S/390® Virtual Image Facility™ for LINUX

Guide and Reference

Version 1 Release 1.0 SL0500

Program Number 5739-A01

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The latest copy of this document can be found at URL:
http://www.s390.ibm.com/linux/vif

GC24-5930-04

Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 62.

Fifth Edition (June 2001)

This publication applies to S/390 Virtual Image Facility for LINUX Version 1 Release 1.0 SL0500 (Virtual Image Facility), Program Number 5739-A01 and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces GC24-5930-02 and GC24-5930-03. Changes or additions to the text and illustrations are indicated by a vertical line (|) to the left of the change.

Contents

Preface

This book describes how to use S/390® Virtual Image Facility™ for LINUX (VIF).

Who Should Read this Book

This book is for anyone who wants to learn how to use VIF and has not used VIF before or has had some experience with VIF and wants to gain more knowledge.

What You Should Know before Reading this Book

Before using this book you should be familiar with S/390 hardware concepts. It would also be helpful if you were familiar with Linux and have some experience with Linux, VM and S/390 systems programming.

What This Book Contains

Following are some of the topics you can expect to learn about after reading this book:

- Overview of VIF
- Installing VIF
- Administering VIF
- Servicing VIF
- Using VIF Support Procedures
- Using VIF Commands

Where to Find More Information

| For more information about VIF, Linux and Linux for zSeries and S/390, and the various Linux
| distributions, refer to:

- http://www.s390.ibm.com/linux/vif
- http://linuxvm.org/
- http://www10.software.ibm.com/developerworks/opensource/linux390/
- Marist College Listserv Archives: http://www.marist.edu/htbin/wlvindex?linux-vm
- Linux distributors' websites:
  - SuSe: http://www.suse.com
  - Turbo Linux: http://www.turbolinux.com

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- E-mail to vifserv@vnet.ibm.com
- Facsimile to telephone number (+1)607-752-1497
- Postal mail to

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  Endicott, NY 13760
  USA

Chapter 1. Introduction to the S/390 Virtual Image Facility for LINUX

The S/390 Virtual Image Facility for LINUX (VIF) provides an environment that lets you create and manage multiple Linux images on a single S/390 or zSeries platform. If you are familiar with VM, then you already understand the underlying concepts of VIF. Much of the internal functions of VIF are the same as VM because they are built on the same code base, but VIF has been simplified to eliminate the need for in-depth VM skills. If your background is the Linux, Unix or Windows operating system, then VIF introduces you to a new level of flexibility and efficiency in managing large numbers of servers.

Under Unix or Windows, a program can be multithreaded and allocate software resources (such as files) among the threads. In a similar way, VIF can allocate resources among multiple Linux servers running on one hardware box. The VIF hypervisor manages the assignment of portions of hardware to each individual Linux image. A simple Linux client program running on the master Linux image (LINUX0) is used to send system management commands to the VIF hypervisor. These VIF commands create Linux images, assign disk partitions, query, start and stop Linux images, and provide other control functions. The VIF commands do not require previous system S/390 skills.

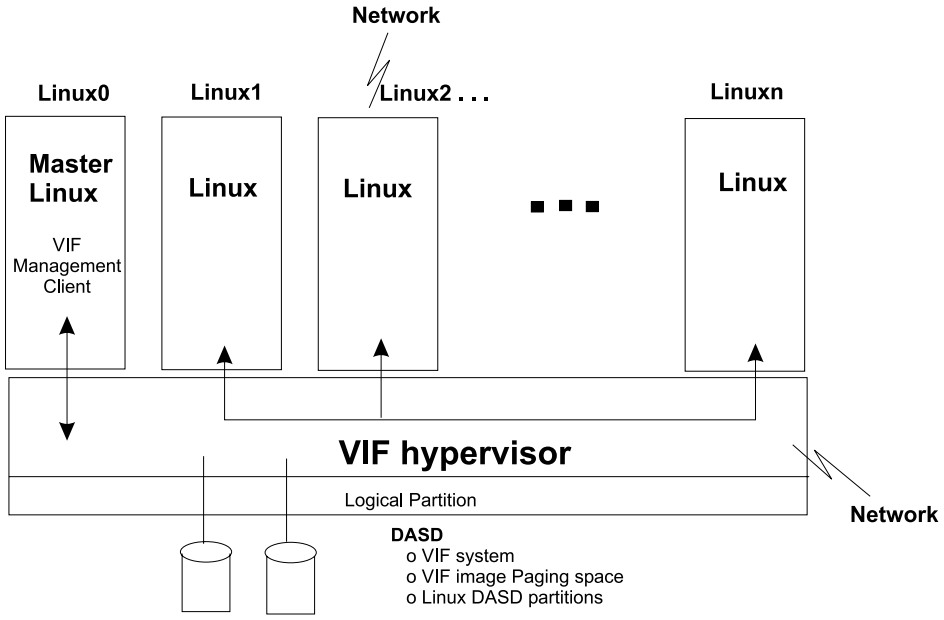

Figure 1. Sample VIF Environment

Chapter 2. Installing VIF

Overview of the Installation

Installation of VIF draws on many different skills. It is important to assemble a team of people with specific expertise, each ready to contribute in their area at the start of this project. In some projects, these jobs may be done by one or two people taking on different roles as required. However, if one of these areas is overlooked, it could lead to failure of the project. Good planning and securing necessary resources is vital.

Close cooperation among personnel with the following expertise is crucial to designing and implementing a successful VIF installation:

Personnel with S/390 System Programming Experience
: The S/390 programmer is needed to provide access to the Hardware Management Console (HMC), guidance on its use, to define an LPAR (if VIF is to be run in an LPAR), and to add I/O devices, which are to be used by Linux and the Hypervisor, to the I/O Configuration Data Set (IOCDS).

DASD Personnel
: DASD personnel must be able to provide enough disk storage space for the initial installation, with additional space as required for the proposed total number of Linux images.

Networking Personnel
: Personnel with knowledge of networking are responsible for network connectivity.

Linux System Administrator
: The Linux system administrator leads the installation of the Linux code distribution, as well as manages the Linux servers that are created.

The process begins with the product tape. Code on the tape is copied to and booted from a DASD volume. This brings up a mini-kernel, which executes an installation script. The script prompts you to answer basic configuration questions, saves the data, and then boots the first (master) Linux image, called LINUX0. Once LINUX0 is up and you can telnet into it, the installation of VIF is complete, but not all the work is done. At this point, you must install the Linux distribution you have chosen to work with.

Planning for Installation

This section will help you consider all the resources and steps you must complete prior to installation. Before proceeding, it is **VERY IMPORTANT** for you to do the following first:

- Refer to the VIF website for frequently asked “Questions and Answers” about VIF and the “Hints and Tips” section for each supported Linux distribution.
- Ensure you are using the latest level of this manual, which is also available at the VIF website.
- Become familiar with information for the Linux distribution you are using.
- Read through all of the documentation associated with VIF.

| References to all of this information, including the URLs for the various Linux distributions, can be found at
| “Where to Find More Information” on page vi.

Planning Your Network

Installing the VIF environment also installs an initial Linux image (LINUX0, or master Linux image), so a minimum of two IP addresses are required. These IP addresses can be on either of the following:

- A shared network connection
- Two separate physical network connections

| When choosing the configuration to use, keep these considerations in mind:

- VIF requires a LAN connection. This physical connection can also be used to provide network access for Linux images you create, although each image still requires its own IP address.
- You can provide a Linux image with a direct LAN connection. An image that you expect to perform a lot of network communication may benefit from having its own physical connection. Linux images that communicate mostly with the other images under the control of the same VIF environment and do not use the network extensively may not require their own LAN connections.

Selecting an IP Address for Internal Connections

When choosing IP addresses for your Linux images, it is important to understand the network configuration and how it affects the routing of IP packets to your Linux images.

Linux images using internal (IUCV) connections are virtual point-to-point network interfaces and are not directly connected to your LAN. They cannot hear or respond to network ARP requests on the LAN. IP packets must flow from the LAN to either the VIF hypervisor or a Linux image with an external connection and then to the destination Linux image.

It is suggested that you place your Linux images in their own IP subnet and update any routers on the LAN to route that subnet to the VIF hypervisor's IP address. The VIF hypervisor does not use dynamic routing protocols such as RIP or OSPF. If you need to use these protocols, then it is necessary to provide one of your Linux images with an external connection to the LAN and use the Linux `gated` application or its equivalent.

If you assign an IP address to Linux that is in the same subnet as the VIF hypervisor and it is using an internal (IUCV) connection to the VIF hypervisor, then you must have a proxy ARP server operating on the LAN. If you are using an IBM Open Systems Adapter (OSA), update the OSA Address Table (OAT) to include the Linux image IP addresses. If you are using OSA port sharing facilities, then you MUST update the OAT. However, be aware that there is a limit to the number of IP addresses that can be assigned to an OSA port.

If you find that a workstation can “ping” the hypervisor, but cannot ping the master Linux image, verify that the routing information is correct and that you have chosen IP addresses, subnet masks and subnet

| values in accordance with the design of your network. If you continue to have difficulties, consult an IP
| network architect for guidance.

Hardware and Software Requirements

Before installation of VIF can begin, the following must be available for use:

- A processor (G5 or later or Multiprise® 3000) or a logical partition (LPAR) on such a processor
- Access to the Hardware Management Console (HMC) for the processor
- One entire volume of 3390 model 3 DASD (You will need all 3339 cylinders of the volume.)
- One 3480 or 3490 tape drive
- One or two token-ring or Ethernet ports on an IBM Open System Adapter (OSA), IBM 3172, or equivalent device operating in LCS mode, connected to a Local-Area Network (LAN); OSAs operating in QDIO mode are not supported.
- An IP address on the LAN and its associated network mask to be used by the VIF hypervisor
- A second IP address used by the master Linux image (LINUX0); refer to “Planning Your Network” on page 4 for important information.
- The IP address of a gateway on the LAN
- S/390 Virtual Image Facility for LINUX installation tape
- The IP address of an FTP server with access to the contents of a Linux distribution
- The user name, password, account (if required), file path and file name needed to retrieve the Linux installation file and associated materials using this FTP server. The FTP server must support Unix-style (forward slash) path names.

Note: These requirements are only for installing VIF. Linux hardware and software prerequisites should be fulfilled prior to installing VIF or Linux.

Sizing Guidelines for a VIF LPAR

Use the guidelines in this section to help determine the processor and storage requirements for your VIF environment. These guidelines can be used as starting points, but actual requirements depend on the particular Linux workloads and the level of responsiveness you want for your system. For a more detailed analysis, contact your IBM representative or IBM Business Partner to engage the SIZE390 program of the S/390 Performance team.

Storage Sizing

Use the following formula to determine the amount of real storage required for your VIF system:

$$\text{real storage} = \frac{(\text{Linux\_Images} \times 0.5) + \text{Active\_Images} \times (15MB + (\text{Mean\_File\_Size} \times \text{Active\_Files}))}{\text{Paging\_Factor}}$$

Where:

Linux_Images is the number of Linux images.

Active_Images is the average number of Linux images that will be active at one time.

Mean_File_Size is the average size of file being accessed by a Linux image.

Active_Files is the average number of files being accessed by a Linux image.

Paging_Factor is a number between 1 and 5, which represents the level of paging activity you are willing to accept. A low value selects low paging activity and produces better performance. A high value allows more paging activity, but may affect performance.

For example, if 25 of 100 images are active, and each is using ten files that average 0.3 MB in size, then the storage requirement would range from 104 MB to 519 MB, depending on the Paging_Factor selected.

Note: The maximum central storage size that can be used is 2047 MB. Additional storage can be assigned as expanded storage.

Processor Sizing

VIF shares processors among Linux images. The number and speed of processors you need is workload-specific. However, if you are going to have *n* Linux images always active and ready to run, then a configuration with *n* processors allows them to run with minimal wait time for processor resources.

Installation Information

Obtain the following information prior to loading the installation tape. Keep a copy of this information for your records. First, ensure you make note of the following:

Real address of the 3480 or 3490 tape drive _____
The tape drive that will be used to read the VIF product tape.

Real address of the 3390 Mod 3 DASD _____
The DASD (disk) device where the code will be installed.

Information Needed for Installation Prompts

Below is a list of the information you will need to respond to for the VIF installation prompts that you will use for configuring VIF. A checklist version of this information is available for you to complete in Appendix A, "Checklist of Information Needed for the Installation Prompts" on page 61 so it has the information you will need when the actual installation prompts are presented.

Information Needed for Installation Prompts

1. Your choice of sysres volid for VIF (1-6 characters)
The label to be assigned to the 3390 volume where VIF will be installed.

2. OSA device address for VIF hypervisor
The even address of the network device pair that is assigned to the VIF hypervisor for network access. This address pair must be defined in the IOCDS.

3. The OSA device port number
The number of the port associated with the network device pair that is assigned to the VIF hypervisor.

4. VIF hypervisor network type (Ethernet, Token-Ring, 802.3, or FDDI)
The type of local-area network (LAN) to which the hypervisor is connected.

5. VIF hypervisor network MTU size (576, 1492, 1500, 2000, or 4096)
The Maximum Transmission Unit (MTU) of the VIF hypervisor LAN.

6. VIF hypervisor IP address
The IP address assigned to the hypervisor.

7. The hypervisor subnet mask
The IP mask associated with the hypervisor IP address.

8. IP address of gateway to be used by VIF
The IP address of the default gateway on the VIF hypervisor LAN.

9A. Master Linux network type (Internal or External)
The type of network connection to be used by the master Linux image. If a network device pair is available, specify "External;" otherwise, specify "Internal."

9B. Enter master Linux network device address if "External" was chosen in 9A above:

Note: If an **External** network connection is provided for the master Linux image, specify the even address of the network device pair. This address pair must be defined in the IOCDS.

10. IP address of the master Linux image
The IP address assigned to the master Linux image.

Note: If the answer to installation prompt #9A was "internal," then the IP address of the master LINUX system should be in a subnet different than the IP address chosen for the VIF hypervisor in installation prompt #6 unless there is a proxy ARP server in your network.

11. The subnet mask for the master Linux image
The IP mask associated with the master Linux image IP address.

12. The IP address of the FTP Server for the Linux distribution
The IP address of the FTP server where the Linux distribution files are located.

| **Information Needed for Installation Prompts**

13. The user name for the FTP server
The user name to be used to connect to the FTP server where the Linux distribution files are located.

14. The password for the FTP server
The password to be used to connect to the FTP server.

15. The FTP account information, if needed
The account number to be used to access the FTP server, or null if no account information is required.

16. The path and file name of the Linux installation file on the FTP server
The path and file name on the FTP server of the Linux installation file.

Before You Start

The following steps **must be completed before installation** is attempted:

- The IOCDS must be configured and must include the required devices listed above.
- The OSA or other network device must be configured with the IP addresses listed above.
- The TOD clock must be set.
- The installation target DASD must be initialized.
- The installation checklist must be completed.

Installation Procedure

Install VIF as follows:

1. Mount the Installation tape on the tape drive.
2. Use the HMC to load from the tape drive with a load type of clear and the load parameter

| **AUTO***dasdaddress*

| Where *dasdaddress* is the real address of the 3390 DASD on which VIF is to be installed. This
| address must be defined in the IOCDS.

3. Wait for the system to enter a disabled wait state. This will be signified by the flashing of the *Hardware Messages* function icon. The time for this to occur has ranged from 15 minutes to one hour.
4. When the disabled wait state occurs, display the PSW and ensure that it is 000A0000 00000000. To check the PSW, double-click on the flashing hardware messages icon. Then double-click on the selected Disabled wait message and then check the PSW it reports. If it is not as stated above, refer to “Troubleshooting” on page 28 for guidance.
5. Load from the VIF DASD volume.

6. Activate the *Operating System Messages* function on the S/390 Hardware Management Console. You will not see any output for about two minutes.

   Note that the following message is **informational**:

   ```
   An error report may be produced using the HYPERVISOR ERROR command
   ```

   Refer to "HYPERVISOR ERRORS" on page 34 for more information.

7. Reply to the installation prompts with the appropriate parameters from your checklist. (Reply **RESTART** to any prompt to restart the configuration process. Enter a null line to accept the default value enclosed in angle brackets after a prompt.)

   Installation Prompts

   Enter system residence volume Label:

   Enter Hypervisor network device address:

   Enter Hypervisor network port number:

   Enter Hypervisor network type (Ethernet, 802.3, TokenRing, FDDI):

   Enter Hypervisor network MTU size (576, 1492, 1500, 2000, 4096):

   Enter Hypervisor IP address:

   Enter Hypervisor IP mask:

   Enter Hypervisor gateway IP address:

   Enter master Linux network type (External, Internal):

   Enter master Linux network device address:

   Note: This prompt appears only if you specified "External" for the previous prompt.

   Enter master Linux IP address:

   Enter master Linux IP mask:

   Enter FTP server IP address:

   Enter FTP server user name:

   Enter FTP server password:

   Enter FTP server account or null:

   Enter installation file path and name:

   The configuration information that you entered is redisplayed followed by a message asking whether it is correct. If you reply `YES` to state it is correct, then installation continues with step 8 on page 10 below. If you respond with `NO`, then the configuration prompts are redisplayed to allow you to change any of the values you previously entered.

   If this installation step is interrupted by FTP server problems, incorrect file paths, problems with network connections, or for any other reasons, you will have to begin again from the point where you loaded VIF from DASD. (Step 5 on page 8.)

8. Wait for the master Linux image to boot. This may take several minutes to start producing output.

   The following resources are provided to the master Linux image automatically:

   - One processor.
   - 128 megabytes of storage.
   - A console (the system console device, accessible through the *Operating System Messages* task of the S/390 Hardware Management Console).
   - An 840-megabyte unformatted read/write DASD partition at device number 201. Depending on the Linux distribution you are using, this partition may not be large enough for a full Linux installation. LINUX0 only needs a "minimum" Linux installation to function.
   - A 3.5-megabyte read-only DASD partition at device number 203 (refer to Chapter 6, "VIF Command Reference" on page 31 for more information about the contents and use of this partition).
   - A network connection, as selected during system configuration.

9. To complete the installation of the master Linux image you must plan for your Linux installation as follows:

   - Become familiar with the configuration procedures for the distribution you are using to determine the type of installation that is necessary, what partitions need to be defined, and so on. The URLs for the various Linux distributions are documented in "Where to Find More Information" on page vi.
   - To use the 840-megabyte unformatted read/write DASD partition at device number 201, decide whether you should define more DASD partitions or install a single "/" (root) partition. The size of the device 201 DASD partition may limit the type of installation you can perform.
   - When installing the Linux distribution, the 3.5 megabyte DASD partition at device number 203 must be known to Linux and must be mounted read-only. Refer to the documentation for the Linux distribution you are using to determine the procedure to accomplish this.

   The following is one example of preparing to install a Linux system on the master Linux image. In this example, a "/" partition and swap space are used, and for simplicity, 1.2.3.52 is used as the VIF system IP address.

   a. The VIF commands are accessed using the following commands:

      ```
      insmod dasd dasd=201,203
      mount /dev/dasdb1 /mnt -r
      ```

      (Refer to Chapter 3, "Administering your VIF System" on page 13 for information on mounting the VIF partition and entering VIF commands.)

   b. After reviewing the Linux installation documentation, it was decided to create two new DASD partitions; one that is 1500 megabytes for the "/" partition and one that is 200 megabytes for swap space. These DASD partitions are created using the following VIF commands:

      ```
      /mnt/vif  1.2.3.52 partition create linux0 151 1500
      /mnt/vif  1.2.3.52 partition create linux0 152 200
      ```

c. The system must then be restarted using the default boot so these DASD partitions can be formatted before Linux is installed.

d. After the system is restarted, the DASD partitions are made accessible using the following Linux command:

```
insmod dasd dasd=151,152,203
```

Where:

dasd=151 The 151 disk is loaded as dasda.
dasd=152 The 152 disk is loaded as dasdb.
dasd=203 The 203 disk is loaded as dasdc.

e. The Linux `dasdfmt` command is used to format only `dasda` and `dasdb`:

```
dasdfmt -vL -b 4096 -f  /dev/dasda
dasdfmt -vL -b 4096 -f  /dev/dasdb
```

The system is now ready to install Linux. Ensure that the 203 disk is mounted; it is where the VIF commands reside. For this reason, it should be mounted read-only. Refer to your Linux documentation to obtain instructions for mounting the 203 disk; this procedure differs for each Linux distribution.

When You Are Done

Once you have completed the installation, you should change the Linux system boot device for the master Linux image on your newly configured system. To boot from DASD, enter the *vif* command:

```
/mnt/vif 1.2.3.52 image set linux0 boot xxxx
```

Where *xxxx* is the device number of the DASD partition containing the Linux system you wish to boot. From our example in Step 9 on page 10, if you are installing your Linux system on device 151, you would enter:

```
/mnt/vif 1.2.3.52 image set linux0 boot 151
```

This will start LINUX0 using your configured Linux system on device 151 instead of the RAM disk image. Refer to Chapter 6, “VIF Command Reference” on page 31 for information on using the *vif* commands.

With VIF installed and LINUX0 configured and saved to disk, you are now ready to define and configure images and save the image configuration. Refer to Chapter 3, “Administering your VIF System” on page 13 and Chapter 6, “VIF Command Reference” on page 31 for information about these functions. Also refer to the “How-to” section of the VIF web site at http://www.s390.ibm.com/linux/vif/procs.html for an overview of how to set up new images under VIF.

Note: Any time you configure images, you should make a back-up copy of the resulting configuration. Refer to “HYPERVISOR EXPORT” on page 35.

If you encounter problems during VIF installation or configuration, refer to Chapter 5, “VIF Support Procedures” on page 27 for guidance.

Chapter 3. Administering your VIF System

Administering VIF involves employing its administrative interface. This interface is provided in LINUX0 in the form of the **vif** command. Administrative commands are used to manage paging space, create new images, maintain images, and manage your Linux network. This chapter describes the basics for getting started and then describes some common procedures you can use to manage your VIF system. All VIF commands are described in Chapter 6, "VIF Command Reference" on page 31.

The Basics

The Master Linux Image

The master Linux image (LINUX0) console is always on the hardware system console. It can be accessed by using the HMC or SE (Support Element) *Operating System Messages* task. LINUX0 provides the interface to VIF administration functions, so access to it should be limited and care should be taken to ensure that this image does not become unusable. In general, it is advisable to limit your use of LINUX0 to essential system management functions and to create other images for other purposes.

The vif Command

The `vif` command is always issued from the LINUX0 image. The VIF hypervisor does not accept `vif` commands from any other image. The `vif` command resides in a separate, read-only file system on LINUX0's device 203. In order to use the `vif` command, the disk must be mounted in one of the following ways:

- You can create a mount point for the disk and update /etc/fstab to mount it automatically as follows:

  ```
  mkdir /usr/local/vif390
  ```

  Then add the following to /etc/fstab:

  ```
  mount /dev/dasdb1  /usr/local/vif390  -r
  ```

  Use the directory path names appropriate to your system. The 203 disk may have been chosen as a mount point when Linux was installed.

- You can issue the mount command to mount the disk manually every time you want to use the `vif` command:

  ```
  mount /dev/dasdb1  /usr/local/vif390  -r
  ```

You can also create a symbolic link to the `vif` command by entering the **ln** command. A sample of the command, using the directories from our previous examples is as follows:

```
ln -s /usr/local/vif390/vif  /usr/sbin/vif
```

| Finally, you may wish to write a shell script to simplify the use of the vif command. You can include the
| required IP address in the shell script so that it does not have to be typed each time. Such a shell script
| might look like this:

```
| #!/bin/bash
| vif  1.2.3.52  $@
```

| Where 1.2.3.52 is the IP address of the VIF hypervisor.

| Command Syntax

The general command syntax is:

```
vif ipaddress command function [operands]
```

Where:

| *ipaddress* is the IP address of the VIF hypervisor (1.2.3.52 in these examples).

command is the command to be executed.

function is the function to be executed.

operands are the parameters of the command.

| For example, to determine the current level of VIF, enter:

```
vif 1.2.3.52 query level
```

| Where `1.2.3.52` is the VIF system IP address.

| Or you can define a new Linux image named `mailhost` using the following command:

```
vif 1.2.3.52 image create mailhost
```

| To list the available commands, enter:

```
vif 1.2.3.52 help
```

| For a brief explanation of the syntax and purpose of the IMAGE command, enter:

```
vif 1.2.3.52 help image
```

Console Access for Other Linux Images

Once you have defined additional Linux images, access the console of any started Linux image through
| VIF by connecting to the VIF hypervisor through `telnet` and logging onto the image you want to work with.
| For example, continuing with the same IP address used for the VIF hypervisor from the previous
| examples, you would enter the following (from possibly a personal computer) to access the VIF hypervisor:

```
| telnet 1.2.3.52
```

| The following would be displayed:

```
S/390 Virtual Image Facility for Linux ----VIF   --PRESS BREAK KEY TO BEGIN SESSION.
```

Press the Break key and then enter the `logon` command specifying the image name you want to work with. For example:

LOGON *image_name*

After you have logged on, you can use Linux commands, run shell scripts, and so on.

Note Regarding Telnet to Linux on zSeries and S/390: To log into the Hypervisor XTERM from AIX® or Linux is recommended using the default settings. Telnet preferences such as `VT220` with `local echo off` should be used in other environments. If use of the backspace or cursor movement (up, down, left and right arrow) keys produce unexpected results, press the Ctrl-Backspace key combination to resolve the problem.

Common Procedures

Setting up New Linux Images

New images are set up from the LINUX0 console. To set up a new image, you must have DASD space to use for partitions and paging. DASD should have been assigned to your processor for this purpose when the hardware was set up.

For network connections to your images, you may use internal or external connections. If you are using external connections, external devices should be assigned to your processor for this purpose.

After you have entered the VIF commands to create an image, assign partitions, and define a network connection, you must start the image and log onto its console to complete your network configuration.

Example

The following is an example of how to set up a new image. Throughout these steps, the IP address of the VIF hypervisor is 1.2.3.52.

1. If you are using a DASD type that is initialized when it is installed, such as Shark™ or RVA (RAMAC® Virtual Array), then you should skip this step. If your DASD is NOT initialized at installation, then enter the following; you need to do this step for each DASD attached to your processor:

   `vif 1.2.3.52 hypervisor volume initialize` *devaddr*

   Where:

   devaddr is the real device address you wish to initialize for use by your VIF system.

2. Enter the following to add a device to the paging space available on your VIF system:

   `vif 1.2.3.52 hypervisor volume add paging` *devaddr volid*

3. Enter the following to add a device to be used for image partitions:

   ```
   vif 1.2.3.52 hypervisor volume add image devaddr volid
   ```

4. Enter the following to create a new image, replacing *newimage* with the name of your new image:

   ```
   vif 1.2.3.52 image create newimage
   ```

5. There are a variety of ways to add DASD space to your image. If this is your first image, you will need to create at least one partition using the following command to add a DASD partition of size *partsize* at device address *devaddr* to Linux image *newimage*:

   ```
   vif 1.2.3.52 partition create newimage devaddr partsize
   ```

   If this is not your first image, you may want to copy your new partition from an existing image using the following command:

   ```
   vif 1.2.3.52 partition copy oldimage oldpartition to newimage newpartition
   ```

   You may also provide an image with read-only access to the partition of another image by using the following command:

   ```
   vif 1.2.3.52 partition share oldimage oldpartition with newimage newpartition
   ```

6. You must also set up a network connection for your image. For an “internal” connection (IUCV), use the following command:

   ```
   vif 1.2.3.52 hypervisor network add newimage ipaddress 255.255.255.255
   ```

   The *ipaddress* is the IP address to be used for the *newimage* network connection.

   If you are setting up an external connection for your image (OSA, OSA Express, Channel-to-channel adapter, or 3172), use the following command:

   ```
   vif 1.2.3.52 image network newimage add devnumber
   ```

   Where *devnumber* is the even device number of the even-odd network device pair to be added to *newimage*.

7. Start your image using the following command:

   ```
   vif 1.2.3.52 image start newimage
   ```

8. You should `telnet` to the VIF Hypervisor now so you can log onto the console of your new image to configure the Linux network connection. Refer to “Console Access for Other Linux Images” on page 14 for more information.

Checking the Status of Your System

You can use VIF commands to check the status of your system. As in previous examples, the VIF system IP address used in the following examples will be 1.2.3.52.

HYPERVISOR ECHO: This command verifies connectivity between the VIF Hypervisor and LINUX0. For example, if you enter the following:

```
vif 1.2.3.52 hypervisor echo
```

The displayed response may be similar to this:

```
21:26:14 S/390 Virtual Image Facility for LINUX System Manager ready
Command Complete
```

QUERY LEVEL: This command displays the level of VIF you are running. For example:

```
vif 1.2.3.52 query level
```

The following is displayed:

```
Hypervisor level: V1-R1-M0-SL0500
Command Complete
```

QUERY CONFIG: The QUERY CONFIGURATION command displays the configuration information that was entered when VIF was installed. For example, if you enter the following:

```
vif 1.2.3.52 query configuration
```

The system displays configuration information:

```
Here is the configuration (please make a note of it):

Hypervisor:
  System residence volume label: LX5675
          Network device address: 1E00
             Network port number: 0
                    Network type: T
                Network MTU size: 1500
                      IP address: 1.2.3.52
                         IP mask: 255.255.255.240
               Gateway IP address: 1.2.3.49

Master Linux Image:
                    Network type: INTERNAL
          Network device address: N/A
                      IP address: 1.2.3.66
                         IP mask: 255.255.255.255

Linux Installation Site:
           FTP server IP address: 1.2.5.4
            FTP server user name: newlin01
             FTP server password: try2get
              FTP server account:
      Install file path and name: /linux390/SuSE/GA70/cd1/susev.ins

Command Complete
```

QUERY BOOT: To display when the VIF hypervisor was started (booted), you could enter the following:

```
vif 1.2.3.52 query boot
```

The information is displayed:

```
Last boot on 2001-03-16 at 12:43:27
System has been up for 5 days, 4 hours, 20 minutes
Command Complete
```

QUERY NETWORK: To provide an overall description of the network layout for your VIF system, use the QUERY NETWORK command. For example, enter:

```
vif 1.2.3.52 query network
```

A sample response for a system with one image in addition to LINUX0 is displayed:

```
Hypervisor uses IP address 1.2.3.52 via device 1E00
Linux image LINUX1 uses IP address 1.2.3.67 via the internal network
Linux image LINUX0 uses IP address 1.2.3.66 via the internal network
Command Complete
```

QUERY ACTIVE: Use this command to determine which Linux images are active. An “active” Linux image is one that is using system resources. It does not indicate that someone is using the image or that Linux is up and running. For example, enter the following:

```
vif 1.2.3.52 query active
```

This might display:

```
The following Linux images are active:
   LINUX0  LINUX1
Command Complete
```

QUERY IMAGE: This command provides details about all images on your system or about just one image. It indicates how many CPUs are assigned to each image, the amount of storage allocated to each image, the device number of the boot device, information about the network connection, and information about DASD partitions. For example, enter the following command:

```
vif 1.2.3.52 query image linux1
```

This displays the results of the query of the single LINUX1 image:

```
LINUX1 has 1 CPUs and 64M of storage and boots 151
LINUX1 has an internal network connection
LINUX1 has a 1500 MB read/write partition as device 151 on volume LX5679
LINUX1 has a 200 MB read/write partition as device 152 on volume LX5678
Command Complete
```

QUERY PERFORMANCE: Use this command to obtain the general performance characteristics of your system. For more detailed information on the performance of individual Linux images, you should consider using performance tools that run on Linux and are designed to help you manage your Linux images. The response from this command is intended to provide only general information for managing your VIF system. If the status of any of the factors (CPU, Paging, or I/O) becomes Yellow, then you may need to add resources (CPU, paging space, or system storage) to your system. Refer to “Storage Sizing” on page 6 to determine how to calculate your real storage requirements, and consult with your IBM representative concerning system sizing to determine the best way to address performance issues. An example of this command follows:

```
vif 1.2.3.52 query performance
```

The preferred response would be:

```
VIF performance: CPU is Green, Paging is Green, I/O is Green
Command Complete
```

QUERY ALL: This command performs most of the possible QUERY commands and reports the results to your console. For example:

```
vif 1.2.3.52 query all
```

A sample response for a system with one image in addition to LINUX0 is displayed:

```
Here is the configuration (please make a note of it):

Hypervisor:
  System residence volume label: LX5675
         Network device address: 1E00
            Network port number: 0
                   Network type: T
               Network MTU size: 1500
                     IP address: 1.2.3.52
                        IP mask: 255.255.255.240
             Gateway IP address: 1.2.3.49

Master Linux Image:
                   Network type: INTERNAL
         Network device address: N/A
                     IP address: 1.2.3.66
                        IP mask: 255.255.255.255

Linux Installation Site:
           FTP server IP address: 1.2.5.4
            FTP server user name: newlin01
             FTP server password: try2get
              FTP server account:
     Install file path and name: /linux390/SuSE/GA70/cd1/susev.ins

 LINUX0 has 1 CPUs and 128M of storage and boots 151
 LINUX0 has an internal network connection
 LINUX0 has a 843 MB read/write partition as device 201 on volume LX5675
 LINUX0 has a 1500 MB read/write partition as device 151 on volume LX5678
 LINUX0 has a 200 MB read/write partition as device 152 on volume LX5678
 LINUX0 has a 3 MB read-only partition as device 203 on volume LX5675
 LINUX1 has 1 CPUs and 64M of storage and boots 151
 LINUX1 has an internal network connection
 LINUX1 has a 1500 MB read/write partition as device 151 on volume LX5679
 LINUX1 has a 200 MB read/write partition as device 152 on volume LX5678
 288 of 1264 MB of hypervisor paging space in use
 3400 MB of 4691 MB of Linux image partition space in use
 1291 MB of Linux image partition space is available in 2 extents
 VIF performance: CPU is Green, Paging is Green, I/O is Green
 The following paging volumes are defined:
    LINPG1 (553E)
 The following image volumes are defined:
    LX5678 (553F)   LX5679 (5534)
 Hypervisor uses IP address 1.2.3.52 via device 1E00
 Linux image LINUX1 uses IP address 1.2.3.67 via the internal network
 Linux image LINUX0 uses IP address 1.2.3.66 via the internal network
 The following Linux images are active:
   LINUX0   LINUX1
 Hypervisor level: V1-R1-M0-SL0500
 Last boot on 2001-03-15 at 14:34:40
 System has been up for 5 days, 5 hours, 35 minutes
 No error records are pending
 Command Complete
```

How to Determine Paging and Partition Space Usage

As your business needs expand and grow, you may need to determine how much space your VIF system uses for paging and for the Linux images as partition space. VIF provides several commands to help you assess the amount of space your system is using.

QUERY PAGING: To determine the amount of paging space you are using, enter the following command:

```
vif 1.2.3.52 query paging
```

The paging space in use and the effective amount of hypervisor paging space available to the user are displayed. The effective amount of available paging space displayed is always less than the amount installed in order to ensure efficient paging performance. For example, you might receive a response similar to this:

```
416 of 1264 MB of hypervisor paging space in use
Command Complete
```

QUERY PARTITION: To find out the amount of partition space that is in use, you could enter the following:

```
vif 1.2.3.52 query partition
```

The response displays how much of the total available partition space is in use. For example, the following response might be displayed:

```
3400 MB of 4691 MB of Linux image partition space in use
1291 MB of Linux image partition space is available in 2 extents
Command Complete
```

HYPERVISOR VOLUME MAP USED: To check image volume utilization, enter the following:

```
vif 1.2.3.52 hypervisor volume map used
```

For each image volume assigned to your system, the response displays which images have space assigned to them and the device number and size of each partition. For example, you might receive a response similar to this:

```
VolID    Image    Device   Size(MB)
LX5679   LINUX1   151          1500
LX5678   LINUX0   151          1500
LX5678   LINUX0   152           200
LX5678   LINUX1   152           200
LX5675   LINUX0   201           843
Command Complete
```

HYPERVISOR VOLUME MAP FREE: Enter the following to check how much free space is on an image volume:

```
vif 1.2.3.52 hypervisor volume map free
```

| The response displays the size of the free space gap on the volume for each image volume assigned to
| your system. For example:

```
VolID    Gap(MB)
LX5679       846
LX5678       445
Command Complete
```

Add Paging Space and Space for Partitions

After you have determined how much space you are currently using on your system, you can decide whether more paging or partition space is necessary. Before adding space, a DASD volume must be assigned to your processor or logical partition through the Host Management Console (HMC). (Refer to your hardware documentation for more information.) After the DASD is assigned to your system, use the following commands to add the volume as either paging or partition space.

HYPERVISOR VOLUME INITIALIZE: If you are using the type of DASD that is initialized when it is installed, such as Shark or RVA, then you do NOT need to use this command. If your DASD is not initialized when it is installed, then you will need to use this command for each new DASD device attached to your system:

```
vif 1.2.3.52 hypervisor volume initialize devaddr
```

Where:

devaddr is the device address you are initializing. A real device address must be specified that is defined in the IOCDS.

HYPERVISOR VOLUME ADD PAGING: To add a device to the paging space available on your VIF system, enter the following:

```
vif 1.2.3.52 hypervisor volume add paging devaddr volid
```

HYPERVISOR VOLUME ADD IMAGE: To add a device to be used for image partitions, enter the following:

```
vif 1.2.3.52 hypervisor volume add image devaddr volid
```

Where:

volid is the volume ID of the device being added.

Managing your VIF Network

As you add and delete images to your VIF system, the VIF commands in this section allow you to query and change the network connections for these images. You can also change the network connections you set up for the VIF hypervisor if necessary.

QUERY NETWORK: You can determine the IP addresses for your Linux images by entering the following command:

```
vif 1.2.3.52 query network
```

This displays information similar to the following:

```
Hypervisor uses IP address 1.2.3.52 via device 1E00
Linux image LINUX1 uses IP address 1.2.3.67 via the internal network
Linux image LINUX0 uses IP address 1.2.3.66 via the internal network
Command Complete
```

You can also use the QUERY CONFIGURATION command (see the example on page 17) to display the hypervisor IP address, the gateway IP address, the network type (Internal or External), and the IP address for LINUX0. Or you can use the QUERY ALL command (see the example on page 19) to retrieve all network information about your system. However, if you have many images defined on your system, QUERY ALL may display a very long list of information.

HYPERVISOR NETWORK: If you are using an “Internal” network, you can add, change or delete image IP addresses using the HYPERVISOR NETWORK command. This command is also used to make changes to the VIF hypervisor's network connections or to change its Gateway IP address.

IMAGE NETWORK: If you are using an “External” network, use this command to add or delete network devices that are dedicated to an image.

Backing up and Restoring your VIF Configuration

Whenever you create new images, change your network, or add DASD to your VIF system, VIF retains this information in configuration files. Whenever you boot your VIF system, these configuration files are read and used to set up your system. VIF provides the following commands to back up and restore your VIF configuration:

HYPERVISOR EXPORT: You should always keep a current backup of your configuration. You can create a backup file with the following command:

```
vif 1.2.3.52 hypervisor export
```

This command writes the system configuration to a file named `config.save` in the current directory for LINUX0. The directory must be mounted read/write. If a file named `config.save` already exists, it is overwritten. Therefore, you may want to rename your backup configuration information or send it to a separate system for safekeeping.

HYPERVISOR IMPORT: If you need to restore a previous configuration to your VIF system, you should first ensure that the `config.save` file that is in the current directory of LINUX0 is the version of the file you want to use for the restore. Then enter the following command:

```
vif 1.2.3.52 hypervisor import
```

You must restart your VIF system to use the restored system configuration. Before you restart VIF, you should ensure that all your Linux images are shut down, either by logging onto each console and issuing the Linux 'halt' command, or by using a Linux system management tool to shut down the images.

HYPERVISOR RESTART: Restart your VIF system using the following command:

```
vif 1.2.3.52 hypervisor restart
```

IMAGE START: Start each Linux image on your system using the following command:

```
vif 1.2.3.52 image start imagename
```

An alternative method is create a shell script that issues the IMAGE START commands.

Chapter 4. Servicing VIF

Service for VIF is shipped as a full product replacement. It is always a good practice to make a backup copy of your configuration file before you start the service process. (Refer to steps 3 and 4 below.) However, applying service should affect neither the configuration information that you provided during installation, nor information about the images you already have defined.

Before applying service, please read the documentation that is shipped with your service tape. That document often contains important instructions concerning service.

After you receive your VIF service tape, do the following:

1. Access the master Linux image, known as LINUX0. (Refer to "The Master Linux Image" on page 13.)
2. Mount the S/390 Virtual Image Facility for LINUX Service tape on a tape drive accessible to the VIF system. Make a note of the tape drive address.
3. Ensure the file system where the vif command resides is mounted:

   ```
   mount  /dev/dasdb1  /usr/local/vif390  -r
   ```

4. Enter the following command to save the configuration in file ***config.save***.

   ```
   /usr/local/vif390/vif ipaddress hypervisor export
   ```

   Where:

   ipaddress is the VIF hypervisor IP address.

5. Enter the following command to service VIF:

   ```
   /usr/local/vif390/vif ipaddress hypervisor service device
   ```

   Where:

   ipaddress is the VIF hypervisor IP address.

   device is the device address of the tape drive where the service tape is mounted. This is a real device address that must be defined in the IOCDS.

6. If you receive the message:

   ```
   At your convenience, use the RESTART function to restart the system
   and bring the service online
   ```

   then you may complete the service process, when it is convenient, by issuing the following command from the master Linux image:

   ```
   /usr/local/vif390/vif ipaddress hypervisor restart
   ```

   Where:

   ipaddress is the VIF hypervisor IP address.

7. If the system was not restarted, issue the following commands to reaccess the file system where the `vif` command resides:

```
umount /dev/dasdb1
mount  /dev/dasdb1  /usr/local/vif390  -r
```

If you encounter problems during the VIF service process, refer to Chapter 5, “VIF Support Procedures” on page 27 for guidance.

Chapter 5. VIF Support Procedures

There are two levels of support for VIF:

1. Program services are provided as part of the IBM basic warranty services for VIF. Problems can be reported using e-mail, facsimile, or regular mail. Anyone with a VIF license is entitled to this support. Refer to the *License Information Document* (GC24-5933) and the Reader's Comments section of this document for specific mailing information.
2. If SW Subscription and Support was ordered for VIF, using program number 5739-SPT, then service support is provided as documented in the *Addendum for Linux for S/390 Programs* (Z125-6284). Also refer to section “Service Information” on page 29 for further service information.

Problem Determination and Documentation Collection

Linux Problems

If you are experiencing problems with Linux itself, contact your Linux distributor or Linux service organization.

VIF Problems

Before you contact IBM, ensure that you are running the latest service level of VIF. New service levels of VIF are periodically made available. You can check the service level by issuing the following command:

| `/mountpoint/vif ipaddress query level`

Where *ipaddress* is the VIF hypervisor IP address.

Informational APAR II12642 lists the latest service level available. If you are **not** running the latest service level of VIF, you can determine if your problem was resolved by a subsequent service level by reading the informational APAR. If this is the case, the latest service level should be ordered.

If you are still experiencing problems, refer to “Troubleshooting” on page 28 for a possible cause of the problem you are experiencing. If the troubleshooting guide does not help with your problem then you need to collect problem determination information to help figure out what the problem is.

If you are receiving error messages when running the `vif` command, do the following:

1. Access the master Linux image, known as LINUX0.
2. Ensure the file system where the `vif` command resides is mounted. For example:

   ```
   mount  /dev/dasdb1  /usr/local/vif390  -r
   ```

   | Where `dasdb1` is the 203 partition that contains the VIF commands.

   Also make sure the current directory is read/write.

3. Enter the following command to collect problem determination information (which will be saved in file ***/collect.data***):

   ```
   /usr/local/vif390/vif ipaddress HYPERVISOR COLLECT
   ```

   Where:

   ipaddress is the VIF hypervisor IP address.

4. Contact IBM, based on the type of service support to which you are entitled. Be prepared to provide the ***/collect.data*** file to IBM (for example, by sending it to a designated FTP site).

Troubleshooting

The following problems may occur when installing or running VIF.

Figure 2 (Page 1 of 2). Troubleshooting

Problem	Probable Cause	Possible Solution
Incorrect configuration data entered during installation	Typographical error or erroneous information	Obtain corrected information and reinstall the system.
Wait state 1040 on IPL of VIF installation tape	Device address specified in the load parameter (AUTOxxxx) does not exist	Correct the device address and re-IPL the installation tape.
Wait state 9010 during VIF initialization	TOD Clock is not set	IPL a S/390 operating system to set the clock.
Wait state 7002 during VIF initialization	System verification failed	Ensure all required hardware and network resources are online.
Wait state 7004 during VIF initialization	Paging volume could not be mounted	Ensure hypervisor paging volumes are online.
Wait state 7005 during VIF initialization	Linux installation did not complete successfully	Verify that the designated Linux installation FTP server is running and configured properly.
Wait state 7006 during VIF initialization	System configuration could not be created	Report the problem to IBM.
Wait state 7007 during VIF initialization	Internal network could not be started	Report the problem to IBM.
Wait state 7008 during VIF initialization	Master Linux or other Linux images could not be started	Report the problem to IBM.
Wait state 700B during VIF initialization	Disk initialization error	Initialize the installation volume using ICKDSF and reinstall.
Disabled wait PSW 000E0000 00000000	An old level of VIF is being used.	Order the latest service tape for VIF. Refer to informational APAR II12642 for details.

Figure 2 (Page 2 of 2). Troubleshooting		
Problem	**Probable Cause**	**Possible Solution**
Any other disabled wait PSW	Depends on the actual code causing the problem	Report the problem to your IBM support personnel, if necessary.

Service Information

If you have ordered 5739-SPT, SW Subscription and Support for S/390 Virtual Image Facility for LINUX, on the processor where a problem is occurring, you can report any difficulties you encounter with VIF to IBM using the contact information in the *Addendum for Linux for S/390 Programs*. In order to report a problem to IBM you may need the following information.

Figure 3 lists the RETAIN® component identifier (COMPID) and release for VIF.

Figure 3. Component IDs

	Retain	
COMPID	**Release**	**Component Name**
5739A0100	110	S/390 Virtual Image Facility for LINUX **Note:** The VIF service process only supports tapes. When ordering service, make sure you order a physical tape media that is supported by VIF.

If you are having problems with VIF, refer to “VIF Problems” on page 27 for assistance.

Chapter 6. VIF Command Reference

| This chapter provides information about the VIF administrator commands, which are intended to be used
| by only the VIF administrator. For each command there is a description of the purpose, explanations of
| operands and options, and one or more examples of how the command is used. For information on
| common procedures, refer to Chapter 3, “Administering your VIF System” on page 13.

Notation

The following syntactic notation conventions are used in this chapter:

1. The required portion of a keyword is shown in upper case; the optional portion is shown in lower case (for example, `PARtition`).
2. Alternative command operands are separated by vertical bars (`|`) or are shown one under another in a column.
3. Optional command operands are enclosed in brackets (`[ ]`).

The general command syntax is:

| `vif` *`ipaddress command function`* [*`operands`*]

Where:

| ***ipaddress*** is the IP address of the VIF hypervisor.

command is the command to be executed.

function is the function to be executed.

operands are the parameters of the command.

VIF is managed using the following commands:

| **HELP** displays a list of valid commands or information about a particular command.

HYPERVISOR manages VIF.

IMAGE manages Linux images.

PARTITION manages Linux DASD partitions.

QUERY displays configuration and activity information.

Objects

The VIF administrative interface works with several different kinds of objects. These objects, their descriptions and how they are specified are as follows:

ipaddress an IP address in dotted-decimal form (for example, 9.130.58.78).

device a one- to four-digit hexadecimal number identifying a device. If a real device address is being specified, it must be defined in the IOCDS.

image an individual Linux system, with a one- to eight-character alphanumeric name that begins with an alphabetic character. Restrictions: LINUX0 is reserved for use by VIF.

mask an IP mask in dotted-decimal form (for example, 255.255.240.0).

mtu a network Maximum Transmission Unit size in characters (for example, 1500).

partition an area of 3390 disk storage, identified by a *device* number and associated with an *image*.

port a network device adapter number (for example, 0).

size a device or storage capacity in megabytes (for example, 100M).

string a sequence consisting of any printable characters.

type a local-area network type (ETHernet, TR, TOKenring, 802.3, FDDI, or CTCA).

volid a 3390 disk storage volume serial number with a valid one- to six-character label (for example, VIFPG7).

HELP Command

Purpose: Use the HELP command to display a list of the valid VIF commands that are available or to display information about a particular VIF command.

Format:

```
Help [command]
Help HYPERVISOR [function]
```

Where:

command is the VIF command (HELP, HYPERVISOR, IMAGE, PARTITION, or QUERY) about which information is required. Omit the command name to obtain a list of valid commands.

function is a function of the HYPERVISOR command about which information is required. Omit the function name to obtain a list of valid HYPERVISOR functions.

| ***Example:*** To display a list of the valid VIF commands, enter:

```
vif 1.2.3.52 help
```

This displays the following:

```
Usage: VIF address Help|HYPervisor|IMAGE|
                   PARtition|Query

Manage S/390 Virtual Image Facility for LINUX configuration
Command Complete
```

HYPERVISOR Command

| ***Purpose:*** The HYPERVISOR command manages the VIF hypervisor.

| ***Format:***

```
HYPervisor function [operands]
```

Where:

function is the name of the function to be performed and can be COLLECT, ECHO, ERRORS, EXPORT, IMPORT, INSTALL, NETWORK, RESTART, SERVICE, SHUTDOWN, VERIFY, or VOLUME.

The HYPERVISOR command functions are described below.

HYPERVISOR COLLECT

| ***Purpose:*** HYPERVISOR COLLECT gathers VIF problem determination information and transfers it to Linux file ***/collect.data*** in your current directory. Use COLLECT under the direction of the IBM Support Center to provide information to assist in problem diagnosis.

| ***Format:***

```
HYPervisor COLLect
```

| ***Usage Notes:***

1. The ***collect.data*** file is written to your current directory. The directory must be mounted read/write or the command will fail.
2. The ***collect.data*** file is overwritten each time the HYPERVISOR COLLECT command is issued. Therefore, it is recommended to make a backup copy of this file if the iteration of the VIF problem determination information it contains needs to be saved.

Example:

```
vif 1.2.3.52 hypervisor collect
```

The following is displayed:

```
Command may take up to 40 seconds; please wait
Command Complete
```

HYPERVISOR ECHO

Purpose: HYPERVISOR ECHO verifies connectivity with the VIF hypervisor.

Format:

```
HYPervisor ECHO
```

Example:

```
vif 1.2.3.52 hypervisor echo
```

The following is displayed:

```
19:06:14 S/390 Virtual Image Facility for LINUX System Manager ready
Command Complete
```

HYPERVISOR ERRORS

Purpose: HYPERVISOR ERRORS creates a report of hardware errors for IBM service personnel in file ***/ereprept.****yyyymmdd*, where *yyyymmdd* is the current date. The current directory must be read/write.

Format:

```
HYPervisor ERRors
```

Example:

```
vif 1.2.3.52 hypervisor errors
```

The following is displayed:

```
No error records are pending
Command Complete
```

HYPERVISOR EXPORT

Purpose: HYPERVISOR EXPORT creates a backup of the system configuration in Linux file ***/config.save***. The current directory must be read/write.

Format:

```
HYPervisor EXPort
```

Usage Notes:

1. The ***config.save*** file is overwritten each time the HYPERVISOR EXPORT command is issued. Therefore, it is recommended to make a backup copy of this file if the iteration of the VIF system configuration information it contains needs to be saved.

Example:

```
vif 1.2.3.52 hypervisor export
```

The following is displayed:

```
Command Complete
```

HYPERVISOR IMPORT

Purpose: HYPERVISOR IMPORT restores a backup of the system configuration from Linux file ***/config.save***.

Format:

```
HYPervisor IMPort
```

Usage Notes:

1. VIF restores the system configuration from the ***/config.save*** file in your current directory. Therefore, if several ***/config.save*** files exist in different directories, ensure the current directory contains the file from which the restore should occur before using HYPERVISOR IMPORT.

Example:

```
vif 1.2.3.52 hypervisor import
```

The following is displayed:

```
Configuration import complete - restart system to apply
Command Complete
```

HYPERVISOR INSTALL

Purpose: HYPERVISOR INSTALL replaces the Linux installation configuration file and the files it references (usually a Linux kernel, parameter file, and RAM disk). Specify the network location of the installation configuration file to be used. Use INSTALL to create a new Linux recovery system to replace one that was created during VIF installation or by a previous use of the INSTALL function.

Format:

```
HYPervisor INSTall ipaddress user password [account] location
```

Where:

ipaddress is the IP address of the FTP server where the files to be installed reside.

user is the user name to be supplied to the FTP server.

password is the password to be supplied to the FTP server.

account is the account, if required, to be supplied to the FTP server. This operand is optional.

location is the path and file name of the Linux installation file to be installed.

Example:

```
vif 1.2.3.52 hypervisor install 1.2.5.4 newlin01 try2get /linux390/SuSE/GA70/cd1/susev.ins
```

The following is displayed:

```
Transferring Linux from 1.2.5.4 /linux390/SuSE/GA70/cd1/susev.ins
Command may take up to 3 minutes; please wait
Linux installed from 1.2.5.4 /linux390/SuSE/GA70/cd1/susev.ins
Command Complete
```

HYPERVISOR NETWORK

Purpose: HYPERVISOR NETWORK is used to ADD, CHANGE or DELETE hypervisor or internal network connections or to change the hypervisor GATEWAY.

Format:

```
HYPervisor NETwork     ADD device port type mtu ipaddress ipmask
                       ADD image ipaddress mask

                   CHAnge device port type mtu ipaddress ipmask
                   CHAnge image ipaddress ipmask

                   DELete device
                   DELete image

                  GATEway ipaddress
```

Where:

device is the even device number of the even-odd network device pair to be added to, changed in or deleted from the VIF hypervisor network configuration. This address pair must be defined in the IOCDS.

port is the port number associated with the device.

type is the network type.

mtu is the MTU size.

ipaddress is the IP address associated with the device or with the network gateway.

ipmask is the IP mask associated with the address.

image is the name of the image with the internal network connection that is to be added, changed, or deleted.

Usage Notes:

1. After the IP address is changed using HYPERVISOR NETWORK CHANGE, the master Linux image starts using it immediately. VIF commands are no longer accepted from the old IP address. The new IP address is used to determine whether the master Linux image is operational. If the change is not in effect within 90 seconds, then the master Linux image is restarted.

Example:

```
vif hypervisor network add newlinux 192.168.23.5 255.255.255.255
```

The following is displayed:

```
Command Complete
```

Note: The response to all successful HYPERVISOR NETWORK commands is `Command Complete`.

HYPERVISOR RESTART

Purpose: The HYPERVISOR RESTART command restarts the hypervisor and all Linux images.

Format:

```
HYPervisor RESTART
```

Usage Notes:

1. Prior to using this command, a Linux *halt* command should be issued to any active Linux images, if possible, to avoid startup delays due to Linux file system validation. This requires logging onto the console of each Linux image and issuing the Linux *halt* command.
2. After entering a HYPERVISOR RESTART command, a message indicating that the command is complete is displayed (see example below), even though the RESTART may still be in progress. Commands cannot be entered while the RESTART is in progress because the master Linux image is disabled. When a reconnect to LINUX0 can be accomplished, this indicates that the RESTART is complete.

Example:

```
vif 1.2.3.52 hypervisor restart
```

The following is displayed:

```
Restart starting
Command Complete
```

HYPERVISOR SERVICE

Purpose: HYPERVISOR SERVICE installs a VIF service tape mounted on a tape drive.

Format:

```
HYPervisor SERVice device
```

Where:

device specifies the device number of the tape drive where the service tape is mounted.

Usage Notes:

1. The tape drive you specify in the command must be online. Use the HMC to verify that the tape drive is attached to your system.

Example:

```
vif 1.2.3.52 hypervisor service 490
```

The following is displayed:

```
Command may take up to 5 minutes; please wait
Do you want to restart the system at this time to bring the
    Hypervisor service online ? (Y/N)
Y
Proceeding with service of HYPERVISOR; system will shut down
Restart starting
Command Complete
```

HYPERVISOR SHUTDOWN

Purpose: HYPERVISOR SHUTDOWN shuts down the hypervisor and all Linux images.

Format:

```
HYPervisor SHUTDOWN  [RECONFigure]
```

Where:

RECONFigure causes reconfiguration of the system. This operand is optional.

Usage Notes:

1. Your configuration is displayed and you are prompted to verify the information. At this point you can make changes to your system configuration, such as changes to IP addresses and to the gateway address. The service process ***will not*** attempt to load Linux from the FTP server.
2. Prior to using this command, a Linux *halt* command should be issued to any active Linux images, if possible, to avoid startup delays due to Linux file system validation. This requires logging onto the console of each Linux image and issuing the Linux *halt* command.
3. After entering a HYPERVISOR SHUTDOWN command, a message indicating that the command is complete is displayed (see example below), even though the SHUTDOWN may still be in progress. Commands cannot be entered while the SHUTDOWN is in progress because the master Linux image is disabled.

Example:

```
vif 1.2.3.52 hypervisor shutdown
```

The following is displayed:

```
Shutdown starting
Command Complete
```

HYPERVISOR VERIFY

Purpose: HYPERVISOR VERIFY performs consistency checks of the VIF environment or verifies that there is network connectivity with a particular Linux image.

Format:

```
HYPervisor VERify  FULL
                   BRIef
                   NETwork image
```

Where:

FULL causes a complete verification of the environment.

BRIef causes a partial verification of the environment that is suitable for establishing its overall consistency.

NETwork verifies connectivity between the VIF hypervisor and a particular Linux image.

image is the name of the image for which connectivity is to be verified.

Examples:

Example 1:

```
vif 1.2.3.52 hypervisor verify full
```

The following is displayed:

```
Verification starting
Command is still processing; please wait
Verification completed successfully
Command Complete
```

Example 2:

```
vif 1.2.3.52 hypervisor verify network linux1
```

The following is displayed:

```
Verification starting
Linux image LINUX1 is active on the network
Verification completed successfully
Command Complete
```

HYPERVISOR VOLUME

Purpose: HYPERVISOR VOLUME adds paging or image DASD volumes to the hypervisor configuration, removes these volumes from the configuration, reports the utilization of such volumes, or initializes a new volume.

Format:

```
HYPervisor VOLume       ADD IMAGE|PAGING  device volid

                      DELete IMAGE|PAGING  device|volid

                         MAP USED|FREE [device|volid]

                    INITialize device
```

Where:

IMAGE specifies that volumes for image use are to be added or deleted.

PAGING specifies that volumes for paging use are to be added or deleted.

USED specifies that space in use on an image volume is to be reported.

FREE specifies that available space on an image volume is to be reported.

| ***device*** is the number of the device to be added, deleted, mapped, or initialized. This address must be defined in the IOCDS.

volid is the volume ID of the device to be added, deleted, or mapped.

| ***Usage Notes:***

| 1. Some types of DASD are initialized when they are installed (for example, Shark and RVA). If this is the case, it is not necessary to issue the HYPERVISOR INITIALIZE command for that DASD. In some cases, initializing such DASD may report an error (which can be ignored).
| 2. The result of the HYPERVISOR VOLUME MAP USED command includes only DASD partitions that are mounted read/write. Any partition mounted read-only (such as the 203 partition for LINUX0) is not displayed. For complete details on an image and its partitions, use the QUERY IMAGE command (see “QUERY IMAGE” on page 56).

| ***Examples:***

| Example 1:

```
| vif 1.2.3.52 hypervisor volume map free
```

| The following is displayed:

```
      VolID     Gap(MB)
      LX5679       846
      LX5678       144
    Command Complete
```

Example 2:

```
vif 1.2.3.52 hypervisor volume map used
```

```
      VolID    Image    Device   Size(MB)
      LX5679   LINUX1   151          1500
      LX5678   LINUX0   151          1500
      LX5678   LINUX0   152           200
      LX5678   LINUX1   152           200
      LX5678   LINUX1   153            50
      LX5678   LINUX2   152           200
      LX5678   LINUX2   153            50
      LX5675   LINUX0   201           843
    Command Complete
```

Example 3:

```
vif 1.2.3.52 hypervisor volume add image 5678 lx5680
```

```
IMAGE volume LX5680 added
Command Complete
```

IMAGE Command

Purpose: IMAGE manages Linux system images.

Format:

IMAGE *function* [*operands*]

Where:

function is the image management function to be performed (CREATE, DELETE, NETWORK, SET, START, STOP, or STOPALL).

The functions of the IMAGE command are described below.

IMAGE CREATE

Purpose: IMAGE CREATE defines a new Linux image.

Format:

```
IMAGE CREATE image
```

Where:

image is the name to be assigned to the new image.

Example:

```
vif 1.2.3.52 image create linux2
```

The following is displayed:

```
Image LINUX2 created successfully
Command Complete
```

IMAGE DELETE

Purpose: IMAGE DELETE removes a Linux image and all its associated resources.

Format:

```
IMAGE DELete image
```

Where:

image is the name of the image to be deleted.

Example:

```
vif 1.2.3.52 image delete linux2
```

The following is displayed:

```
Image LINUX2 deleted successfully
Command Complete
```

IMAGE NETWORK

Purpose: IMAGE NETWORK adds or deletes network connections for a Linux image.

Format:

```
IMAGE NETwork image ADD|DELete device
```

Where:

image is the name of the image for which a network device is to be added or deleted.

ADD specifies that the network device is to be added to the image configuration.

DELete specifies that the network device is to be removed from the image configuration.

device is the even device number of the even-odd network device pair to be added or deleted. This address pair must be defined in the IOCDS.

Examples:

Example 1:

```
vif 1.2.3.52 image network linux2 add 1e04
```

The following is displayed:

```
NETWORK ADD completed successfully
Command Complete
```

Example 2:

```
vif 1.2.3.52 image network linux2 delete 1e04
```

The following is displayed:

```
NETWORK DELETE completed successfully
Command Complete
```

IMAGE SET

Purpose: IMAGE SET changes the storage size, number of processors or the boot device for a Linux image.

Format:

```
IMAGE SET image STOrage size
IMAGE SET image CPUs number
IMAGE SET image BOOT device|DEFAULT
```

Where:

image is the name of the image for which storage size, number of CPUs or boot device is to be changed.

STOrage specifies that the image storage size is to be changed.

size is the new image storage size in megabytes.

CPUs specifies that the number of image CPUs is to be changed.

number is the new number of image CPUs. The valid range is 1 - 16.

BOOT specifies that the image boot device is to be changed.

device is the number of the device (partition) from which the image is to boot.

DEFAULT specifies that the image is to boot from the recovery system installed either during system configuration or using the HYPERVISOR command INSTALL function.

Usage Notes:

1. If changes are made to the settings of a Linux image after it has been started, the image must be stopped and started again for the changes to take effect. Refer to “IMAGE START” on page 46 and “IMAGE STOP” on page 47 for more information.

Examples:

Example 1:

```
vif 1.2.3.52 image set linux2 storage 128
```

This displays the following:

```
Storage is set to 128M for LINUX2
Command Complete
```

Example 2:

```
vif 1.2.3.52 image set linux2 cpus 2
```

This displays the following:

```
SET CPUS completed successfully
Command Complete
```

Example 3:

```
vif 1.2.3.52 image set linux2 boot 151
```

This displays the following:

```
LINUX2 boot changed to 151
Command Complete
```

IMAGE START

Purpose: IMAGE START activates and boots a Linux image.

Format:

```
IMAGE START image
```

Where:

image is the name of the image to be started.

Usage Notes:

1. To automate the activation of Linux images at system startup, a shell script can be created to control the order and number of Linux images started at once. It is recommended that all Linux images should not be started at the same time.

Example:

```
vif 1.2.3.52 image start linux2
```

This displays the following:

```
Linux image LINUX2 started
Command Complete
```

IMAGE STOP

Purpose: IMAGE STOP terminates a Linux image.

Format:

```
IMAGE STOP image
```

Where:

image is the name of the image to be stopped.

Usage Notes:

1. Before stopping an image, it is recommended to shut down Linux first. This avoids delays when the Linux image is restarted.

Example:

```
vif 1.2.3.52 image stop linux2
```

This displays the following:

```
Linux image LINUX2 stopped
Command Complete
```

IMAGE STOPALL

Purpose: IMAGE STOPALL terminates all the Linux images on the system.

Format:

```
IMAGE STOPALL
```

Usage Notes:

1. Before stopping Linux images, it is recommended that Linux be shut down using the Linux `halt` command. This avoids potential damage to your file system.

Example:

```
vif 1.2.3.52 image stopall
```

The following is displayed:

```
Linux image LINUX1 stopped
Linux image LINUX2 stopped
Command Complete
```

PARTITION Command

Purpose: PARTITION manages DASD partitions.

Format:

```
PARtition function [operands]
```

Where:

function specifies the function to be performed (COPY, CREATE, DELETE, INITIALIZE, SHARE, or SWAP), each of which is explained below.

Usage Notes:

1. The PARTITION command specifies device numbers (such as *device1* and *device2*) for the DASD partitions corresponding to each individual Linux image (for example, *linux1* and *linux2*). These device numbers do **NOT** need to be defined in the IOCDS. These device identifier numbers must be unique within each individual image. However, multiple Linux images can specify identical device numbers as long as no two are the same for an individual image.
2. To change partitions (using COPY, CREATE, DELETE, INITIALIZE, SHARE, or SWAP) for a Linux image after it is started, the image must be stopped and started again before the changes take effect. Refer to “IMAGE START” on page 46 and “IMAGE STOP” on page 47 for more information.

PARTITION COPY

Purpose: PARTITION COPY adds a partition to a Linux image and initializes its contents from a partition that belongs to the same or another image.

Format:

```
PARtition COPY image1 device1 [TO] image2 device2
```

Where:

image1 is the name of the image from which a partition is to be copied.

device1 is the device number of the partition to be copied.

TO is an optional keyword

image2 is the name of the image to which the partition is to be added.

device2 is the device number of the new partition.

Example:

```
vif 1.2.3.52 partition copy linux1 152 to linux2 153
```

The following is displayed:

```
Command may take up to 5 minutes; please wait
PARTITION COPY completed successfully
Command Complete
```

PARTITION CREATE

Purpose: PARTITION CREATE adds a partition to a Linux image.

Format:

```
PARtition CREATE image device size
```

Where:

image is the name of the image to which the partition is to be added.

device is the device number of the new partition.

size is the size of the new partition in megabytes.

Usage Notes:

1. When a new partition is created for a Linux image, use PARTITION INITIALIZE to initialize the new partition for use by Linux. Refer to “PARTITION INITIALIZE” on page 50 for more information.

Example:

```
vif 1.2.3.52 partition create linux2 152 50
```

The following is displayed:

```
PARTITION CREATE completed successfully
Command Complete
```

PARTITION DELETE

Purpose: PARTITION DELETE removes a partition from a Linux image.

Format:

```
PARtition DELete image device
```

Where:

image is the name of the image from which the partition is to be deleted.

device is the device number of the partition to be deleted.

Example:

```
vif 1.2.3.52 partition delete linux2 152
```

The following is displayed:

```
PARTITION DELETE completed successfully
Command Complete
```

PARTITION INITIALIZE

Purpose: PARTITION INITIALIZE initializes a partition for use by Linux.

Format:

```
PARtition INITialize image device
```

Where:

image is the name of the image for which a partition is to be initialized.

device is the device number of the partition to be initialized.

Example:

```
vif 1.2.3.52 partition initialize linux2 152
```

The following is displayed:

```
PARTITION INITIALIZE completed successfully
Command Complete
```

PARTITION SHARE

Purpose: PARTITION SHARE gives one Linux image read-only access to the partition of another Linux image.

Format:

```
PARtition SHARE image1 device1 [WITH] image2 device2
```

Where:

image1 is the name of the image with the partition that is to be shared.

device1 is the device number of the shared partition.

WITH is an optional keyword

image2 is the name of the image that is to share the partition.

device2 is the device number of the sharing partition.

Example:

```
vif 1.2.3.52 partition share linux1 151 with linux2 151
```

The following is displayed:

```
PARTITION SHARE completed successfully
Command Complete
```

PARTITION SWAP

Purpose: PARTITION SWAP interchanges the device numbers of two partitions that belong to one Linux image.

Format:

```
PARtition SWAP image device1 [WITH] device2
```

Where:

image is the name of the image with the partitions that are to be interchanged.

device1 is the device number of the first partition.

WITH is an optional keyword

device2 is the device number of the second partition.

Usage Notes:

1. If one of the partitions that is swapped is the boot device for the image, unexpected results may occur the next time that image is booted.

Example:

```
vif 1.2.3.52 partition swap linux2 152 with 153
```

The following is displayed:

```
PARTITION SWAP completed successfully
Command Complete
```

QUERY Command

Purpose: QUERY displays information about the VIF configuration and activity.

Format:

```
Query function [operands]
```

Where:

function specifies the information to be displayed (ACTIVE, ALL, BOOT, CONFIGURATION, ERRORS, IMAGE, LEVEL, NETWORK, PAGING, PARTITIONS, PERFORMANCE, SHARED, or VOLUMES), each of which is explained below.

operands further qualify the information to be displayed for some functions.

QUERY ACTIVE

Purpose: QUERY ACTIVE reports which Linux images are running.

Format:

```
Query ACTive
```

Example:

```
vif 1.2.3.52 query active
```

The following is displayed:

```
The following Linux images are active:
  LINUX0   LINUX1   LINUX2
Command Complete
```

QUERY ALL

Purpose: QUERY ALL invokes all the functions of the QUERY command.

Format:

```
Query ALL
```

Example:

```
vif 1.2.3.52 query all
```

The following is displayed:

```
Here is the configuration (please make a note of it):

Hypervisor:
  System residence volume label: LX5675
         Network device address: 1E00
            Network port number: 0
                   Network type: T
               Network MTU size: 1500
                     IP address: 1.2.3.52
                        IP mask: 255.255.255.240
             Gateway IP address: 1.2.3.49

Master Linux Image:
                   Network type: INTERNAL
         Network device address: N/A
                     IP address: 1.2.3.66
                        IP mask: 255.255.255.255

Linux Installation Site:
           FTP server IP address: 1.2.5.4
            FTP server user name: newlin01
             FTP server password: try2get
              FTP server account:
     Install file path and name: /linux390/SuSE/GA70/cd1/susev.ins

LINUX0 has 1 CPUs and 128M of storage and boots 151
LINUX0 has an internal network connection
LINUX0 has a 843 MB read/write partition as device 201 on volume LX5675
LINUX0 has a 1500 MB read/write partition as device 151 on volume LX5678
LINUX0 has a 200 MB read/write partition as device 152 on volume LX5678
LINUX0 has a 3 MB read-only partition as device 203 on volume LX5575
LINUX1 has 1 CPUs and 64M of storage and boots 151
LINUX1 has an internal network connection
LINUX1 has a 1500 MB read/write partition as device 151 on volume LX5679
LINUX1 has a 200 MB read/write partition as device 152 on volume LX5678
LINUX1 has a 50 MB read/write partition as device 153 on volume LX5678
LINUX2 has 2 CPUs and 128M of storage and boots 151
LINUX2 has a 200 MB read/write partition as device 152 on volume LX5678
LINUX2 has a 50 MB read/write partition as device 153 on volume LX5678
LINUX2 shares LINUX1's device 151 read-only as device 151
416 of 2192 MB of hypervisor paging space in use
3700 MB of 4690 MB of Linux image partition space in use
990 MB of Linux image partition space is available in 2 extents
VIF performance: CPU is Green, Paging is Green, I/O is Green
The following paging volumes are defined:
   LINPG1 (5670)   LINPG2 (5671)
The following image volumes are defined:
   LX5678 (5678)   LX5679 (5679)
Hypervisor uses IP address 1.2.3.52 via device 1E00
Linux image LINUX1 uses IP address 1.2.3.67 via the internal network
Linux image LINUX0 uses IP address 1.2.3.66 via the internal network
The following Linux images are active:
  LINUX0   LINUX1   LINUX2
Hypervisor level: V1-R1-M0-SL0500
Last boot on 2001-04-05 at 20:11:47
System has been up for 5 days, 19 hours, 23 minutes
No error records are pending
Command Complete
```

QUERY BOOT

Purpose: QUERY BOOT reports when the VIF hypervisor was booted.

Format:

```
Query BOOt
```

Example:

```
vif 1.2.3.52 query boot
```

The following is displayed:

```
Last boot on 2001-04-05 at 20:11:47
System has been up for 5 days, 19 hours, 41 minutes
Command Complete
```

QUERY CONFIGURATION

Purpose: QUERY CONFIGURATION displays the current configuration settings of the VIF system.

Format:

```
Query CONFiguration
```

Example:

```
vif 1.2.3.52 query configuration
```

The following is displayed:

```
Here is the configuration (please make a note of it):

Hypervisor:
  System residence volume label: LX5675
          Network device address: 1E00
             Network port number: 0
                    Network type: T
                Network MTU size: 1500
                      IP address: 1.2.3.52
                         IP mask: 255.255.255.240
               Gateway IP address: 1.2.3.49

Master Linux Image:
                    Network type: INTERNAL
          Network device address: N/A
                      IP address: 1.2.3.66
                         IP mask: 255.255.255.255

Linux Installation Site:
           FTP server IP address: 1.2.5.4
            FTP server user name: newlin01
            FTP server password: try2get
             FTP server account:
      Install file path and name: /linux390/SuSE/GA70/cd1/susev.ins

Command Complete
```

QUERY ERRORS

Purpose: QUERY ERRORS indicates whether there are hardware errors that need to be reported.

Format:

```
Query ERRors
```

Example:

```
vif 1.2.3.52 query errors
```

The following is displayed:

```
No error records are pending
Command Complete
```

QUERY IMAGE

Purpose: QUERY IMAGE displays the configuration of a Linux image.

Format:

```
Query IMAGE [image]
```

Where:

image is the name of the image for which the configuration is to be displayed. If the image name is omitted, all image configurations are displayed.

Example:

```
vif 1.2.3.52 query image linux1
```

The following is displayed:

```
LINUX1 has 1 CPUs and 64M of storage and boots 151
LINUX1 has an internal network connection
LINUX1 has a 1500 MB read/write partition as device 151 on volume LX5679
LINUX1 has a 200 MB read/write partition as device 152 on volume LX5678
LINUX1 has a 50 MB read/write partition as device 153 on volume LX5678
Command Complete
```

QUERY LEVEL

Purpose: QUERY LEVEL reports the level of the VIF hypervisor.

Format:

```
Query LEVel
```

Example:

```
vif 1.2.3.52 query level
```

The following is displayed:

```
Hypervisor level: V1-R1-M0-SL0500
Command Complete
```

QUERY NETWORK

Purpose: QUERY NETWORK displays the network configuration.

Format:

```
Query NETwork
```

Example:

```
vif 1.2.3.52 query network
```

The following is displayed:

```
Hypervisor uses IP address 1.2.3.52 via device 1E00
Linux image LINUX1 uses IP address 1.2.3.67 via the internal network
Linux image LINUX0 uses IP address 1.2.3.66 via the internal network
Command Complete
```

QUERY PAGING

Purpose: QUERY PAGING displays the the paging space in use and the effective amount of hypervisor paging space available to the user. The effective amount of available paging space displayed is always less than the amount installed in order to ensure efficient paging performance.

Format:

```
Query PAGING
```

Example:

```
vif 1.2.3.52 query paging
```

The following is displayed:

```
416 of 2192 MB of hypervisor paging space in use
Command Complete
```

QUERY PARTITIONS

Purpose: QUERY PARTITIONS displays information about the Linux image DASD utilization.

Format:

```
Query PARtitions
```

Usage Notes:

1. To display the layout of partitions on the DASD volumes, use the `HYPervisor VOLumes MAP USED` *`volid`* command.

Example:

```
vif 1.2.3.52 query partitions
```

The following is displayed:

```
3700 MB of 4690 MB of Linux image partition space in use
990 MB of Linux image partition space is available in 2 extents
Command Complete
```

QUERY PERFORMANCE

Purpose: QUERY PERFORMANCE displays the current performance levels of the system that is running VIF.

Format:

```
Query PERformance
```

Example:

```
vif 1.2.3.52 query performance
```

The following is displayed:

```
VIF performance: CPU is Green, Paging is Green, I/O is Green
Command Complete
```

QUERY SHARED

Purpose: QUERY SHARED displays the names of the images that share the partitions of another image.

Format:

```
Query SHARED [image]
```

Where:

image is the name of the image with shared partitions that are to be listed. If the image name is omitted, the shared partitions of all images are listed.

Examples: If a user issued the following command earlier:

```
partition share linux1 151 with linux2 151
```

The queries would provide the following responses:

Example 1:

```
vif 1.2.3.52 query shared
```

The following is displayed:

```
The following images share LINUX1's device 151:
   LINUX2    151
Command Complete
```

Example 2:

```
vif 1.2.3.52 query shared linux1
```

The following is displayed:

```
The following images share LINUX1's device 151:
   LINUX2    151
Command Complete
```

Example 3:

```
vif 1.2.3.52 query shared linux2
```

The following is displayed:

```
No devices are shared among images
Command Complete
```

QUERY VOLUMES

Purpose: QUERY VOLUMES displays the image and paging DASD volumes volume ID and device number.

Format:

```
Query VOLumes
```

Example:

```
vif 1.2.3.52 query volumes
```

The following is displayed:

```
The following paging volumes are defined:
   LINPG1 (5670)   LINPG2 (5671)
The following image volumes are defined:
   LX5678 (5678)   LX5679 (5679)
Command Complete
```

Appendix A. Checklist of Information Needed for the Installation Prompts

Information Needed for Installation Prompts	Fill In Answers
1. Your choice of sysres volid for VIF (1-6 characters) The label to be assigned to the 3390 volume where VIF will be installed.	
2. OSA device address for VIF hypervisor The even address of the network device pair that is assigned to the VIF hypervisor for network access. This address pair must be defined in the IOCDS.	
3. The OSA device port number The number of the port associated with the network device pair that is assigned to the VIF hypervisor.	
4. VIF hypervisor network type (Ethernet, Token-Ring, 802.3, or FDDI) The type of local-area network (LAN) to which the hypervisor is connected.	
5. VIF hypervisor network MTU size (576, 1492, 1500, 2000, or 4096) The Maximum Transmission Unit of the VIF hypervisor LAN.	
6. VIF hypervisor IP address The IP address assigned to the hypervisor.	
7. The hypervisor subnet mask The IP mask associated with the hypervisor IP address.	
8. IP address of gateway to be used by VIF The IP address of the default gateway on the VIF hypervisor LAN.	
9A. Master Linux network type (Internal or External) The type of network connection to be used by the master Linux image. If a network device pair is available, specify **External.** Otherwise, specify **Internal.**	
9B. Enter master Linux network device address if "External" was chosen in 9A above: **Note:** If an **External** network connection is provided for the master Linux image, specify the even address of the network device pair. This address pair must be defined in the IOCDS.	
10. IP address of the master Linux image The IP address assigned to the master Linux image. **Note:** If the answer to installation prompt #9A was "internal," then the IP address of the master LINUX system should be in a subnet different than the IP address chosen for the VIF hypervisor in installation prompt #6 unless there is a proxy ARP server in your network.	
11. The subnet mask for the master Linux image The IP mask associated with the master Linux image IP address.	
12. The IP address of the FTP Server for the Linux distribution The IP address of the FTP server where the Linux distribution files are located.	
13. The user name for the FTP server The user name to be used to connect to the FTP server where the Linux distribution files are located.	
14. The password for the FTP server The password to be used to connect to the FTP server.	
15. The FTP account information, if needed The account number to be used to access the FTP server, or null if no account information is required.	
16. The path and file name of the Linux installation file on the FTP server The path and file name on the FTP server of the Linux installation file.	

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