

## zVM and z/LINUX Operations Workshop

### Course Summary

#### Description

This course details and covers z/VM and z/LINUX operations.

#### Topics

- Introduction and Logistics
- Overview of System z Virtualization Environment
- Servicing of z/VM
- Linux on z/VM
- System Management Overview
- Storage Architecture
- CMS Primer
- z/VM Operation Tools and Tasks
- z/VM Operation Lab
- Linux Navigation
- Networking Overview
- Networking Troubleshooting
- Networking Lab
- Backup and Recovery
- System Diagnosis Techniques
- Help! My Penguin is Sick
- Penguin Field Hospital
- Performance Lab
- System Performance
- Little Black Bag

#### Audience

This course is designed for anyone wanting to learn more about z/VM and z/LINUX operations.

#### Prerequisites

There are no prerequisites for this course.

#### Duration

Three days

## **zVM and z/LINUX Operations Workshop**

### **Course Outline**

- I. Overview of System z Virtualization Environment**
  - A. Understanding the advantages and differences between LPAR and virtual machines
  - B. Understand why z/VM and virtual machines complement Linux
  - C. Understand the technical and business justification for the combination of LPAR and z/VM in the same physical system
  - D. Understand why constitutes a z/VM system
  - E. Understand the role of the Control Program (CP)
  - F. Understand how z/VM instantiates a Virtual Machine and manages resources
  - G. Understand how z/VM implements clustering
  - H. Be introduced to commands that query and control resources of the system and resources within a virtual machine
  - I. Be familiar with the operation of some useful commands
- II. Servicing of z/VM**
  - A. Understand the terms used in z/VM servicing
  - B. Understand the concepts of VMSES/E
  - C. Understand the commands used to service z/VM
- III. Linux on z/VM**
  - A. Understand the rationale for Linux on Z hardware
  - B. Understand some of the unique characteristics of the System z environment and their impact on Linux
  - C. Understand what workloads are best suited for Linux on System z hardware
  - D. Understand the relationship of Linux to other System z operating systems
  - E. Understand the positioning of Linux on System z
- F. Understand how to set up z/VM to get the most out of your guests**
- IV. System Management Overview**
  - A. Provide a quick reference for common system administration tasks
    1. Startup and Shutdown of virtual machines
    2. Package management
    3. Adding disk devices (SAN and ECKD/FBA)
    4. Adding and configuring network devices
    5. Use vmcp to interrogate the virtual machine environment
    6. Using sysfs to interrogate the virtual machine environment
  - B. Understand how to interrogate the virtual machine environment outside an individual Linux virtual machine
- V. Storage Architecture**
  - A. Understand the disk storage options for Z Systems hardware (including emulated devices provided by z/VM)
  - B. Understand the positioning of each storage option and benefits of each
  - C. Discuss customer scenarios for use of each type of storage technology and advantages/disadvantages of each scenario
- VI. CMS Primer**
  - A. Understand how to log into CMS and how to log off
  - B. Understand basic CMS commands
  - C. Understand file access and navigation
  - D. Understand XEDIT basics
  - E. Understand REXX basics
- VII. z/VM Operations: Tools and Tasks**
  - A. Understand how to perform common z/VM tasks
  - B. Understand directory maintenance basics

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### **Course Outline (cont'd)**

- C. Understand logging virtual machines on and off
- D. Understand basics of important system files

#### **VIII. z/VM Operation Lab**

- A. Perform several common z/VM operational tasks
  1. Identifying logged-in users
  2. How much memory does your virtual machine have
  3. How much memory does z/VM have
  4. How do you determine what the IP address of the VM system is
  5. How do you know what network routes it has
  6. How can you test basic connectivity
  7. Spool file interrogation and manipulation
  8. Resource consumption monitoring and interrogating
  9. z/VM Shutdown and Startup
  10. Starting and Stopping guests

#### **IX. Linux Navigation and Operations**

- A. Understand basic Linux concepts
- B. Understand the basics of Linux file systems and device files
- C. Understand file access, navigation, and basic editing
- D. Understand users and groups
- E. Understand the relationship between Linux and the command shell
- F. Understand basic Linux commands
- G. Understand system startup and shutdown

#### **X. Networking Overview**

- A. Understand network devices available and their general usage
- B. Understand guest LANs, IEEE VLANs, and virtual switches

- C. Understand layer 2 vs. layer 3 configuration and pros/cons of each
- D. Understand network design principles for virtual networks

#### **XI. Network Troubleshooting**

- A. Understand common network failure modes affecting Linux on System z
- B. Understand how to determine whether the failures are under your control
- C. How to fix the ones that are
- D. Who to talk to to fix the ones that aren't, so they will
- E. And the wisdom to tell the difference

#### **XII. Networking Lab**

- A. Creating interfaces with directory management tool
- B. Creating interfaces with CMS
- C. Configuring interfaces with YaST
- D. Creating interfaces in Linux
- E. Configuring interfaces from the command line
- F. Configuring subinterfaces
- G. Quagga, iproute2, and iptables

#### **XIII. z/VM Linux Backup and Recovery**

- A. Understand unique backup and recovery challenges in virtual machines
- B. Understand why traditional System z backup techniques are not appropriate for Linux on System z
- C. Understand your tools for backup and recovery for Linux in virtual machines
- D. Explore and plan cautionary measures to address defects in the your tools

#### **XIV. System Diagnosis Techniques**

- A. Understand problem isolation fundamentals
- B. CP ABENDS
  1. Hard
  2. Soft
- C. Common z/VM Problems

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### Course Outline (cont'd)

- D. Know what tools are available in the Linux z/VM environment
- E. Apply problem isolation principles to this environment

#### XV. Help! My Penguin is Sick!

- A. Understand common problems with Linux virtual machines running on z/VM
- B. Learn how to troubleshoot those problems

#### XVI. Penguin Field Hospital

- A. We have some sick penguins
- B. Figure out what's making them sick
- C. Cure them
  - 1. Or put them out of their misery

#### XVII. Performance Lab

- A. Understand how to find and diagnose performance problems on a z/VM system with mostly Linux workload
  - 1. Establish a base line
  - 2. CPU intensive situations
  - 3. I/O contention
  - 4. Memory hogging

#### XVIII. System Performance

- A. Understand common performance problems with Linux virtual machines running on z/VM
- B. Learn how to troubleshoot those problems
  - 1. Try to determine whether the problem is real and whether it's on a part of the overall system you control
  - 2. Look for VM resource contention issues
  - 3. Then look at individual virtual machine performance settings
  - 4. Get some sort of performance measurement toolkit
  - 5. Look especially for guests that are too big, graphical applications, and inappropriate workloads

#### XIX. Your Little Black Bag

- A. Understand some of the common day-to-day operations in running Linux on System z
- B. Get a list of good go-to technical resources, tools, and tricks
- C. Discuss expected challenges within your environment and ways to meet them
  - 1. Really, really, interrupt me if I'm going off into irrelevant weeds here!
  - 2. I don't know your environment
  - 3. So the things I point out as challenges to be managed might be completely irrelevant to you