

z/OS Technical Bootcamp

Course Summary

Description

This course provides an intense examination of z/OS for systems programmers. Topics include an introduction to computer systems hardware and an exploration of architecture, system services and functions, storage management mechanisms, and I/O processes. Additional topics include REXX programming, SMP/E processing, an overview of Workload Manager and performance tuning. In the final section a look at system diagnostics and data collection will be examined.

Topics

- System Basics
- Programs
- History and Overview of z/OS
- The IPL Process
- System Services and PARMLIB
- Storage Management Mechanisms
- Task Management
- I/O Processing
- Access Methods and Data Bases
- Resource Management
- System Managed Storage
- Introduction to JES2
- Introduction to Unix System Services (USS)
- Introduction to Basic Communication Services
- Introduction to TSO/ISPF
- Introduction to JCL and Utilities
- Introduction to TSO CLIST Processing
- Introduction to REXX Programming
- SYSTEM Installation and Maintenance
- Understanding the z/OS Package Environment
- z/OS Performance and Tuning
- z/OS Diagnostics and Debugging

Audience

This course is designed for system programmers, operators, and application programmers that need an understanding of the z/OS environment and the subsystems supported. Workstations will be used to illustrate concepts and provide basic exposure to the elements of the z/OS environment

Prerequisites

There are no prerequisites for this course.

Duration

Ten days

z/OS Technical Bootcamp

Course Outline

I. System Basics

- A. Examine how data is represented in computers, using binary, hexadecimal, and decimal.
- B. Introduction to memory addresses and basic instruction operation
- C. Explore the role of the PSW in machine operations
- D. Introduce basic computer hardware inventory: CPU, Memory, and I/O devices

II. Programs

- A. Examine basic program structure.
- B. Introduction to Linkage Editor functions
- C. Illustrate connection between data, JCL and programs
- D. Introduction to basic TSO/ISPF and SDSF

III. History and Overview of z/OS

- A. Evolution of operating systems from MVT/MFT to OS/390 and z/OS.
- B. Examining LPARs and parallel sysplex configurations.

IV. The IPL Process

- A. Review the IPL process
- B. Steps in systems initialization

V. System Services and PARMLIB

- A. Interrupts and interrupt handling
- B. PARMLIB definitions related to system functions
- C. System Address spaces

VI. Storage Management Mechanisms

- A. Real storage management:
- B. Central and expanded storage usage
- C. Virtual storage management:
- D. Paging/Swapping mechanisms
- E. Auxiliary storage management

VII. Task Management

- A. Review of initiator/terminator functions
- B. Address spaces and task control

VIII. I/O Processing

- A. Introduction to DASD hardware functions:
 - 1. CKD, ECKD, and FBA devices
 - 2. Parallel Access Volumes (PAV)
 - 3. Volume Affinity
- B. Components of I/O operation:
- C. Introduction to channel command processing
- D. Access method services
- E. Caching mechanisms

IX. Access Methods and Data Bases

- A. Data set organization and access methods:
 - 1. Sequential access (SAM)
 - 2. Basic Partitioned Access (BPAM)
 - 3. Basic Direct Access (BDAM)
 - 4. VSAM processing (ESDS, KSDS, RRDS)
- B. Introduction to database processing concepts

X. Resource Management

- A. Examine basic objectives in managing system resources
- B. Explore the process of defining objectives
- C. Discuss the process WLM uses to make decisions and monitoring requirements
- D. Scheduling environments
- E. Intelligent Resource Director

XI. System Managed Storage

- A. Introduce DFSMS concepts
- B. Review SMS components
 - 1. SMS Control data sets
- C. ISMF Panels and Storage Administration Functions
 - 1. Storage Groups
 - 2. Data Class
 - 3. Management Class
 - 4. Storage Class

z/OS Technical Bootcamp

Course Outline (cont'd)

XII. Introduction to JES2

- A. Introduction to JES2 Concepts
 - 1. Introduction to JES2 Checkpoint and Spool operations
 - 2. Examine JES2 job execution phases
 - 3. JES2 and Workload Manager (WLM)
 - 4. JES2 system configuration options (including Poly-JES)
- B. JES2 Initialization
 - 1. JES2 start-up options
 - 2. JES2 procedure and specification requirements
 - 3. Dynamic allocation of PROCLIB and PARMLIB specifications
 - 4. Introduction to JES2 initialization statements
- C. Controlling JES2 Processes
 - 1. JES2 device assignments
 - 2. Internal reader facility
 - 3. Job selection criteria and job initiation
 - 4. Member affinity and initiator management
 - 5. Output management
 - 6. Print/Punch phase and output routine
- D. Spool Volumes and Operation
 - 1. Spool volume allocation
 - 2. Spool management
 - 3. Spool Offload Facility
- E. JES2 Checkpoint Processing
 - 1. Checkpoint sizing and placement
 - 2. Checkpoint configuration considerations
 - 3. Checkpoint reconfiguration dialogues
 - 4. Recovering from Multi-Access Spool (MAS) failures
 - 5. JES2 Checkpoint and coupling facility
- F. Remote JES2 Configurations: RJE/NJE
- G. Network Job Entry (NJE) definitions
- H. Networking considerations and topology
- I. Remote Job Entry (RJE) definitions

XIII. Introduction to Unix System Services (USS)

- A. USS File systems
- B. USS Setup, commands, and definitions

XIV. Introduction to Basic Communication Services

- A. Basic networking and configurations
- B. VTAM/SNA overview and function
 - 1. Examine terminology associated with SNA networks
 - 2. Review VTAM/SNA networking concepts and configurations
 - 3. VTAM JCL and data sets
 - 4. VTAM initialization parameters (ATCSTR00 and ATCCONxx)
 - 5. Terminal definitions, USSMODE, LOGON mode
- C. TCP/IP overview and function
 - 1. Examine terminology associated with TCP/IP networks
 - 2. Review TCP/IP networking concepts and packet delivery
 - 3. Examine architecture and standards
 - 4. Review TCP/IP protocols
 - 5. Describe various TCP/IP applications and their uses

XV. Introduction to TSO/ISPF

- A. LOGON procedures
- B. TSO OPER functions
- C. ISPF Dialogue Management Services
- D. ISPF customization

XVI. Introduction to JCL and Utilities

- A. JCL Overview
- B. IDCAMS
 - 1. ICF Catalogs
 - 2. Master catalog management
 - 3. Non-VSAM Data sets
 - 4. VSAM Data sets
- C. IEBGENER
- D. IEBCOPY
- E. ICKDSF
 - 1. Initializing volumes
 - 2. Creating IPLTXT

z/OS Technical Bootcamp

Course Outline (cont'd)

XVII. Introduction to TSO CLIST Processing

- A. CLIST Basic statements
 1. WRITE/WRITER
 2. SET statement
 3. READ statement
 4. PROC statement
 5. EXIT statement
- B. CLIST logic functions
 1. GOTO
 2. IF-THEN-ELSE logic
 3. DO GROUP
 4. DO WHILE
 5. Variables

XVIII. Introduction to REXX Programming

- A. REXX Overview
 1. Basic language structure
 2. Clauses
 3. Literals
- B. Running REXX programs
 1. ALTLIB
- C. REXX Procedures
 1. PARSE
 2. Data Stack
 3. Operators
 4. DO Loops
 5. Built-in functions
 6. External functions
 7. Routines
 8. ADDRESS host environments

XIX. SYSTEM Installation and Maintenance

- A. SMP/E Overview and Methodology
 1. SMP/E data sets and their role in maintaining system information
 2. Introduction to SMP/E dialogues
 3. Introduction to the SMP/E zones; Global, Target, and Distribution
 4. Establishing the SMP/E environment and its definitions
- B. SYSMODS
 1. Introduction to SYSMOD types; PTF, APAR, FUNCTION, and USERMODS
 2. Review HOLDDATA

3. Examine MCS statements and how utility functions are performed within SMP/E
 4. RECEIVE, APPLY, and ACCEPT processing
 5. Examine the SMP/E process for introducing change into the z/OS environment
 6. RECEIVE processing
 7. APPLY CHECK and APPLY processing
 8. ACCEPT CHECK and ACCEPT processing
- C. RESTORE and REJECT processing
 1. Examine SMP/E process for restoring and removing changes from z/OS
 2. RESTORE CHECK and RESTORE processing
 3. REJECT processing
 - D. Managing SYSMODS
 1. CLEANUP processing to remove extraneous data from zones
 2. REPORT processing commands for reviewing SYSMOD status
 - E. Controlling SMP/E data sets
 1. UCLIN processing to modify data elements within zones
 2. ZONE processing commands
 3. BUILD MCS command for migrating SMP/E managed elements to other systems
 - F. SMP/E Reporting
 1. SMP/E logging functions to trace activity
 2. SMP/E LIST command to report on managed elements
 3. SMP/E Report functions

z/OS Technical Bootcamp

Course Outline (cont'd)

XX. Understanding the z/OS package environment

- A. Driving system requirements
 - 1. Determine hardware requirements for installation
 - 2. Evaluate hardware/software dependencies for migration
 - 3. Planning for toleration maintenance and 'fall-back' scenarios
- B. Using the dialogs to install z/OS
 - 1. ServerPac functions
 - 2. Building systems using the ServerPac dialogs
- C. Customization before the first IPL
 - 1. Defining the hardware configuration using IOCP and HCD
 - 2. Defining basic PARMLIB members
 - 3. Configuring initial TSO/VTAM environment
- D. Customization after the initial IPL
 - 1. Customizing PARMLIB
 - 2. Migrating system elements and components
 - 3. Using HCD to define hardware configurations and create IODF
 - 4. Creating HCD configuration reports
 - 5. Setting up LOADxx parm members for IPL
 - 6. Working with I/O definition files (IODF)
- E. Planning for a production environment
 - 1. Setting up the maintenance environment
 - 2. Exploiting architectural enhancements
 - 3. Configuration considerations
 - 4. LPAR definitions
 - 5. Workload Manager (WLM) considerations

XXI. z/OS Performance and Tuning

- A. Performance Management Overview
 - 1. Define elements of performance tuning
 - 2. Examine basic queuing models
 - 3. Interpret results of queuing theory models

- B. System Components of Tuning: Processor
 - 1. Evaluate processor power ratings
 - 2. Examine key processor metrics
 - 3. Review data gathering methods for processor metrics
- C. System Components of Tuning: Memory
 - 1. Review paging/swapping mechanism
 - 2. Examine real storage and auxiliary storage metrics
 - 3. Review data gathering methods for storage metrics
- D. System Components of Tuning: I/O
 - 1. Review I/O subsystem components
 - 2. Examine I/O metrics
 - 3. Review data gathering methods for I/O metrics
- E. Workload Characterization
 - 1. Review processes for grouping comparable workloads
 - 2. Establishing workload objectives
 - 3. Workload Management
 - 4. Service class definitions:
 - 5. Importance levels
 - 6. Execution velocity
 - 7. Response time goals
 - 8. Performance Index
 - 9. Classification rules
 - 10. Setting exception conditions
 - 11. Resource groups
 - 12. CPU/storage critical settings
 - 13. Service coefficients and options
 - 14. Service coefficients
 - 15. I/O priority management
 - 16. Dynamic alias management
 - 17. Applications environment
 - 18. Specifying and managing application environments
 - 19. Server limits for application environment
 - 20. Scheduling environments
 - 21. Specifying scheduling environments
 - 22. Managing resource states
 - 23. WLM managed initiators
 - 24. Intelligent Resource Director
 - 25. LPAR CPU management

Due to the nature of this material, this document refers to numerous hardware and software products by their trade names. References to other companies and their products are for informational purposes only, and all trademarks are the properties of their respective companies. It is not the intent of ProTech Professional Technical Services, Inc. to use any of these names generically

z/OS Technical Bootcamp

Course Outline (cont'd)

- 26. Dynamic Channel Path Management
- 27. Channel Subsystem Priority Queuing
- 28. SMF Type 99 records
- F. Monitoring and Tuning Systems
- G. Diagnosing various performance problems
- H. Examine tracking mechanisms available through RMF
- I. Review performance reporting and data interpretation

XXII. z/OS Diagnostics and Debugging

- A. Data Gathering
 - 1. DUMPS
 - 2. SLIP Traps
 - 3. GTF Traces
 - 4. Service Aids
 - 5. Component Traces
 - 6. LOGREC
- B. IPCS Overview
 - 1. IPCS navigation
 - 2. Basic commands
 - 3. Browing dumps
 - 4. Processing trace data
- C. Problem Analysis
 - 1. Type of problems
 - 2. Component failure isolation approaches
 - 3. Assessment
 - 4. Specifying sym
 - 5. ptoms