeid* **Address** *addr* **Users** *nn status* **Group** *name*

Link *linkid* **Type** *typeid* **Resource** *nickname* **Users** *nn status*

Link *linkid* **Type** *typeid* **Resource** *nickname* **Users** *nn status* **Group** *name*

Link *linkid* **Type** *typeid* **Path** *pathid* **Users** *nn status*

| **Link** *linkid* **Type** *typeid* **IP** *ipaddr* **Port** *portid* **Users** *nn status*

| **Link** *linkid* **Type** *typeid* **IP** *ipaddr* **Port** *portid* **Users** *nn status* **Group** *name*

| **Link** *linkid* **Type** *typeid* **IP** *ipaddr* **Port** *portid* **Users** *nn status* **TLS configured**

| **Link** *linkid* **Type** *typeid* **IP** *ipaddr* **Port** *portid* **Users** *nn status* **Group** *name* **TLS configured**

Issuing Component: PVM

Explanation: The status of the indicated link is displayed in response to a QUERY command. The group name is supplied if this link is part of a line group. The link type defined by the LINK configuration file record is also displayed. The link status is defined as follows:

DOWN Terminated or not started

ACTIVE Started but communications not established

CONNECT Communications established

QUIESCE The line driver has been quiesced.

System Action: None.

User Action: None.

104I **Link** *linkid* **Line** *addr* **Status is CONNECT**

Link *linkid* **Status is CONNECT**

| **Link** *linkid* **Status is CONNECT TLS configured**

Issuing Component: PVM

Explanation: The communications have been established over the indicated link.

System Action: None.

System Programmer Action: None.

166E **Task** *taskid* **Path** *pathid* **IUCV interrupt** *code* **is not supported**

Issuing Component: PVM

Explanation: VM/Pass-Through Facility received an IUCV interrupt that it does not support.

System Action: The system action varies, depending on the module issuing the message.

CON The IUCV path to *MSG is severed and re-established later.

UID The line driver creates a dump and continues processing, ignoring the interrupt.

TCC The redirector task ends.

TCR The TCPIP type link ends and restarts.

System Programmer Action: If the problem continues, start local diagnostic procedures.

187I *ttype* **tracing is terminated for** *options*

PCCF tracing is terminated for user *userid*

TCP/IP redirector task *ttype* **tracing is terminated**

Issuing Component: PVM

Explanation: In response to a TRACE command with the OFF operand, this message indicates that the specified trace has ended.

System Action: The specified trace ends.

User Action: None.

188I *ttype* **tracing is started on** *vdev* **for** *options*

ttype **tracing is started for** *options*

PCCF tracing is started on *vdev* **for user** *userid*

TCP/IP redirector task *ttype* **tracing is started on** *vdev*

Issuing Component: PVM

Explanation: In response to a TRACE command with the ON option, tracing has started for the indicated task. This message displays the requested trace type (I/O, DATA, WRAP, or PCCF) and command operands.

System Action: The specified trace is started.

User Action: None.

189I *ttype* **tracing is not started for** *options*

PCCF tracing is not started for user *userid*

TCP/IP redirector task *ttype* **tracing is not started**

Issuing Component: PVM

Explanation: This is a response to a TRACE command with the OFF option when the requested trace was not previously started. The message displays the trace type (I/O, DATA, WRAP, or PCCF) and options specified on the TRACE command.

System Action: The command is ignored.

User Action: Verify the trace setting and, if needed, issue the command again.

190E *ttype* **tracing is already started on** *vdev* **for** *options*

ttype **tracing is already started for** *options*

PCCF tracing is already started on *vdev* **for user** *userid*

TCP/IP redirector task *ttype* **tracing is already started on** *vdev*

Issuing Component: PVM

Explanation: This is a response to a TRACE command with the ON option when the requested trace has already been started. The message displays the trace type (I/O, DATA, WRAP, or PCCF), command operands, and the virtual printer address for trace output.

System Action: The command is ignored.

User Action: Verify the trace setting, if needed, and issue the command again.

192E Link *linkid* cannot be added to GROUP *name*

Issuing Component: PVM

Explanation: LINK configuration statement or DEFINE command is not valid. The indicated group already contains an APPC or TCPIP type link; only one APPC or TCPIP link can be defined in a group.

System Action: The specified link is added or defined to the VM/Pass-Through Facility system, but it is not included in the group.

System Programmer Action: Determine how this condition will affect your system and take any necessary action.

193E The IP address is missing or invalid

Issuing Component: PVM

Explanation: A TCPIP type link was not defined correctly on the DEFINE command or a LINK configuration file record. The IP address value is missing or is not within the valid range. The IP address value may have been specified using the wrong format for PVM. The correct address format for PVM should be *www.xxx yyy.zzz*.

Note: There is usually a period separating the second and third address fields in an IP address. However, PVM requires that a blank separate the second and third address fields.

System Action: The command or record is ignored.

User Action: Correct the LINK record and restart VM/Pass-Through Facility or correct the IP option and enter the DEFINE command again.

195E The TCP/IP PORT value is missing or invalid

Explanation: A TCPIP type link was not defined correctly on the DEFINE command or a LINK configuration file record, or the TCP configuration file record was not defined correctly. The PORT value is missing or is not within the valid range.

System Action: The command or record is ignored.

User Action: Correct the record and restart VM/Pass-Through Facility or correct the PORT option and enter the DEFINE command again.

198E The IP option must be specified with this link type

Issuing Component: PVM

Explanation: A TCPIP type link was not defined correctly on the DEFINE command or a LINK configuration file record. The IP option was not specified and must be for TCPIP type links.

System Action: The command or record is ignored.

User Action: Correct the LINK record and restart VM/Pass-Through Facility or specify the IP option and enter the DEFINE command again.

199E The only optional parameters on the TCP record are TRACE and START

Issuing Component: PVM

Explanation: The TCP configuration file record was not defined correctly. The only valid parameters following the VM TCP/IP user ID are TRACE and START.

System Action: The record is ignored.

User Action: Correct the TCP record and restart VM/Pass-Through Facility.

228I **The link *linkid* control block DUMP has completed**

The PCCF *userid* control block DUMP has completed

The TCP/IP redirector task control block DUMP has completed

Issuing Component: PVM

Explanation: VM/Pass-Through Facility has completed processing the TRACE DUMP command.

System Action: VM/Pass-Through Facility writes a dump of line driver control blocks to a CP printer spool file.

System Programmer Action: Examine the printer file.

318I ***taskid* is starting**

The PCCF task for user *userid* is starting

The CSE task for system *sysid* is starting

The TCP/IP redirector task is starting

Issuing Component: PVM

Explanation: The indicated task is starting.

System Action: None.

System Programmer Action: None.

319I **Task *taskid* is terminating**

The PCCF task for user *userid* is terminating

The CSE task for system *sysid* is terminating

The MPVM task for user *userid* is terminating

The TCP/IP redirector task is terminating

Issuing Component: PVM

Explanation: The indicated task is ending. A user task may end due to an error or because a DROP command was issued.

System Action: None.

System Programmer Action: Check the log to determine if the task ended because of an error.

700E **Link *linkid* already has path *pathid* in the DVMEXTT table**

Issuing Component: PVM

Explanation: The APPC or TCPIP type link attempted to add information to the DVMEXTT table for the indicated path ID. However, the table already contained information about that path ID.

System Action: The line driver produces a dump and ends.

User Action: Restart the link. If the problem continues, start local diagnostic procedures.

702E **The IUCV path number is too large on APPC/VM link *linkid***

The IUCV path number is too large for PCCF user *userid*

The IUCV path number is too large on TCP/IP link *linkid*

The IUCV path number is too large for TCP/IP redirector task

Issuing Component: PVM

Explanation: The path ID created for the indicated APPC or TCP/IP type link, or PCCF user, exceeds the maximum allowed. The MAXCONN configuration file record defines the maximum number of IUCV connections that VM/Pass-Through Facility will support. If the record is not specified, the default number, 1024, is used.

System Action: The IUCV path is severed.

User Action: Retry the connection request. If the problem continues, increase the MAXCONN value in the configuration file and in the CP directory entry for VM/Pass-Through Facility.

703E **Link** *linkid* **APPC/VM CONNECT to target resource failed with Return Code** *iprcode*

Link *linkid* **CONNECT to TCP/IP virtual machine failed with Return Code** *iprcode*

Issuing Component: PVM

Explanation: An error occurred as the indicated link attempted to establish a SEND path to the target resource, or attempted to establish an IUCV path to the VM TCP/IP server machine. The APPC/VM or IUCV CONNECT request returned condition code 1.

System Action: The line driver creates a dump and ends.

User Action: Attempt to restart the link. If the problem persists, start local diagnostic procedures. The IPARML parameter list in the dump may contain more information about APPC/VM or IUCV CONNECT problem.

730I **TCP/IP vmid is** *userid***, local port** *port***, status** *status*

Issuing Component: PVM

Explanation: Information regarding the TCP/IP redirector task is displayed in response to a QUERY TCP command. The defined virtual machine running VM TCP/IP, the defined TCP/IP port number used by the local PVM machine, and the status of the redirector task are supplied. The status is displayed as one of the following:

DOWN The PVM TCP/IP redirector task has not started, or it has ended because it encountered an error.

WAITING The redirector task is in the process of connecting with VM TCP/IP.

CONNECT The redirector task has connected with VM TCP/IP and is currently sending the initial data string.

ISEND The initial data string has been sent and the redirector task is currently issuing a SOCKET socket request to VM TCP/IP.

SOCKET The SOCKET request has been accepted by VM TCP/IP and the redirector task is currently issuing a BIND socket request to VM TCP/IP.

BOUND VM TCP/IP has accepted the BIND request and the redirector task is currently issuing a LISTEN socket request to VM TCP/IP.

LISTEN VM TCP/IP has accepted the LISTEN socket request. The redirector task is either blocked on an ACCEPT socket request to VM TCP/IP, or is processing a remote node's connect request.

System Action: None.

User Action: None.

731E **IUCV SEVER on initial CONNECT to TCP/IP for redirector task, IPUSER data is** *ipuser*

Link *linkid* **IUCV SEVER on initial CONNECT to TCP/IP, IPUSER data is** *ipuser*

Issuing Component: PVM

Explanation: An error occurred as a TCPIP type link or the TCP/IP redirector task attempted to establish initial IUCV communications with the VM TCP/IP virtual machine. The IUCV communications line was severed. The IPUSER data field from IUCV is included.

System Action: The indicated task will attempt the connect request again after a short time.

System Programmer Action: If the problem persists, start local diagnostic procedures. The IPUSER data field may contain more information about the IUCV CONNECT problem.

732E **IUCV error on TCP/IP function** *socket function* **for redirector task**

Link *linkid* **IUCV error on TCP/IP function** *socket function*

Issuing Component: PVM

Explanation: An IUCV error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine.

System Action: System action is dependant on the task and where the error occurred.

- If the error occurred for a link that was already connected, the task ends and is restarted. Otherwise, the task ends.
- If the redirector task was processing a connect request, the socket is closed and a new TCP/IP ACCEPT socket request is issued. Otherwise, the task ends.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures.

733E **IUCV SEVER on TCP/IP function** *socket function* **for redirector task, IPUSER data is** *ipuser*

Link *linkid* **IUCV SEVER on TCP/IP function** *socket function*, **IPUSER data is** *ipuser*

Issuing Component: PVM

Explanation: An IUCV error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine. TCP/IP severed the communications line. The IPUSER data field from IUCV is included.

System Action: System action is dependant on the task and where the error occurred.

- If the error occurred for a link that was already connected, the task ends and is restarted. Otherwise, the task will attempt to establish IUCV communications with TCP/IP and connect to the remote side after a short time.
- If the error occurred for the redirector task, the redirector task will attempt to re-establish IUCV communications with TCP/IP after a short time.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures. The IPUSER data field may contain more information about the TCP/IP function problem.

734E **IUCV error on TCP/IP function** *socket function* **for redirector task, IPAUDIT data is** *ipaudit*

Link *linkid* **IUCV error on TCP/IP function** *socket function*, **IPAUDIT data is** *ipaudit*

Issuing Component: PVM

Explanation: An IUCV error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine. The IPAUDIT data field from IUCV is included.

System Action: The indicated task ends.

System Programmer Action: Attempt to restart the link or redirector task. If the problem persists, start local diagnostic procedures. The IPAUDIT field may contain more information about the TCP/IP function problem.

735E **RC =** *rc* **ERRNO =** *error number* **on TCP/IP function** *socket function* **for redirector task**

Link *linkid* **RC =** *rc* **ERRNO =** *error number* **on TCP/IP function** *socket function*

Issuing Component: PVM

Explanation: An error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine.

Error numbers greater than 400000 are from the SSL server and can be returned from IOCTL Socket calls PVM issues to manipulate the TLS encryption environment. If the error number is from the SSL server see the Messages and Codes chapter of *z/OS: Cryptographic Service Secure Socket Layer Programming* Manual for additional details.

For TCPIP links which are configured for TLS encryption, a return code of -1 with corresponding error number 22 (Invalid Argument) may indicate required TCP/IP stack and SSL server support have not been applied to the system.

System Action: System action is dependant on the task and where the error occurred.

- If the link task encountered an error on the TCP/IP CONNECT socket request, after a short time the task will issue the CONNECT socket request again. Otherwise, the task will end. The link task will be restarted only if the link was already connected.
- If the redirector task was processing a connect request, the socket is closed and a new TCP/IP ACCEPT socket request is issued. Otherwise the task ends.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures. The VM TCP/IP return code and error number may contain more information about the TCP/IP socket function problem. For further details on the specific error, see the *z/VM: TCP/IP Programmer's Reference*.

If the two links will not connect, some possible reasons are:

- The redirector task is not started on one or both nodes
- The IP address's are not correct for the opposite node
- The TCP/IP port number for the redirector task is already in use
- The IP address value was specified using the wrong format for PVM. The correct format for PVM is *www.xxx yyy.zzz* (a blank instead of a period is required by PVM between the second and third address fields).
- An error number of 1012 on an IOCTL socket request may indicate the SSL server is unavailable or the SSL server is unable to access the certificate database.

For TCPIP links defined with TLS encryption, if the error description indicates the SSL server is not available, please ensure the TCP/IP stack and SSL servers are initialized before starting such links.

736E Transferred only *bytes* **of** *bytes* **bytes of data on TCP/IP function** *socket function* **for redirector task**

Link *linkid* **transferred only** *bytes* **of** *bytes* **bytes of data on TCP/IP function** *socket function*

Issuing Component: PVM

Explanation: An error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine. The amount of data sent by TCP/IP was not what the task has requested.

System Action: System action is dependant on the task and where the error occurred.

- If error occurred for a link that was already connected, the task ends and is restarted. Otherwise, the task ends.
- If the redirector task was processing a connect request, the socket is closed and a new TCP/IP ACCEPT socket request is issued. Otherwise, the task ends.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures.

737E IUCV SEVER from TCP/IP for redirector task, IPUSER data is *ipuser*

Link *linkid* **IUCV SEVER from TCP/IP, IPUSER data is** *ipuser*

Issuing Component: PVM

Explanation: An unexpected asynchronous IUCV SEVER was received by a TCPIP type link or the TCP/IP redirector task.

System Action: System action is dependant on the task and where the error occurred.

- If the error occurred for a link that was already connected, the task ends and is restarted. Otherwise, the task will attempt to establish IUCV communications with TCP/IP and connect to the remote side after a short time.
- If the error occurred for the redirector task, it will attempt to establish IUCV communications with TCP/IP after a short time.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures.

738E The TCP/IP redirector task is not started

Issuing Component: PVM

Explanation: A tracing request for the redirector task, or a request to end the redirector task failed. The command failed since the redirector task is not currently running.

System Action: The TCP command is ignored.

System Programmer Action: Restart the redirector task.

741E Received end of file for redirector task on TCP/IP function *socket function*

Link *linkid* **received end of file on TCP/IP function** *socket function*

Issuing Component: PVM

Explanation: An error occurred as a TCPIP type link or the TCP/IP redirector task attempted the indicated TCP/IP socket function with the VM TCP/IP virtual machine. An End-of-File condition was received indicating the socket has been closed for the other side of the link.

System Action: System action is dependant on the task and where the error occurred.

- If the error occurred for a link that was already connected, the task ends and is restarted. Otherwise, the task will issue a TCP/IP CONNECT socket request after a short time.
- If the error occurred for the redirector task during a connect request, the socket is closed and a new TCP/IP ACCEPT socket request is issued.

System Programmer Action: Attempt to restart the link or redirector task if appropriate. If the problem persists, start local diagnostic procedures.

742E Link *linkid* **local node is unknown at remote site**

Issuing Component: PVM

Explanation: A start command was issued for the indicated TCP/IP line driver task to a remote site, but the remote site does not have a defined link with the local node.

System Action: The indicated TCP/IP line driver ends.

System Programmer Action: Have a TCP/IP link defined to the local node at the remote site and restart the link.

743E Link *linkid* timeout while waiting for inbound connect

Issuing Component: PVM

Explanation: A start command was issued for the indicated TCP/IP line driver task to a remote site. The outbound connection has been initiated by the local node, but has not received an inbound connection from the remote site within a short amount of time.

System Action: The link will attempt to establish communications again in a short amount of time.

System Programmer Action: If the problem persists, start local diagnostic procedures.

744E Link *linkid* IP address and port are previously defined

Explanation: The IP address and PORT values on the DEFINE command or TCPIP type LINK configuration file record matches a previously defined TCPIP type link.

System Action: The command or record is ignored.

User Action: Correct the LINK record and restart VM/Pass-Through Facility or correct the IP and PORT option and enter the DEFINE command again.

745E Link *linkid* received bad block length of *data length*

Issuing Component: PVM

Explanation: The indicated TCP/IP line driver can not receive an incoming transmission block that is larger than defined on the TCP type link configuration file record.

System Action: The indicated TCP/IP line driver ends.

System Programmer Action: Restart the link. If the problem persists, start local diagnostic procedures.

746E The TCP/IP TLSLABEL is missing or invalid

Explanation: A TCPIP type link was not defined correctly on the DEFINE command or a LINK configuration file record. The TLSLABEL keyword is not followed by a label or the label is not correct on the specified DEFINE command or on the LINK configuration record.

System Action: The command or record is ignored.

User Action: Correct the record and restart VM/Pass-Through Facility or correct the TLSLABEL option and enter the DEFINE command again.

747E TLS configuration mismatch on link *linkid*

Issuing Component: PVM

Explanation: This message is issued when a TCPIP link driver detects a mismatch in the TLS configuration with the remote node. One side of the link is configured for TLS/SSL encryption while the other side is not.

System Action: The error is logged.

System Programmer Action: Correct the LINK configuration record and restart PVM or correct the label specified on the TLSLABEL option on the DEFINE command. The QUERY command can be used to determine how the link was configured on each side.

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Non-programming interface information...

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Bibliography

This topic lists publications in the VM/Pass-Through Facility library and their order numbers.

Title	Order Number
VM/Pass-Through Facility: User's Guide	SC24-5555
VM/Pass-Through Facility: Programming Reference	SC24-5556
VM/Pass-Through Facility: Administration and Operations	SC24-5557
VM/Pass-Through Facility: Licensed Program Specifications	GC24-5591
VM/Pass-Through Facility: Messages	SC24-5648
VM/Pass-Through Facility: Auto-Signon Reference	SC24-5656

In addition, you may find the following TCP/IP books helpful.

Title	Order Number
z/VM: TCP/IP Programmer's Reference	SC24-6332
z/VM: TCP/IP Planning and Customization	SC24-6331
z/VM: TCP/IP Messages and Codes	GC24-6330
z/VM: TCP/IP User's Guide	SC24-6333
z/OS Cryptographic Services System Secure Sockets Layer Programming	SC14-7495

Where to Get PVM Information

The current VM/Pass-Through Facility product documentation is available in the Related section of the z/VM Library page (http://www.vm.ibm.com/library/other.html).

Where to Get z/VM Information

The current z/VM product documentation is available in IBM Knowledge Center - z/VM (www.ibm.com/support/knowledgecenter/SSB27U).

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