z/OS Introduction and Workshop

z/VM
Hybrid & Cloud Computing
DevOps
Unit Objectives

After completing this unit, you should be able to:

• Describe difference between virtualization and hypervisor
• List 2 types of hypervisor
• Describe the difference between the 2 types of hypervisors
Virtualization is the engine that enables cloud computing.

Hypervisor is a virtualization manager.

2 Types of Hypervisors
1. Native
2. Hosted

Type 1 (Native)

Type 2 (Hosted)
Levels of Flexibility

An operating system controlled hypervisor is more flexible, enabling automated virtualization (perfect for cloud computing architecture)

Type 1 (Native)

Type 2 (Hosted)
Enterprise Computing Technology Decisions

Lots of expensive power

Lots of physical servers

Lots of cables

Data Centers with 30,000 – 60,000 – 180,000 Servers
z Systems Processor Characterization, Operating Systems, and Microcode Load

- zIIP
- CP
- ICF
- IFL
- Processor
- LPAR
- Microcode Load
- z/OS
- z/VM
- Linux
- z/TPF
- z/VSE
- SSC
- zACI
- * Coupling Facility
- * Secure Service Container
- * Application Container Infrastructure
- Hyperledger (Blockchain)
- LinuxONE and z Systems
z System Environment Diagram

Virtualization (TCO Incentive)

Hipersockets and vSwitch connectivity

- z/OS
- CMS
- z/OS
- zLinux
- z/VM
- z/OS
- z/OS

z/VM Guest Control Program (CP)

System z
Processing Units, Central Memory, Encryption Processor
I/O Channels to External Disk and Network

Disk
Public Internet
Tape

Type 2 hypervisor

Type 1 hypervisor

LPAR
z/VM Operating System

A Virtual Machine simulates the existence of a dedicated real machine, including processor functions, storage, and input/output resources.
z/VM and Linux Guest Images

- Install z/VM from DVD
- Configure z/VM network connection
- Install linux as z/VM ‘model’ linux
- Copy ‘model’ linux disk and z/VM definitions to quickly create new operational linux

z/VM and Linux on IBM System z
The Virtualization Cookbook
Enterprise Computing Technology Decisions

Computing Infrastructure

- x86 Systems
- z Systems LinuxONE
- Power Systems
- Cloud

Decision Making

- Scale
- Time
- Horizon
- Software & Hardware Vendor Support
- Non-Functional Requirements
- Geographical Considerations
- Power, Cooling, Floor Space
- Cost
- Skills
- Politics
- Technology Adoption
- Deployment Model
- Architecture
Enterprise Computing Technology Decisions

How about a single computer system with the following attributes:
• Can host 5 unique operating systems simultaneously, including Linux
• Can run many thousands of these operating systems concurrently
• Network delay between the operating systems is near zero
• Unparalleled business data throughput capability
• Known for high speed, scalability, and security
• Has unparalleled high availability technology

This single computer system:
• Enables server consolidation significantly reducing costs
• Can have access to all critical data eliminating costly ETL
• Design characteristics that serve the most strict SLA
• Enables SOE, SOR, and SOI capabilities
z Systems

- 141 Customer Usable CPUs (5+ GHz)
- 10 TeraByte of Processing Memory
- 85 LPARs
- 832 GB/sec throughput

Each adapter has its own processor and memory for I/O to attached devices or cryptographic work.

Capable of running 1000's of operating systems concurrently with near zero communication between operating systems.

z13 Technical Guide

Figure 1-2  Platform design: The z13 versus its predecessors
Enterprise Computing Technology Decisions

- Overhead Power Cables (option)
- Internal Batteries (optional)
- Bulk Power Regulators (BPRs)
- Displays and keyboards for Support Elements
- PCIe I/O drawers numbers 1 to 4 (Note: for an upgraded System, drawer slots 1 and 2 are used for the I/O Drawer)
- 2 x 1U Support Elements
- PCIe I/O drawer number 5
- System Control Hubs (SCH)
- CPC drawers, PCIe Fanouts, Cooling water manifold and pipes, PCIe I/O interconnect cables, FSPs and ethernet cables
- N+2 Radiator Pumps
- Overhead I/O feature is a co-req for overhead power option
Enterprise Computing Technology Decisions

Technology Categorization

- Customer Interface
- Streaming Data
- Disposable Data
- New Frontier Technology

- Business Back Office
- Structured Data
- Business Critical Data
- Core Technology

Systems Of Engagement

- Systems Of Insight

Systems Of Record

Business Opportunity
- Prescriptive Analytics
- Analytics at Time of Transaction
Ops is more critical than ever to enable new Dev work
Dev must appreciate “law of the instrument”
z/VM Professional Manuals and Documentation

z/VM Basics
Unit summary

Having completed this unit, you should be able to:

✓ Describe differences between virtualization and hypervisor
✓ List 2 types of hypervisor
✓ Describe the difference between the 2 types of hypervisors