z/OS Introduction and Workshop

Overview of z Systems Environment
Unit Objectives

After completing this unit, you should be able to:

• Describe z Systems Family of Processors
• List 5 z Systems Operating Systems
• Discuss z Systems Virtualization Technology
• Discuss Systems Support and Services Technical Roles
• Locate Supporting 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
z Systems Hardware Architecture

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

- **Advanced processor and real memory technology**
  - CEC Drawer packaging of processors and memory

- **I/O Architecture**
  - Throughput capability only found in System 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 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
z Systems (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
z Systems design comparison for high end systems
z Systems design comparison for high end systems

Figure 1-2  Platform design: The z13 versus its predecessors
z Systems design comparison for high end systems

Figure 1-3  Platform design: The z13s versus its predecessors
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

Having completed this unit, you should be able to:

✔ Describe z Systems Family of Processors
✔ List 5 z Systems Operating Systems
✔ Discuss z Systems Virtualization Technology
✔ Discuss z Systems Support and Services Technical Roles
✔ Locate Supporting z Systems Redbook Technical References