



# **S/390® Virtual Image Facility™ for LINUX®**

## **Guide and Reference**

Version 1 Release 1.0

Program Number 5739-A01

Document Date: August 2000

GC24-5930-00

**Note**

Before using this information and the product it supports, be sure to read the general information under 6.0, "Notices" on page 22.

This publication, First Edition (August 2000), applies to S/390 Virtual Image Facility for LINUX Version 1 Release 1.0 (Virtual Image Facility), Program Number 5739-A01.

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## 1.0 Installing Virtual Image Facility (VIF)

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 platform. A simple Linux client program is used to send system management commands to VIF and to interact with its facilities. VIF requires a LAN connection but allows Linux images to communicate with one another without requiring their own LAN connections. As well, these images can share the VIF LAN connection to communicate with external systems.

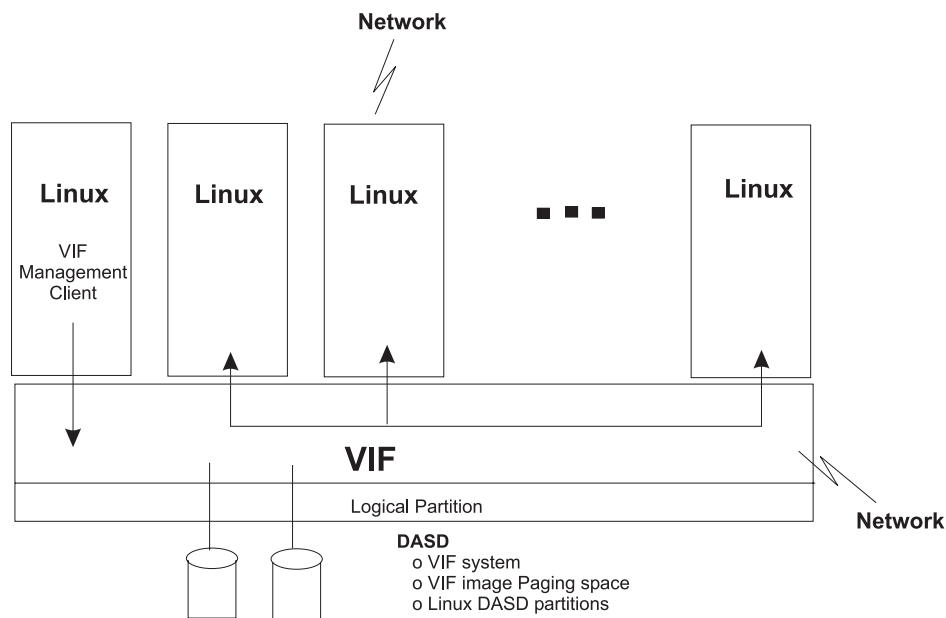


Figure 1. Sample VIF Environment

---

### 1.1 Installation Considerations

VIF requires a LAN connection and an associated IP address. This connection can be used to provide network access for Linux images that you create, though each image still requires its own IP address. Alternatively, or in addition, you can provide a Linux image with a direct LAN connection. An image that you expect will perform a lot of network communication may benefit from having its own LAN connection. Images that communicate mostly with others under the control of VIF or that do not use the network extensively may not require their own LAN connections.

Installing VIF also installs an initial Linux image, so at least one LAN connection and two IP addresses are required. A second LAN connection can be provided for this initial image, although in general this is not necessary.

---

## 1.2 Installation Requirements

Before installation of Virtual Image Facility can begin, the following must be available for use:

- A processor (G5 or later or Multiprise 3000) or a logical partition on such a processor.
- Access to the Hardware Management Console (HMC) for the processor.
- One 3390 model 3 DASD.
- One 3480 or 3490 tape drive.
- S/390 Virtual Image Facility for LINUX installation tape.
- One or two ports on Open System Adapters, IBM 3172s, or equivalent devices, connected to a Local-Area Network (LAN).
- An IP address on the LAN and its associated network mask.
- The IP address of a gateway on the LAN.
- A second IP address.
- The IP address of an FTP server with access to the contents of a Linux distribution, as well as a user name, password, account, file path, and file name needed to retrieve a Linux installation file and associated materials using this FTP server.

---

## 1.3 Installation Procedures

Installing S/390 Virtual Image Facility for LINUX is a straightforward process. First, prepare for installation; then, perform it.

### 1.3.1 Getting Ready

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

- IOCDs and OSA must be configured and must include the required devices listed above.
- The TOD clock must be set.
- The installation target DASD must be initialized (using ICKDSF).

### 1.3.2 Installing

Install S/390 Virtual Image Facility for LINUX as follows:

1. Mount the Installation tape on the tape drive.
2. Use the HMC to load from the tape drive with the load parameter

**AUTOxxxx**

where xxxx is the address of the 3390 DASD on which Virtual Image Facility is to be installed.

3. Wait for the system to enter a disabled wait state.
4. When the disabled wait state occurs, display the PSW and ensure that it is 000E0000 00000000. If it is not, refer to 5.0, "Using VIF Support Procedures" on page 19 for guidance.
5. Load from the Virtual Image Facility DASD volume.
6. Activate the *Operating System Messages* function on the S/390 Hardware Management Console.
7. Reply to the configuration prompts with the appropriate parameters, as follows:

**Enter system residence volume Label:** the label to be assigned to the volume where Virtual Image Facility was installed.

**Enter Hypervisor network device address:** the even address of the network device pair that is assigned to the Virtual Image Facility Hypervisor for network access.

**Enter Hypervisor network port number:** the number of the port associated with the network device pair that is assigned to the Virtual Image Facility Hypervisor.

**Enter Hypervisor network type (Ethernet, 802.3, TokenRing, FDDI):** the type of local-area network (LAN) to which the Hypervisor is connected.

**Enter Hypervisor network MTU size (576, 1492, 1500, 2000, 4096):** the Maximum Transmission Unit of the Virtual Image Facility Hypervisor LAN.

**Enter Hypervisor IP address:** the IP address assigned to the Hypervisor.

**Enter Hypervisor IP mask:** the IP mask associated with the Hypervisor IP address.

**Enter Hypervisor gateway IP address:** the IP address of the default gateway on the Virtual Image Facility Hypervisor LAN.

**Enter master Linux network type (External, Internal):** 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".

**Enter master Linux network device address:** if an external network connection is provided for the master Linux image, specify the even address of the network device pair.

**Enter master Linux IP address:** the IP address assigned to the master Linux.

**Enter master Linux IP mask:** the IP mask associated with the master Linux IP address.

**Enter FTP server IP address:** the IP address of the FTP server where the Linux distribution files are located.

**Enter FTP server user name:** the user name to be used to connect to the FTP server.

**Enter FTP server password:** the password to be used to access the FTP server.

**Enter FTP server account or null:** the account number to be used to access the FTP server, or null if none is required.

**Enter installation file path and name:** the path and file name on the FTP server of the Linux installation file.

(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.)

8. Wait for the master Linux image to boot.
9. Complete the installation of the master Linux image by following the configuration procedures for the distribution you used. The following resources are provided to the master Linux image automatically:
  - One processor.
  - 64 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 uninitialized read/write DASD partition at device number 201.
  - A 3.5-megabyte read-only DASD partition at device number 203 (refer to 3.0, “Administering VIF” on page 6 for more information about the contents and use of this partition).
  - A network connection, as selected during system configuration.
10. Define and configure images and save the image configuration. Refer to 3.0, “Administering VIF” on page 6 for information about how to perform these functions.

**Note:** Any time you configure images, you should save the resulting configuration.

If you encounter problems during Virtual Image Facility installation or configuration, refer to 5.0, “Using VIF Support Procedures” on page 19 for guidance.



---

## 2.0 Using VIF

Using S/390 Virtual Image Facility for LINUX involves employing its administration interface, which is described in 3.0, “Administering VIF” on page 6. Some other aspects of using VIF are described in this section.

---

### 2.1 Image Console Access

You may access the console of a started Linux image through VIF. Connect to the VIF hypervisor using telnet and enter the command

```
LOGON image
```

specifying the name of the *image* whose console you want to access.

---

### 2.2 Using the Master Linux Image

The master Linux image console is always on the system console, accessible using the HMC *Operating System Messages* task. Because this image provides the interface to VIF administration functions, access to it should be limited. As well, care should be taken to ensure that this image does not become unusable. In general, it is advisable to limit your use of this image to essential system management functions and to create other images for other purposes.

---

## 3.0 Administering VIF

After you have installed S/390 Virtual Image Facility for LINUX, it initializes itself and installs the *master Linux image*, known as *LINUX0*, from the FTP location you specified during the system configuration process. LINUX0 provides an administration interface to the S/390 Virtual Image Facility for LINUX environment in the form of the `vif` command. For example, you can issue

```
vif 1.2.3.4 query level
```

(where 1.2.3.4 is the Virtual Image Facility system IP address) to determine the current level of Virtual Image Facility. Or, you can define a new Linux image named `mailhost` with the command

```
vif 1.2.3.4 image create mailhost
```

Issue

```
vif 1.2.3.4 help
```

to list the available commands, or

```
vif 1.2.3.4 help image
```

for a brief explanation of the syntax and purpose of the `IMAGE` command.

The `vif` command resides in a separate, read-only file system on LINUX0's device 203. It may be convenient to create a mount point for it, for example,

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

and to update `/etc/fstab` to mount it automatically, rather than issuing the `mount` command

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

manually.

Create a symbolic link to the `vif` command by issuing

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

To make using `vif` more convenient, a simple shell script might be helpful. For example,

```
#!/bin/bash
vif 1.2.3.4 $@
```

(with the appropriate IP address substituted for 1.2.3.4) could provide an interface that is easier to use.

---

## 3.1 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 ([ ]).

---

## 3.2 Objects

The S/390 Virtual Image Facility for LINUX administrative interface lets you manipulate several different kinds of objects. These objects, their descriptions, and how they are specified are as follows:

<b>address</b>	an IP address in dotted-decimal form (for example, 9.130.58.78).
<b>device</b>	a one- to four-digit hexadecimal number identifying a device.
<b>image</b>	an individual Linux system, with a one-to-eight character, case-insensitive, alphanumeric name that begins with an alphabetic character.
<b>mask</b>	an IP mask in dotted-decimal form (for example, 255.255.240.0).
<b>mtu</b>	a network Maximum Transmission Unit size in characters (for example, 1500).
<b>partition</b>	an area of 3390 disk storage, identified by a <i>device</i> number and associated with an <i>image</i> .
<b>port</b>	a network device adapter number (for example, 0).
<b>size</b>	a device or storage capacity in megabytes (for example, 100M).
<b>string</b>	a sequence consisting of any printable characters.
<b>type</b>	a local-area network type (ETHERnet, TR, IBMTR, 802.3, FDDI, or CTCA).
<b>valid</b>	a 3390 disk storage volume serial number with a one-to-six character, case-insensitive label (for example, VIFPG7).

---

## 3.3 Commands

S/390 Virtual Image Facility for LINUX is managed using the following commands:

<b>HELP</b>	displays command syntax.
<b>HYPERVERSOR</b>	manages the S/390 Virtual Image Facility for LINUX hypervisor.
<b>IMAGE</b>	manages Linux images.
<b>PARTITION</b>	manages Linux DASD partitions.

**QUERY** displays configuration and activity information.

The general command syntax is:

```
vif address command operands
```

where:

**address** is the IP address of the Virtual Image Facility hypervisor.

**command** is the command to be executed.

**operands** are the parameters of the command.

Each command is described below.

### 3.3.1 HELP Command

HELP reminds you what commands are available or summarizes the syntax of a particular command. The command format is:

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

where:

**command** is the command about which information is required.

**function** is a function of the command about which information is required.

Omit the command name to obtain a list of valid commands.

### 3.3.2 HYPERVISOR Command

HYPERVISOR manages the S/390 Virtual Image Facility for LINUX hypervisor. The format is:

```
HYPervisor function [operands]
```

where:

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

The HYPERVISOR command functions are described below.

#### 3.3.2.1 HYPERVISOR COLLECT

HYPERVISOR COLLECT gathers S/390 Virtual Image Facility for LINUX problem determination information and transfers it to Linux file **./collect.data**. Use COLLECT under the direction of the IBM Support Center to provide information to assist in problem diagnosis. The format is:

```
HYPervisor COLlect
```

### 3.3.2.2 HYPERVISOR ECHO

HYPERVISOR ECHO verifies connectivity with the S/390 Virtual Image Facility for LINUX hypervisor. The format is:

```
HYPervisor ECHO
```

### 3.3.2.3 HYPERVISOR ERRORS

HYPERVISOR ERRORS creates a report of hardware errors for IBM service personnel in file *./ereprept.yyyymmdd*, where *yyymmdd* is the current date. The format is:

```
HYPervisor ERRors
```

### 3.3.2.4 HYPERVISOR EXPORT

HYPERVISOR EXPORT creates a backup of the system configuration in Linux file *./config.save*. The format is:

```
HYPervisor EXPort
```

### 3.3.2.5 HYPERVISOR IMPORT

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

```
HYPervisor IMPort
```

### 3.3.2.6 HYPERVISOR INSTALL

HYPERVISOR INSTALL replaces the Linux installation configuration file and the files it references (usually a Linux kernel, parameter file, and RAM disk). You 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 S/390 Virtual Image Facility for LINUX installation or by a previous use of the INSTALL function. The format is:

```
HYPervisor INSTall address user password account location
```

where:

**address** 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 to be supplied to the FTP server.

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

### 3.3.2.7 HYPERVISOR NETWORK

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

```
HYPERvisor NETwork    ADD device port type mtu address mask  
                      ADD image address mask
```

```
                     CHANge device port type mtu address mask  
                     CHANge image address mask
```

```
                     DELEte device type  
                     DELEte image
```

```
                     GATEway address
```

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.

**port** is the port number associated with the device.

**type** is the network type.

**mtu** is the MTU size.

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

**mask** is the IP mask associated with the address.

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

### 3.3.2.8 HYPERVISOR RESTART

HYPERVISOR RESTART restarts the hypervisor and all Linux images. The format is:

```
HYPERvisor RESTART
```

### 3.3.2.9 HYPERVISOR SERVICE

HYPERVISOR SERVICE installs hypervisor service from a service tape mounted on a tape drive. The format is:

```
HYPERvisor SERvice device
```

where:

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

### 3.3.2.10 HYPERVISOR SHUTDOWN

HYPERVISOR SHUTDOWN shuts down the hypervisor and all Linux images. The format is:

```
HYPervisor SHUTDOWN
```

### 3.3.2.11 HYPERVISOR VERIFY

HYPERVISOR VERIFY performs consistency checks of the Virtual Image Facility environment or verifies that there is network connectivity with a particular Linux image. The format is:

```
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 Virtual Image Facility hypervisor and a particular Linux image.

**image** is the name of the image whose connectivity is to be verified.

### 3.3.2.12 HYPERVISOR VOLUME

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. The format is:

```
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 is to be reported.

**FREE** specifies that available space is to be reported.

**device** is the number of the device to be added, deleted, mapped, or initialized.

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

### 3.3.3 IMAGE Command

IMAGE manages Linux system images. The format is:

```
IMAGE function
```

where:

**function** is the image management function to be performed and can be CREATE, DELETE, NETWORK, SET, START, or STOP.

The functions of the IMAGE command are described below.

#### 3.3.3.1 IMAGE CREATE

IMAGE CREATE defines a new Linux image. The format is:

```
IMAGE CREATE image
```

where:

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

#### 3.3.3.2 IMAGE DELETE

IMAGE DELETE removes a Linux image and all its associated resources. The format is:

```
IMAGE DELEte image
```

where:

**image** is the name of the image to be deleted.

#### 3.3.3.3 IMAGE NETWORK

IMAGE NETWORK adds or deletes network connections for a Linux image. The format is:

```
IMAGE NETwork image ADD|DELEte device
```

where:

**image** is the name of the image whose 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.

#### 3.3.3.4 IMAGE SET

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



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

where:

**image** is the name of the image whose 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.

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

**device** is the number of the device 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.

### 3.3.3.5 IMAGE START

IMAGE START activates and boots a Linux image. The format is:

```
IMAGE START image|*
```

where:

**image** is the name of the image to be started.

**\*** specifies that all defined images are to be started.

### 3.3.3.6 IMAGE STOP

IMAGE STOP terminates a Linux image. The format is:

```
IMAGE STOP image|*
```

where:

**image** is the name of the image to be stopped.

**\*** specifies that all active images are to be stopped.

## 3.3.4 PARTITION Command

PARTITION manages DASD partitions. The format is:

```
PARTition function operands
```

where:

**function** specifies the function to be performed and can be COPY, CREATE, DELETE, INITIALIZE, SHARE, or SWAP.

The PARTITION command functions are described below.

### 3.3.4.1 PARTITION COPY

PARTITION COPY adds a partition to a Linux image and initialize its contents from a partition that belongs to the same or another image. The format is:

```
PARTition COPY image1 device1 [T0] image2 device2
```

where:

**image1** is the name of the image whose 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.

### 3.3.4.2 PARTITION CREATE

PARTITION CREATE adds a partition to a Linux image. The format is:

```
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.

### 3.3.4.3 PARTITION DELETE

PARTITION DELETE removes a partition from a Linux image. The format is:

```
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.

### 3.3.4.4 PARTITION INITIALIZE

PARTITION INITIALIZE initializes a partition for use by Linux. The format is:

```
PARTition INITialize image device
```

where:

**image** is the name of the image whose partition is to be initialized.

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

### 3.3.4.5 PARTITION SHARE

PARTITION SHARE gives one Linux image read-only access to another's partition. The format is:

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

where:

**image1** is the name of the image whose partition 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.

### 3.3.4.6 PARTITION SWAP

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

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

where:

**image** is the name of the image whose partitions 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.

### 3.3.5 QUERY Command

QUERY displays information about your S/390 Virtual Image Facility for LINUX configuration and activity. The command format is:

```
Query function [operands]
```

where:

**function** specifies the information to be displayed and can be ACTIVE, ALL, BOOT, ERRORS, IMAGE, LEVEL, NETWORK, PAGING, PARTITIONS, PERFORMANCE, or SHARED.

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

The functions of the QUERY command are described below.

### 3.3.5.1 QUERY ACTIVE

QUERY ACTIVE reports which Linux images are running. The format is:

Query ACTive

### 3.3.5.2 QUERY ALL

QUERY ALL invokes all the functions of the QUERY command. The format is:

Query ALL

### 3.3.5.3 QUERY BOOT

QUERY BOOT reports when the Virtual Image Facility hypervisor was booted. The format is:

Query B00t

### 3.3.5.4 QUERY ERRORS

QUERY ERRORS indicates whether there are hardware errors that need to be reported. The format is:

Query ERRors

### 3.3.5.5 QUERY IMAGE

QUERY IMAGE displays the configuration of a Linux image. The format is:

Query IMAGE [*image*]

where:

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

### 3.3.5.6 QUERY LEVEL

QUERY LEVEL reports the level of the S/390 Virtual Image Facility for LINUX hypervisor. The format is:

Query LEVe1

### 3.3.5.7 QUERY NETWORK

QUERY NETWORK displays the network configuration. The format is:

Query NETwork

### 3.3.5.8 QUERY PAGING

QUERY PAGING displays the hypervisor paging configuration. The format is:

Query PAGING

### 3.3.5.9 QUERY PARTITIONS

QUERY PARTITIONS displays information about the Linux image DASD configuration. The format is:

Query PARTitions

### 3.3.5.10 QUERY PERFORMANCE

QUERY PERFORMANCE displays the current performance levels of the system that is running S/390 Virtual Image Facility for LINUX. The format is:

Query PERFORMANCE

### 3.3.5.11 QUERY SHARED

QUERY SHARED displays the names of the images that share another image's partitions. The format is:

Query SHARED [*image*]

where:

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

---

## 4.0 Servicing VIF

After you receive your S/390 Virtual Image Facility for LINUX (VIF) service tape, do the following:

1. Access the master Linux image, known as LINUX0.
2. Mount the S/390 Virtual Image Facility for LINUX Service tape on a tape drive accessible to the Virtual Image Facility system. Make a note of the tape drive address.
3. Make sure that 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*.

```
vif address EXPORT
```

where:

**address** is the Virtual Image Facility hypervisor IP address.

5. Enter the following command to service Virtual Image Facility:

```
vif address HYPERVISOR SERVICE device
```

where:

**address** is the Virtual Image Facility hypervisor IP address.

**device** is the device address of the tape drive where the service tape is mounted.

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:

```
vif address HYPERVISOR RESTART
```

where:

**address** is the Virtual Image Facility hypervisor IP address.

7. If the system was not restarted, issue the following commands to re-access the file system where the vif command resides:

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

If you encounter problems during the Virtual Image Facility service process, refer to 5.0, "Using VIF Support Procedures" on page 19 for guidance.

---

## 5.0 Using VIF Support Procedures

There are two levels of support for Virtual Image Facility:

1. Program services are provided as part of the IBM basic Warranty services for Virtual Image Facility. Problems can be reported via e-mail, facsimile, or regular mail. Anyone with a VIF license is entitled to this support. Refer to the *License Information Document* (GC24-5933).
2. If SW Subscription and Support was ordered via program number 5739-SPT for Virtual Image Facility then service support is provided by the IBM Software Support Center. Refer to the *Addendum for Linux for S/390 Programs* (Z125-6284) and to section 5.3, "SW Subscription and Support (5739-SPT) Contact" on page 20.

---

### 5.1 Problem Determination and Documentation Collection

#### 5.1.1 Linux Problems

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

#### 5.1.2 Virtual Image Facility Problems

Before you contact IBM, refer to the troubleshooting guide (see 5.2, "Troubleshooting" on page 20) 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. Make sure that the file system where the `vif` command resides is mounted.  

```
mount /dev/dasdb1 /usr/local/vif390 -r
```
3. Enter the following command to collect problem determination information (which will be saved in file ***.collect.data***):

```
vif address HYPERVISOR COLLECT
```

where:

**address** is the Virtual Image Facility 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 dropoff site).

---

## 5.2 Troubleshooting

The following problems may occur when installing or running Virtual Image Facility.

*Figure 2. Troubleshooting*

<b>Problem</b>	<b>Probable Cause</b>	<b>Possible Solution</b>
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.

---

## 5.3 SW Subscription and Support (5739-SPT) Contact

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 the IBM Software Support Center. When contacting the support center, make sure you have your signed Addendum available for entitlement verification.

The Support Center provides you with telephone assistance in problem diagnosis and resolution. You can call the IBM Software Support Center at any time; you will receive a return call within eight business hours (Monday–Friday, 8:00 a.m.–5:00 p.m., local customer time). In the United States and Puerto Rico, the number to call is:



**1-800-237-5511**

Outside the United States and Puerto Rico, contact your local IBM representative or your authorized supplier.

Figure 3 lists the RETAIN component identifier (COMPID) and release for Virtual Image Facility.

*Figure 3. Component IDs*

---

<b>Retain</b>		
<b>COMPID</b>	<b>Release</b>	<b>Component Name</b>
5739A0100	110	S/390 Virtual Image Facility for LINUX

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**Note:** The VIF service process only supports tapes. When ordering service, make sure you order using a physical tape media that is supported by VIF.

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- Facsimile to telephone number (+1)607-752-1497
- Postal mail to

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Printed in U.S.A.

GC24-5930-00

