

Introduction to z/OS

Course Summary

Objectives

By the end of this course, students will be able to:

- Describe the concepts underlying IBM zSeries computer systems in general (hardware: processors, memory, tape, disk, devices in general; software: operating systems, application environment, application programs)
- Correctly use terms related to mainframe computer systems: such as data set / file, fields, records, data set organization
- Understand terms specifically related to z/OS, such as DDname, data set name, PDS, PDSE, VSAM, label, VTOC, directory, catalog, TSO, ISPF, JCL
- Describe the role SMS (System Managed Storage) plays in z/OS
- Describe the roles played in application development of CLIST, REXX, JCL, and TSO/ISPF
- Describe the role of Unicode in the mainframe world, and the support for Unicode provided in z/OS
- Describe capabilities of the latest IBM compilers for COBOL, PL/I, and C as well as the Assembler, the binder, and Language Environment
- Describe the capabilities of DB2, in broad, general terms, and understand the salient features of the latest version of DB2
- Compare and contrast the two major transaction processing environments CICS/TS and IMS, and the role of MQSeries
- Describe the facilities available under z/OS for running UNIX applications, including a web server and email
- Navigate through ISPF and use ISPF Utilities
- Navigate between UNIX and MVS in TSO and ISPF

Topics

- z/OS Overview
- TSO/E and ISPF Overview
- Navigating MVS Documentation
- ISPF Utilities and Settings
- Intro to z/OS UNIX System Services
- Accessing UNIX System Services
- UNIX Essentials (Optional topic)
- Unicode (Optional topic)
- Programming Languages (Optional topic)

Prerequisite

A technical computer background is required for this course.

Duration

Two Days

Introduction to z/OS

Course Outline

1. z/OS Overview

- a. z/Series Hardware
- b. zSeries Operating Systems
- c. zSeries vs. the Rest
- d. A Typical zSeries Data Center
- e. Real vs Virtual Memory
- f. How Virtual Memory Works
- g. Multiprogramming vs. Multiprocessing
- h. Interrupts
- i. Bits and Bytes: EBCDIC vs. ASCII
- j. The CPU (Central Processing Unit)
- k. MVS in a TCP/IP Network
- l. Modern SNA Network
- m. Understanding the 3270 Terminal
- n. zSeries Printer Hardware Categories
- o. Storage Devices: DASD, Tape
- p. Storage Subsystems
- q. Operating Systems Evolution
- r. z/OS Address Spaces
- s. Cross-Memory Services
- t. MVS Data Spaces
- u. z/OS 64 Bit Address Space
- v. MVS HiperSpaces
- w. MVS Dispatching
- x. Workload Manager Overview
- y. MVS Data Management
- z. MVS Data Set Types
- aa. Sequential, Partitioned Datasets
- bb. VSAM (Virtual Storage Access Method) Data
- cc. Systems Managed Storage (SMS)
- dd. Catalogs
- ee. VTOC: Volume Table of Contents
- ff. Tape Labels
- gg. Job Control Language (JCL) Overview
- hh. Recovery / Termination Mgmt
- ii. SMF - System Management Facilities
- jj. Serialization: ENQ / DEQ, Reserve/Release
- kk. Shared DASD and GRS Star
- ll. Security Overview
- mm. JES Overview
- nn. Job Life Cycle Phases
- oo. JES2 vs. JES3
- pp. Parallel Sysplex
- qq. UNIX System Services
- rr. The MCS Console
- ss. MVS Customization
- tt. Intro to SMP/E

- uu. z/OSMF z/OS Management Facility
- vv. Program Products
- ww. Program Products: CICS
- xx. How CICS Works
- yy. CICS Transactions
- zz. Program Products: DB2
- aaa. Program Products: IMS
- bbb. Classic MVS Applications
- ccc. Today's Application Architectures
- ddd. Program Products: MQSeries
- eee. What is a Job Scheduler?

2. TSO/E and ISPF Overview

- a. TSO Operating Modes
- b. Interactive TSO Commands
- c. TSO/E Logon and Logoff
- d. VTAM USS Screen
- e. TSO Logon
- f. TSO Logoff: Exit from ISPF
- g. TSO/E Commands
- h. TSO/E Line Mode
- i. ISPF/PDF Option 6
- j. Issuing TSO cmd from ISPF Panel
- k. TSO/E Command Syntax
- l. TSO/E PROFILE
- m. TSO/E REXX and CLIST
- n. Example REXX EXEC
- o. REXX Language Features
- p. Languages: Compiled vs. Scripting
- q. ISPF Overview
- r. What is a Panel?
- s. Menu Panel
- t. List Panel
- u. Edit Panel
- v. ISPF Primary Option Menu
- w. Standard CUA Format
- x. ISPF Panel Terminology
- y. ISPF Panel Hierarchies
- z. ISPF Jump Function
- aa. ISPF Navigation w/ Action Bar
- bb. ISPF Line and Primary Commands
- cc. ISPF Primary Commands
- dd. ISPF Split Screen
- ee. ISPF Help

3. *Navigating MVS Documentation*

- a. IBM Softcopy Reader
- b. IBM Look@ (Google it)
- c. IBM Doc Buddy App
- d. IBM z/OS Internet Library
- e. IBM Knowledge Center
- f. MVS/QuickRef Overview
- g. QuickRef Request by Category
- h. Select Information By Category
- i. Selecting a Specific Release
- j. Selecting an Abend Code
- k. Abend Code Display
- l. QuickRef Request by Name
- m. Select Information By Category
- n. Selecting From Multiple Matches
- o. Sample JCL Information: NOTIFY
- p. Looking up an Error by Message ID
- q. Example Error Message Info: IOS000I
- r. Language Syntax Info: REXX Parse
- s. QuickRef List Vendors, etc.
- t. Selecting Vendor, Product, Release
- u. Selecting by Vendor
- v. Selecting DASD Free Space Information
- w. DASD Free Space – Selection Details
- x. DASD Free Space – Sample Display
- y. Displaying DASD Hardware Characteristics
- z. QuickRef Batch JCL

ISPF Utilities and Settings

- a. Primary Option Menu
- b. Utility Selection Panel (=3)
- c. Library Utility 3.1
- d. Allocating Data Sets w/ ISPF
- e. Data Set Utility 3.2
- f. Dataset Allocation Suggestions
- g. ISPF LAB 1
- h. Move / Copy Utility 3.3
- i. Data Set List Utility 3.4
- j. Compare & Find – ISRSUPC 3.12-3.15
- k. SuperC Compare Utility 3.12
- l. SuperCE Compare Utility 3.13
- m. Search-For Utility 3.14
- n. Extended Search-For Utility 3.15
- o. Other ISPF Utilities
- p. 11. ISPF Workplace
- q. ISPF Workplace Example
- r. ISPF Settings
- s. ISPF Settings: Log Data Set
- t. ISPF Settings: List Data Set
- u. Function Key Settings
- v. PF Key Definitions and Labels
- w. Keylist Utility
- x. FKA / PFSHOW Example
- y. Other ISPF Settings: Color, Environ

- z. ISPF Lab 2

4. *Intro to z/OS UNIX System Services*

- a. UNIX History & Concepts
- b. UNIX-related Standards Organizations
- c. MVS UNIX Release History
- d. z/OS UNIX vs. z/LINUX
- e. IBM Products Exploiting USS – TCP/IP
- f. IBM Products Exploiting USS – Java
- g. IBM Products Exploiting USS – XML
- h. IBM Products Exploiting USS – DB2
- i. IBM Web Server Overview
- j. IBM WebSphere Overview
- k. IBM Products Exploiting USS – Print
- l. z/OS UNIX Serving PC Files
- m. Third-Party USS Products
- n. Navigating USS Documentation
- o. z/OS UNIX Help On-Line

5. *Accessing UNIX System Services*

- a. Using OMVS to access USS
- b. OMVS & UNIX Differences
- c. Using OMVS
- d. OMVS Subcommands
- e. Other Useful Subcommands
- f. OMVS Lab1
- g. Customizing OMVS
- h. Entering a Long Shell Command
- i. OMVS Lab2
- j. Recovering from Hung Application
- k. Pro's and Con's of using OMVS
- l. Accessing USS with SSH
- m. Logging in using PuTTY
- n. Pro's and Con's of using ssh / telnet
- o. Issuing UNIX commands from TSO
- p. OSHELL: Issue UNIX cmds from TSO
- q. Using the ISPF Shells - Topics
- r. File Edit using ISPF 2
- s. 3.17 UDLIST UNIX Directory List
- t. Using the ISPF Shell
- u. File Mgmt using the ISPF Shell
- v. First-time setup for Ishell File Mgmt
- w. System Admin using the ISPF Shell
- x. ISHELL Lab
- y. Pro's and Con's of using ISHELL
- z. Issue UNIX cmds from BATCH JCL
- aa. BPXBATCH DDNAME Usage
- bb. BPXBATCH Example: Shell Script
- cc. BPXBATCH Example: Shell Cmd
- dd. BPXBATCH Alternatives
- ee. Pro's and Con's of USS access via Batch
- ff. Editing from OMVS

6. *UNIX Essentials*

- a. UNIX Command Overview
 - b. Logging In
 - c. Changing your Password
 - d. Logging Out
 - e. Commands, Options, and Arguments
 - f. Reading the Manual: the man cmd
 - g. Userid, UID, Group, GID
 - h. Understanding UNIX Permissions
 - i. The UNIX File System
 - j. Home and Working Directory
 - k. Commands to List Contents of A File
 - l. head and tail Commands
 - m. Copying and Moving Files
 - n. Deleting Files
 - o. UNIX Filenames
 - p. File Management Lab
 - q. Creating Directories
 - r. Removing Directories
 - s. Copying Files Between Directories
 - t. UNIX File Security: Permissions
 - u. Working with Permissions
 - v. Changing Permissions
 - w. UNIX Directory Permissions
 - x. Lab: chmod
 - y. Real vs. Effective UID / GID
 - z. SETUID, SETGID, and Sticky Bits
 - aa. Working with Special Permissions
 - bb. Setting Special Permissions w/ chmod
 - cc. An Example SETUID Scenario
 - dd. Special Permissions Hints and Tips
 - ee. File/Dir Permissions - umask
 - ff. Changing File Ownership
 - gg. File Systems, inodes, links
 - hh. Optional Link Lab
 - ii. UNIX Power Tools
 - jj. Finding Files
 - kk. UNIX Power Tools: sort
 - ll. Archiving Files
 - mm. Compressing files
 - nn. TCP/IP Networking
 - oo. TCP/IP Diagnostic Commands
 - pp. TCP/IP Applications - ssh
 - qq. TCP/IP Applications: ftp
 - rr. ftp: get & put, mget & mput
 - ss. ftp: (client) & ftpd (server)
 - tt. Example FTP Session
 - uu. TCP/IP Applications: mail
 - vv. Scheduling Work w/ cron & at
- 7. **Understanding Unicode**
 - a. What Is Unicode?
 - b. Unicode Character Encoding Schemes
 - c. Unicode Support
 - d. UTF-32 Assignments - Reference Info
 - 8. **Mainframe Programming Languages**
 - a. Commonality Between Languages
 - b. Language Environment
 - c. Source to Load Process
 - d. High Level Assembler (HLASM)
 - e. Sample Assembler Program
 - f. Language Compilers
 - g. The COBOL Programming Language
 - h. Enterprise COBOL for z/OS
 - i. Sample COBOL Program
 - j. The PL/I Programming Language
 - k. Enterprise PL/I for z/OS
 - l. Sample PL/I Program
 - m. The C Programming Language
 - n. The C++ Programming Language
 - o. IBM XL C/C++ compiler for z/OS
 - p. Sample C Program
 - q. The Program Binder