S/390
Virtual Image Facility for Linux (VIF)

WAVV 2000
Colorado Springs
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Agenda

- Introduction
- Product Overview
- Planning
- Installation
- Positioning
- Availability

Introduction

- S/390 Virtual Image Facility for Linux
  - A way to run multiple Linux images on S/390
    - More capacity than LPAR
    - Linux-based administration
    - Shared resources
  - Requires only limited S/390 skills
    - ICKDSF
    - IOCP
    - HMC/SE

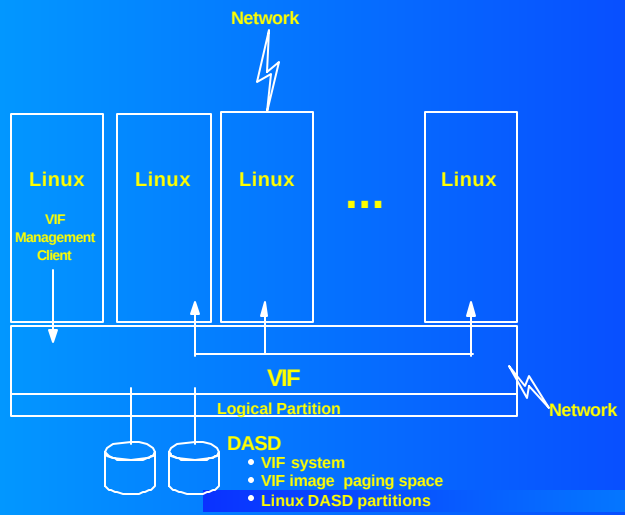
Introduction *(continued)*

- IBM S/390 Integrated Facility for Linux
  - Linux-only processor engines
    - Standalone Linux
    - Virtual Image Facility for Linux
  - Less expensive than full-function engines
  - 9672 G5 and G6 and zSeries 900 only
  - No change to processor model code
    - No change in licensed software charges for other partitions

Virtual Image Facility for Linux

Product Overview

Conceptual Structure



Virtual Image Facility Hypervisor

- Based on virtual machine technology
- Installs from 3480 tape to 3390 DASD
- Requires real network connection
- Provides Linux image management
  - DASD
  - Storage
  - Processors
  - Network

Virtual Image Facility Hypervisor *(continued)*

- Provides volume management
  - Image DASD partitions
  - Hypervisor paging
- Provides DASD partition management
  - Create
  - Copy
  - Initialize
  - Share
  - Swap

Virtual Image Facility Hypervisor *(continued)*

- Provides system management
  - Backup and restore configuration
  - Collect problem determination data
  - Reconfigure internal network
  - Install Linux image from FTP site
  - Produce hardware error report
  - Apply VIF service

Virtual Image Facility Hypervisor *(continued)*

- Provides image console support
  - Telnet to hypervisor
  - *LOGIN <image-name>*
  - Generally for initial configuration or emergency use (normally access image directly via Telnet)

Master Linux Image

- Predefined image named *LINUX0*
  - 64 MB storage
  - 850 MB R/W partition
  - 3 MB R/O partition (*vif* command)
- Must be installed and configured using standard distribution (SuSE, TurboLinux)
- Runs system management client
- Console always on HMC
  - *Operating System Messages* task

Other Linux Images

- Customer-defined
  - From LINUX0 using client program
- May need to add volumes to hypervisor
  - Image DASD partitions
  - Hypervisor paging
- Each image requires a separate IP address

Virtual Image Facility for Linux

Planning

Planning Tasks

- Sizing
  - Storage
  - Processor
- Network Planning
- Hardware Management Console

Sizing

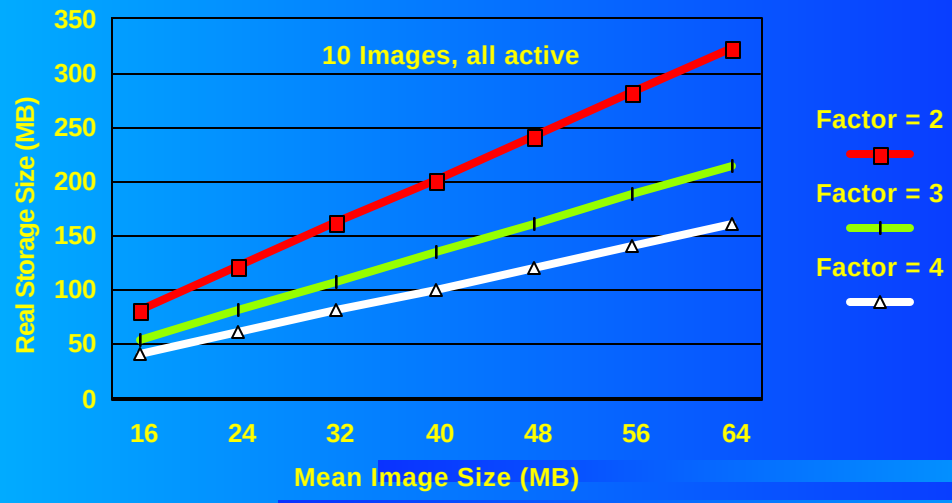
- Many Linux environments consist of a large number of lightly used machines
- Key for S/390 is to determine the number of active machines
  - Can estimate storage requirements
  - Can estimate processor requirements
- Guidelines for initial configuration only
- Engage with IBM or Business Partner to use SIZE390 program

Sizing: Storage

$$\text{Real Storage} = \frac{\text{Images} \times 0.5 + \text{Active} \times (15 + (\text{Files} \times \text{File Size}))}{\text{Paging Factor}}$$

Images:	Images defined
Active:	Images busy per interval
Files:	Mean number of files accessed
File Size:	Mean size of files accessed (MB)
Paging Factor:	Value between 1 and 5 giving tolerance for paging overhead (higher is more tolerant)

Storage Sizing Examples



Sizing: Processor

- Each active image requires processor resources
- For no contention, allow one processor per (100%) active image

Network Planning

- Each image with a network connection requires an IP address
- Virtual Image Facility requires an IP address
- Images must be in subnetwork separate from Virtual Image Facility
- Images may have dedicated network connection(s)
- Internal network connections are fast and inexpensive

Hardware Management Console Planning

- Consider enabling Web access
- Become familiar with operation

Virtual Image Facility for Linux

Installation

Major Steps

- Define Logical Partition
- Restore distribution volume
- Configure VIF
- Install Master Linux image

Define Logical Partition

- Use HMC or SE to define LPAR
- Update IOCDS (if necessary)
  - Device access
    - 3390 DASD
    - Network interfaces
    - Tape drive

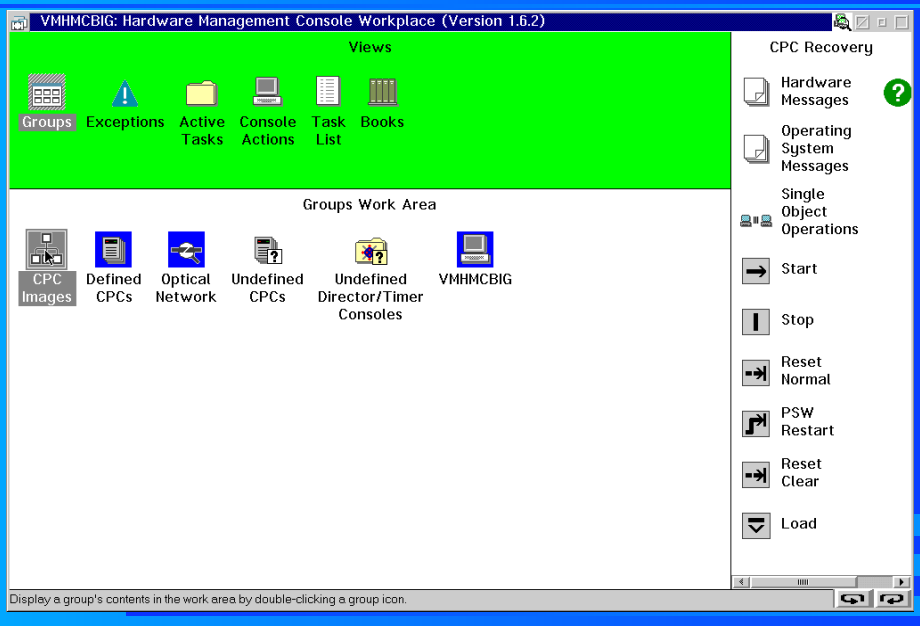
Restore To Disk

- Use ICKDSF to initialize target 3390 volume (if necessary)
- Load from distribution tape
  - Load parameter AUTOxxxx
    - xxxx is 3390 device number
- Check for disabled wait state (via *Hardware Messages* task)

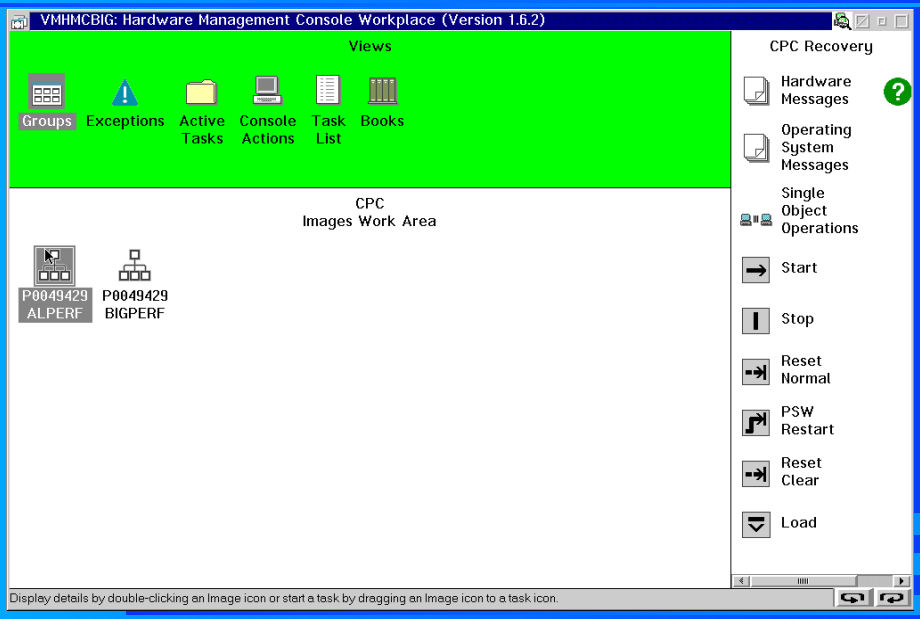
Configure VIF

- IPL from 3390 DASD
- Invoke *Operating System Messages* task
- Respond to configuration prompts

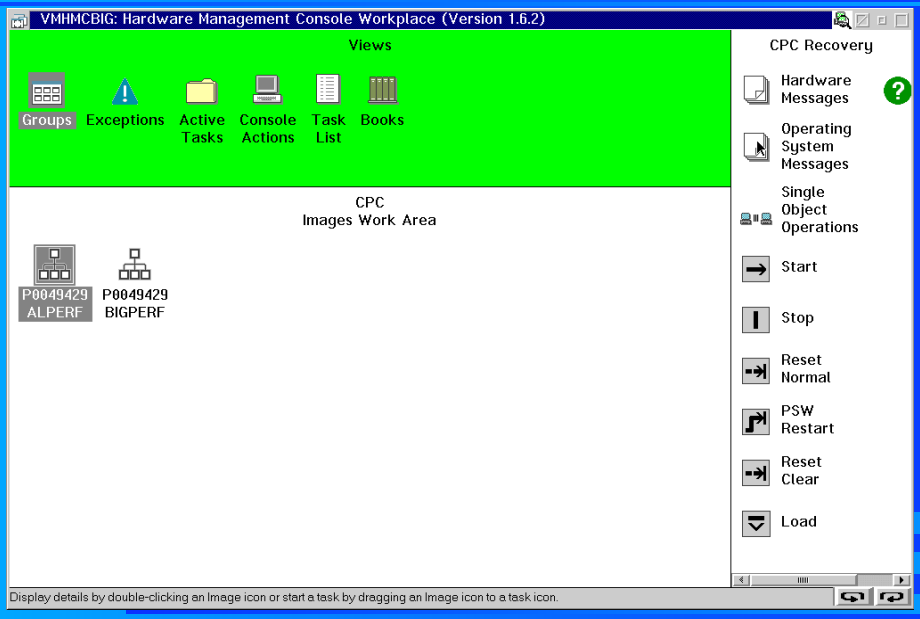
Console Message Access: Select Images



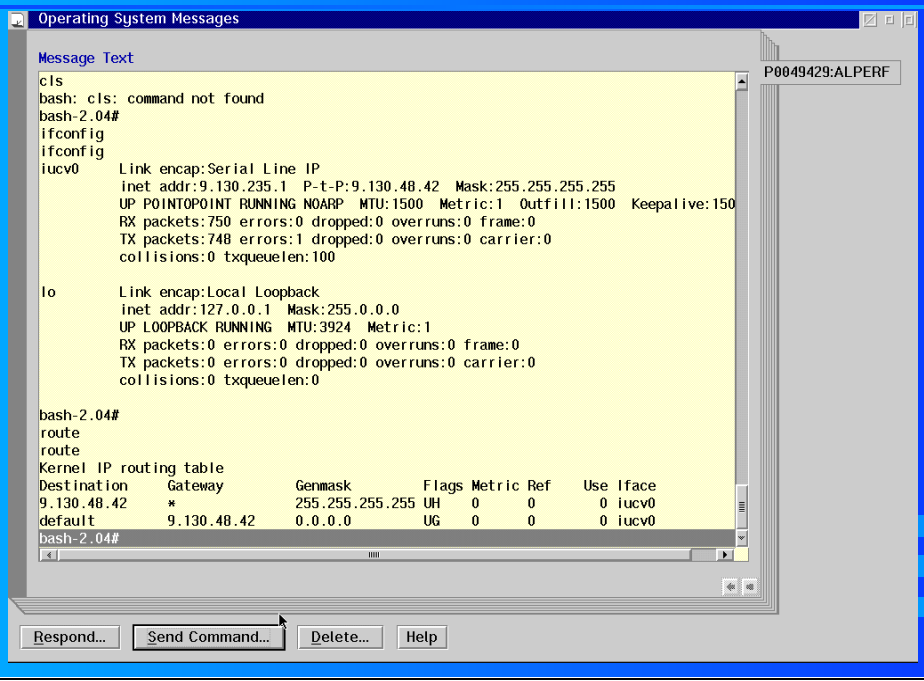
Console Message Access: Select VIF Image



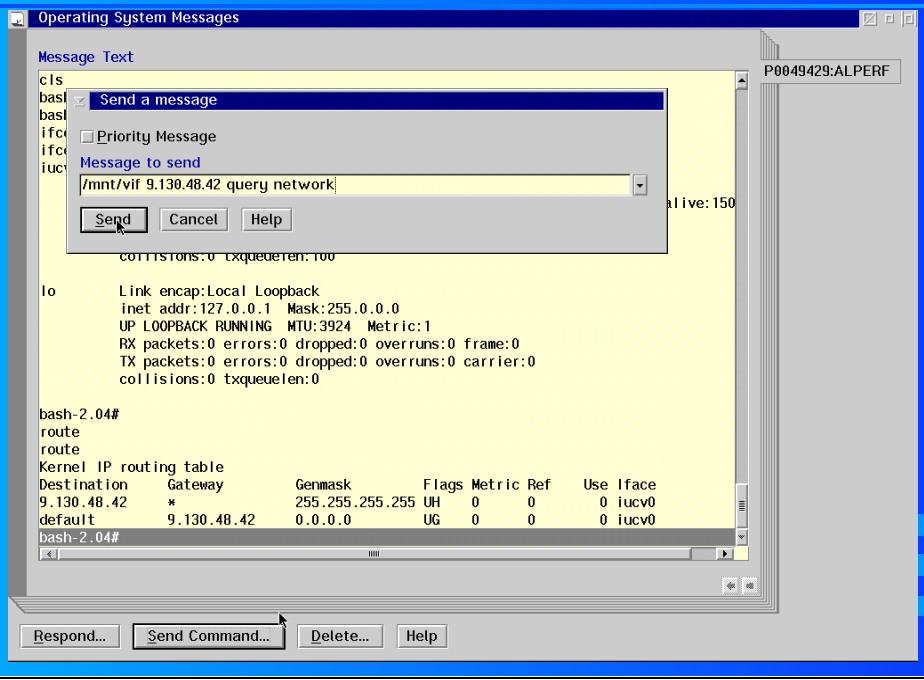
Console Message Access: Select Task



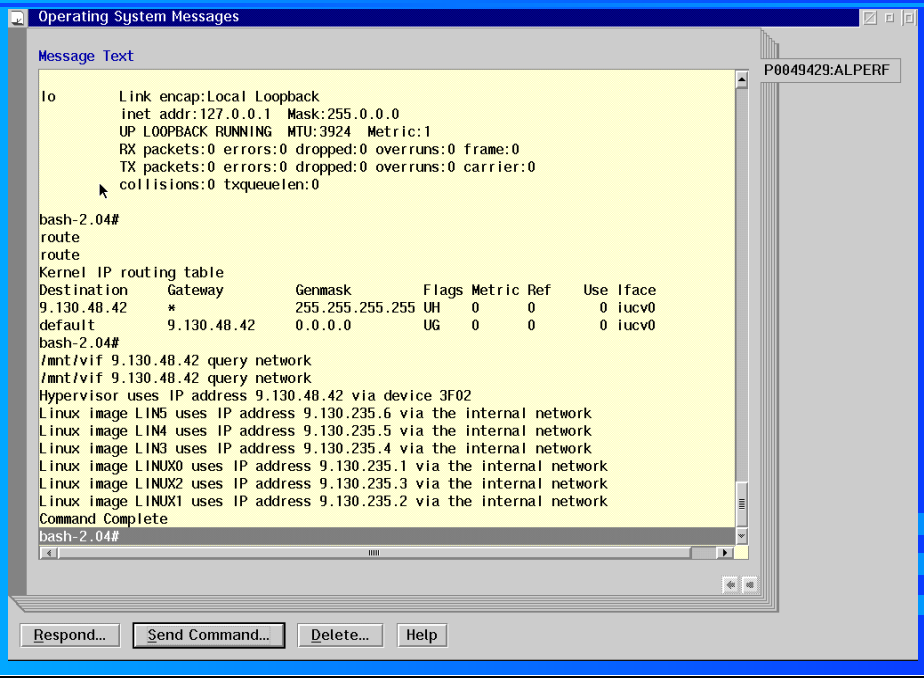
Console Message Access: View Messages



Console Message Access: Send Command



Console Message Access: View Response



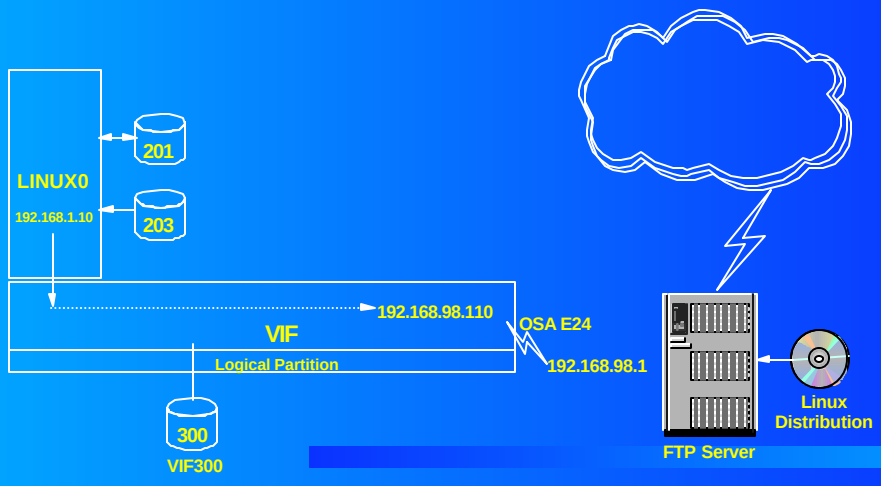
Sample Configuration Responses

Hypervisor system residence Label	vif300
Hypervisor network device address	e24
Hypervisor network port number	2
Hypervisor network type	ethernet
Hypervisor network MTU size	1492
Hypervisor IP address	192.168.98.110
Hypervisor IP mask	255.255.255.0
Hypervisor gateway IP address	192.168.98.1

Sample Configuration Responses *(continued)*

Master Linux network type	internal
Master Linux IP address	192.168.1.10
Master Linux IP mask	255.255.255.255
FTP server IP address	192.168.98.1
FTP server user name	tmcc
FTP server password	guest
FTP server account or null	
Installation file path and name	tmcc/vif/suse7iucv.ins

Configuration Schematic



Install Master Linux

- Invoke *Operating System Messages* task
- Configure network
- Augment configuration (if needed)
- Telnet to master Linux
- Proceed depending on Linux distribution
- After the boot image has been created, use the *vif* IMAGE SET command to change the boot device

Sample SuSE Linux Configuration

- Reply "0" to network prompt
- Issue following commands:
  - insmod dasd dasd=201,203
  - mount /dev/dasdb1 /mnt -r
  - ifconfig iucv0 192.168.1.10 pointopoint 192.168.98.110 mtu 1492
  - route add default gw 192.168.98.110
  - inetd
  - /mnt/vif 192.168.98.110 help

Considerations

- Master Linux access is critical
  - Only authorized *vif* command user
- Take appropriate measures
  - Do not run risky experiments on LINUX0
    - e.g., install an untested new distribution
  - Provide appropriate protection for *root*
- Can reinstall (restore) VIF over existing system without losing customization

Considerations *(continued)*

- Backup function requires Linux-based solution
- Can automate VIF system management functions using shell scripts

Virtual Image Facility for Linux

Positioning

Target Market

- Customers who want to run more than a few Linux images
- Customers who do not run VM
- Customers with spare processor and storage capacity
- Customers with G5, G6, or z900 who can add IFL engine(s)

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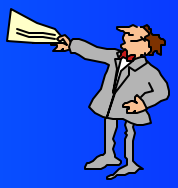
Availability



General Availability

- 5739-A01 GA September 29, 2000
  - One-time charge per processor
  - Warranty service via e-mail, fax, postal mail
- 5739-SPT GA September 29, 2000
  - Software Service and Support
  - Annual charge per processor
  - Telephone service, emergency repair, defect resolution via IBM Software Support Center

Virtual Image Facility for Linux

For more information, visit

http://www.s390.ibm.com/linux/vif/

- Announcement Letter
- Specification Sheet
- Guide and Reference
- How-to information

Virtual Image Facility for Linux

Questions?