z/OS Introduction and Workshop

Overview of IBM Z Systems Environment
Unit Objectives

After completing this unit, you should be able to:

• Describe IBM Z Systems Family of Processors
• List 5 IBM Z Systems Operating Systems
• Discuss IBM Z Virtualization Technology
• Discuss Systems Support and Services Technical Roles
• Locate Supporting IBM Z Systems Redbook Technical References
Role of the mainframe in World Wide Economy

The IBM “mainframe” is a large scale computing platform that controls and processes critical data.

Designed for the business world with 5 decades of technical advancements following strict design criteria that has defined expectations of a “mainframe”.
The mainframe - a major tool of business and government for nearly 5 decades as a result of:

**Upward Compatibility**

*Investment protection of business critical applications with decades of functional advancements and tuning*

*Time tested technology with applied evolution is a matured technology and frequently superior technology*

**Data processing economies of scale**

*Reduced costs of doing business with increased capability*

**Industry Trusted and Recognized**

*Reliability, Availability, Serviceability, Security, Scalability*
IBM Z Systems Environment

Hardware Architecture

Five Unique Operating Systems

Virtualization
IBM Z Systems Hardware Architecture

- **Redundancy and automatic failover**
  - *Z means zero downtime*

- **I/O Architecture**
  - *Throughput capability only found in IBM Z family*
  - *Channel adapters with supporting unique I/O protocol with its own processors and memory per adapter.*
  - *Fiber optic cable connectivity to disk, tape, printers and network*
Five Unique Operating Systems

- **z/OS**

- **z/VM**

- **z/TPF**

- **z/VSE**

- **Linux on IBM Z System (LinuxONE)**
IBM Mainframes & Flagship Operating System

IBM Z Systems Family of 'Mainframes' Architecture
• z/Architecture (2000) z/OS

IBM Mainframe – The original DNA
https://en.wikipedia.org/wiki/IBM_System/360_architecture

Previous IBM 'Mainframe' Architectures
• System 390 Architecture (1990) OS/390
• System 370 Architecture (1970) MVS
• System 360 Architecture (1964) MVT
IBM Z (z13)

- Internal Batteries (optional)
- Bulk Power Regulators (BRs)
- 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+1 Water Cooling Units
IBM Z design comparison for high end systems
IBM Z design comparison for high end systems

Figure 1-2  Platform design: The z13 versus its predecessors
IBM Z design comparison for high end systems
Virtualization

**LPAR (PR/SM)**
- Hardware partitioning
- Processors and I/O Channels may be shared or dedicated
- Real memory must be dedicated
- Capable of hosting 1 of the 5 unique operating systems

**z/VM**
- Industrial strength hypervisor
- Operating system partitioning of CPUs, I/O devices, and memory
- 50+ years of technology evolution
- Capable of hosting 1000’s of guest operating systems

**Hipersockets and VSwitch**
- All hosted operating systems capable of using internal hardware for network communication with near zero network delay
- Server consolidation benefits include elimination of cables and significantly reduced cost of power per server.
Information Technology Organization

Chief Information Officer (CIO)

Application Development Support and Services
  Frequently organized by critical business services

Information Technology Support and Services
  Data Center Operation Staff
    Production Control Analysts
    Computer Operators
    Tape Operators
    Print Operators
    Network Operators

  Systems Administration
    Systems Programmers
    Security Administrators
    Database Administrators
    Disk Storage Administrators
Information Technology Management Responsibilities:

Budget & Cost Control
- Technology Contract Negotiations
- Hardware & Software Vendor Management
- Staff and Facilities

Service Level Agreements
- Availability and Downtime Avoidance
- Response Time Commitments

Change Management
- Maintain Hardware and Software Currency
- Risk Mitigation

Disaster Recovery and Business Continuity
Unit summary

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