Develop New Collar Talent through a Registered Mainframe Apprenticeship Program

Contents

Introduction

In recognition of the need for skilled workers in the z/OS® mainframe industry, we have developed this System Administrator Apprenticeship program. It has been designed to provide a structured training program to develop individuals into journey workers.

There are multiple roles in the mainframe world, and in some organizations the responsibilities overlap.
In this program, the System Administrator's responsibilities focus on maintaining the critical business data on the mainframe. The responsibilities include:

- Performing hardware-software upgrades
- Capacity planning
- Monitoring systems
- Installing the operating system
- Maintaining other system software or products running on the mainframe
- Day to day operations of the environment including change and problem management

This apprenticeship is a competency-based learning program measuring the skill acquisition through the individual apprentice's successful demonstration of acquired skills and knowledge.

Work Process Schedule and Related Instruction Outline

Overview

The following section contains work process, training outline, and related instruction for the System Administrator Apprenticeship. The criteria are segregated into three distinct parts.

- Part I: Work Process – This section delineates the general outline of basic, high-level requirements that each participant will need to satisfy including projects, coaching, job shadowing, and training.

- Part II: Outline of Related Instruction – This section outlines specific formal training that each participant will be required to complete or demonstrate mastery.

- Part III: Competencies and Performance Criteria – In support of this competency-based apprenticeship model, this section identifies what technical knowledge and professional behaviors will be evident as a product of achieving proficiency in these areas.

Work Processes

Work Process
Orientation to the Work Environment. The apprentice will be introduced to leadership personnel. He/she will become aware of mission and business objectives. He/she will also gain exposure to required processes as well as business conduct, safety and security policies. Tips for succeeding in the workplace will be reviewed with him/her. Any system access will be given. The mentor will meet with the apprentice to assess prior learning and experience and determine specific training requirements for apprentice.
Specific Business Area Knowledge. The manager will provide the apprentice with a detailed overview of the organization's work process and how it relates to other organizations within the company.
Professional Development (Onboarding and Soft Skills Training)
Technical Foundational Training
Technical System Administrator Training
Job Shadowing/Mentoring
Formal/Informal Briefings
Performance Evaluations
On the Job Training: 1. Deploy and manage operating systems   2. Deploy and maintain other system software or products running on the mainframe   3. Implement monitoring, configuration management and reporting functions   4. Define and document best practices and support procedures; complete required documentation   5. Execute change management procedures including risk identification, test plans and back-out procedures   6. Implement system security procedures   7. Assist with capacity management and workload balancing   8. Code JCL   9. Write Simple REXX™ programs   10. Assist with disaster recovery plans   11. Assist with problem solving   12. Perform other duties as assigned

Competencies and Performance Criteria

Competencies

#	Type: Knowledge /Skill/ Behavior	Description
	B	Demonstrate key teamwork and collaborative behaviors
	B	Demonstrate strong communication skills
	K / B	Understand and model good feedback behaviors
	B	Demonstrate a willingness to learn from mentors
	K/B	Demonstrate a methodical approach to implementing change, adopting a risk mitigation approach
	K/B	Demonstrate an ability to follow process and procedures with accurate and complete documentation
	K	Demonstrate knowledge of key computer programming fundamentals including structured programming design and its relationship to data structures
	K	Understand mainframe terminology and basic concepts
	K	Understand mainframe hardware components and the structured nature of the mainframe I/O architecture
	K	Understand access method concepts in MVS™ and the structure and design of VSAM files
	K	Understand the associated software and system components that comprise a z/OS System, their purpose and how they interact
	K	Understand the concepts and facilities of TSO and IBM's Interactive System Productivity (ISPF), including familiarization with the Editors
	K	Understand the structure of ICF catalogs and the related VTOC and index VTOC
	K	Understand hierarchical and relational DBMS
	K	Understand the concepts, functions and facilities of CICS®
	K	Understand how security is implemented on the mainframe
	K	Understand File Transfer tools, concepts and configuration
	K	Understand how to use and exploit the additional utilities/ facilities/ program products widely utilized within an enterprise mainframe environment
	K	Understand what can go wrong in a mainframe environment

	S	Be able to code job control statements with sound syntax to execute Mainframe programs and access datasets following best practices and standards	
	S	Be able to create and use programs written in the REXX language	
	S	Be able to exploit utilities/ facilities/ program products widely utilized within an enterprise mainframe environment such as IEBGENER, IDCAMS etc.	
	S	Be able to define an HCD definition to create a z/OS LPAR and connect peripheral devices.	
	S	Be able to install and implement IBM's z/OS Operating system	
	S	Be able to install and implement a major Mainframe subsystem such as IMS™, Db2® or CICS.	
	S	Be able to Install and customize z/OS UNIX® using IBM recommended methods	
	S	Demonstrate the use of SMP/E to manage the deployment and lifecycle of mainframe software products	
	S	Perform and upgrade of a major product in a production like environment, evaluating any risks and taking actions to mitigate/ minimize these risks via proven back-out plan and knowledge of what could wrong including effective testing.	

Evidence Types

Evidence Code	Description
O	Observation
Q&A	Questions and answers
P	Learner products
RA	Reflective accounts / personal statements
S	Simulation
PD	Professional discussion
A	Assignments, projects, case studies
MT	Mentor testimony
EW	Expert witness evidence
RPL	Recognition of prior learning

Principles and Practices Performance Criteria

Job Role	IBM Z® Administrator				
Module	Principles and Practices				
Competency Outcomes	Assessment Criteria		Evidence Type	Sign Off Signature and Date	Education Module Reference
1.0 Demonstrate key teamwork and collaborative behaviors	1.1 1.2	Examples of teamwork and collaboration Feedback from team members and mentors	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		
2.0 Demonstrate strong communication skills	2.1 2.2	Examples of ability to present technical information clearly in both oral and written communications Feedback from team members and mentors on ability to ask relevant questions	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		
3.0 Understand and model good feedback behaviors	3.1 3.2	Examples of giving and receiving feedback Feedback from team members and mentors	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A		

			☐MT ☐EW ☐RPL		
4.0 Demonstrate a willingness to learn from mentors	4.1	Feedback from mentors	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		
5.0 Demonstrate a methodical approach to implementing change, adopting a risk mitigation approach	5.1 5.2 5.3 5.4	Evidence of following change management procedures Evidence of assessing risk when implementing changes and having risk effective mitigation plans Evidence of developing a back-out plan Evidence of a test plan	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		
6.0 Demonstrate an ability to follow process and procedures with accurate and complete documentation	6.1 6.2 6.3	Evidence of knowledge of processes and procedures Documentation related to implementation of processes and procedures Evidence of documentation of technical procedures for users	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		

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Knowledge Performance Criteria

Job Role	IBM Z Administrator			
Module	System Administrator Knowledge			
Competency Outcomes	Assessment Criteria	Evidence Type	Sign Off Signature and Date	Education Module Reference
7.0 Knowledge: An understanding of structured programming design and its relationship to data structures	7.1 Demonstrate an understanding of pseudocode. 7.2 Demonstrate an understanding of variables, operators, constants and data types. 7.3 Demonstrate an understanding of functions, parameters and recursion. 7.4 Demonstrate an understanding of arrays. 7.5 Demonstrate an understanding of APIs.	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		Introduction to Computer Science
8.0 Knowledge: An understanding of Mainframe terminology and basic concepts	8.1 Describe and compare various IBM Z components: 8.1.1 Frame layout and cage usage 8.1.2 Server models, books, memory, and cache structure 8.1.3 Performance and millions of service units (MSUs)	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track

| 9.0 Understand mainframe hardware components and the structured nature of the Mainframe I/O architecture | 9.1 Describe how and what IBM Z physical components are used when processing instructions and performing an I/O operation
9.2 Identify IBM Z Capacity on Demand (CoD) options available for planned and unplanned outages
9.3 Describe the CoD provisioning architecture and which servers can use it
9.4 Describe how logical partitioning is used, resource assignments, and initialization activities
9.5 Describe mainframe channels, usage, and CHPID assignments
9.6 Describe the purpose and use of HCD
9.7 Identify mainframe operating systems and their supported mainframe servers
9.8 Describe the various queues that are used to dispatch work
9.9 Describe the difference between a base and Parallel Sysplex®
9.10 List Parallel Sysplex main characteristics
9.11 Describe the purpose and use of the coupling facility
9.12 Identify the difference between the following sysplex configurations
    9.12.1 MULTISYSTEM
    9.12.2 MONOPLEX
    9.12.3 XCFLOCAL
9.13 Identify and describe the major enhancements provided by the IBM Z software and hardware platform:
    9.13.1 64-bit architecture, IRD, HiperSockets™, MLCSS, MIDAW
    9.13.2 Multiple subchannel sets, zHPF, CPM, HiperDispatch, zDAC | | | |

	9.13.3	TEF, RI, DAT2, Flash Express, zAware, and autonomic computing			
	9.14	Identify processor architectural modes and their supported addressing implementations:			
		9.14.1 Bimodal			
		9.14.2 Trimodal			
		9.14.3 Address spaces			
		9.14.4 Virtual addressing			
		9.14.5 Storage usage			
	9.15	Describe the various queues that are used to dispatch work			
	9.16	Use system commands to display active address spaces and identify their current status			
	9.17	Describe the high-level interaction between z/OS, CSS, and I/O devices during I/O processing			
	9.18	Describe the role of the HMC and SE for IBM Z servers			
	9.19	Identify and change the HMC user interface style			
	9.20	Identify CPC and image objects usage on the HMC			
	9.21	Build and customize user-defined groups			
	9.22	Identify profile types, usage, and assign profiles to objects			
	9.23	Use the Details window to determine object status and assignments			
	9.24	Describe how and why unacceptable status conditions and hardware messages are presented to the HMC			
	9.25	Identify the HMC activation process for CPCs and images			
	9.26	Send messages to the operating system			
	9.27	List program management services that z/OS provides			
	9.28	List main elements and optional features of the z/OS system			

	9.29	Explain system libraries, their use, and methods for managing their content			
	9.30	List main components of a data center and recent improvements being made to data centers			
	9.31	Describe the responsibilities of JES			
	9.32	Describe the use of traditional DB/DC applications like CICS, IMS, and Db2 on z/OS			
	9.33	Describe the purpose of the Language Environment			
	9.34	Describe the support provided for object-oriented application development on z/OS			
	9.35	Explain the differences between authorization and authentication			
	9.36	Identify some firewall technologies within the security server			
	9.37	Describe the Lightweight Directory Access Protocol (LDAP)			
	9.38	Describe the purpose and benefit of z/OS Management Facility			
	9.39	Describe the functions provided z/OS Management Facility			
	9.40	List SDSF commands used to display jobs, active users, and tasks			
	9.41	Know how to filter SDSF output based on DEST, PREFIX, OWNER and SYSNAME			
	9.42	Know how to enter JES and MVS commands through SDSF and use ULOG to view commands and their output			
	9.43	Describe the main features of UNIX System Services (USS) in z/OS			
	9.44	Describe briefly the UNIX shell and utilities			
	9.45	Describe the hierarchical file system (HFS)			
	9.46	Describe the application services provided in USS			
	9.47	Describe how to start and manage a process in USS			
	9.48	Identify the different types of utility programs			

10.0 Understand access method concepts in MVS and the structure and design of VSAM files	10.1 Discuss VSAM data set creation through JCL 10.2 Describe the following data sets and how they are used and accessed (random or sequential): 10.2.1 KSDS 10.2.2 ESDS 10.2.3 RRDS 10.2.4 LDS	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track
11.0 Knowledge: An understanding of the associated software and system components that comprise a z/OS System, their purpose and how they interact	11.1 Identify the installation requirements for an enterprise server and how z/OS supports these requirements 11.2 Discuss the services for application enablement in a z/OS environment 11.3 Identify how z/OS provides support for On Demand Business 11.4 Describe how security is ensured in a z/OS environment 11.5 Identify products and tools that support a central point of control 11.6 Characterize products and facilities that support z/OS systems 11.7 Describe the essential system services of z/OS 11.8 List the z/Architecture® processor configurations for z/OS 11.9 Describe z/OS connectivity, communication facilities, and interfaces 11.10 Describe how Z creates a single system of systems 11.11 Describe the concept, strategy, and benefits of the z/OS environment 11.12 Describe application enablement in z/OS 11.13 Describe On Demand Business support in z/OS 11.14 Explain connectivity to the z/OS environment	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track

	11.15 Describe security support provided by z/OS 11.16 Describe the different types of Systems Management support (Tivoli®, SMP/E, SMF, and RMF™) 11.17 Describe the scalability, availability, backup, and recovery features in z/OS 11.18 Describe System Services support (storage management, job management, work management, data sets, and data set management) 11.19 Describe IBM Z processor configurations and Z hardware			
12.0 Understand the concepts and facilities of TSO and IBM's Interactive System Productivity (ISPF), including familiarization with the Editors	12.1 Log on to TSO and start ISPF/PDF 12.2 Navigate through ISPF/PDF dialogs and use the basic ISPF/PDF functions and the ISPF Editor 12.3 Use ISPF/PDF to allocate data sets and edit data sets (including hierarchical file system (HFS) files) using the ISPF Editor primary and line commands 12.4 Use ISPF to create and manipulate (copy, rename, delete, list, sort, and merge) data sets 12.5 List attributes of TSO/E 12.6 Name the three data set types 12.7 Describe the attributes of data set names 12.8 Use line and prefix commands while editing data set 12.9 Describe and use TSO/E commands 12.10 Perform simple modifications to existing ISPF/PDF panels 12.11 Invoke a REXX exec and TSO CLIST 12.12 Review job status and job output using SDSF 12.13 Invoke UNIX processes 12.14 Manipulate HFS directories and file systems using the UNIX System Services ISHELL	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track

13.0 Understand the structure of ICF catalogs and the related VTOC and	13.1 Describe the classical z/OS data management
	   13.1.1 DASD init: VTOC, VTOC index
	   13.1.2 ICF catalog creation: BCS, VVDS
	   13.1.3 MCAT/UCAT
		☐O
		☐Q&A
		☐P
		☐RA
				IBM Z Fast Track

index VTOC	13.1.4 IDCAMS utility
	13.1.5 DFSMS™: DFSMSdss™, DFSMShsm™
	13.1.6 Data, storage, and management classes
	13.1.7 Define the hierarchical data management
	    13.1.8 HFS file system
	    13.1.9 zFS file system
		☐S
		☐PD
		☐A
		☐MT
		☐EW
		☐RPL		

14.0 Knowledge: Understand hierarchical and relational DBMS	14.1 Explain how databases are used in a typical online business. 14.2 Describe two models for network connectivity for large systems 14.3 Explain the role of Db2 in online transaction processing 14.4 List common Db2 data structures 14.5 Compose simple SQL queries to run on z/OS 14.6 Give an overview of application programming with Db2 14.7 Explain what the IMS components are 14.8 Describe the structure of the IMS DB subsystem	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		[Introduction to the New Mainframe: z/OS Basics (An IBM Redbook® Publication)](#) (Chapter 12)
15.0 Understand the concepts, functions and facilities of CICS	15.1 Describe the role of large systems in a typical online business 15.2 List the attributes common to most transaction systems 15.3 Explain the role of CICS in online transaction processing 15.4 Describe CICS programs, CICS transactions, and CICS tasks 15.5 Explain what conversational and pseudo-conversational programming is 15.6 Explain CICS and web enabling 15.7 Discuss the IMS components	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		[Introduction to the New Mainframe: z/OS Basics (An IBM Redbook Publication)](#) (Chapter 13)
16.0 Understand how security is implemented on the mainframe	16.1 List and describe the basic features and concepts of IBM Z architecture and of the z/OS operating system as they relate to security administration 16.2 Identify the security requirements of a system	☐O ☐Q&A ☐P	Z	[IBM Z Fast Track](#)

	16.3 Discuss z/OS security architecture 16.4 Describe the components of network security 16.5 Describe how security is handled in USS 16.6 Use the basic facilities and features of the implemented security product 16.7 Use the security product to define users and protect resources 16.8 Describe how security is implemented in USS 16.9 Identify security considerations for Multiple Virtual Storage (MVS) data sets and HFS files	☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		
17.0 Knowledge: Understand file transfer tools, concepts and configurations	17.1 Connect to a remote host to get/put files 17.2 Describe Managed File Transfer including auditability, security, recoverability and platform connectivity. 17.3 Compare internal and external file transfers.	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track
18.0 Understand how to use and exploit the additional utilities/ facilities/ program products widely utilized within an enterprise mainframe environment	18.1 Describe the system initialization process of the z/OS operating systems 18.2 State the differences between an address space, data space, and hyperspace 18.3 Describe the process of translating a virtual address to a real address 18.4 Explain the difference between paging and swapping 18.5 Define a z/OS task 18.6 Describe dispatching, interrupt processing, supervisor calls, cross memory services, and serialization 18.7 Describe the purpose of the Job Entry Subsystem (JES)	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		z/OS Facilities

	18.8 Illustrate the flow of a job through the z/OS environment 18.9 Describe the allocation process for data sets in the z/OS environments 18.10 Illustrate how an I/O request is processed in a z/OS environment 18.11 Describe how workload management is accomplished in a z/OS environment 18.12 Explain the z/OS recovery processes and list available Problem Determination Tools 18.13 Describe z/OS storage management concepts 18.14 Describe the UNIX System Services functions provided in the z/OS environments 18.15 Explain the network topologies and protocol support provided in z/OS 18.16 Describe system security and network security for a z/OS environment			
19.0 Understand what can go wrong in a mainframe environment	19.1 Explain the MVS functions and control blocks necessary to support a task in a multitasking and multiprocessing environment 19.2 Describe the software and hardware functions that allow a program to interact with programs running in other address spaces, use data in other address spaces, and use data in data spaces 19.3 Trace the flow of an I/O operation from the initial request in the application program through the completion of data transfer 19.4 Identify the control blocks that describe the current status of an I/O request 19.5 Describe the functions of the z/OS BCP Virtual, Real, and Auxiliary Storage Managers	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track

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	19.6 Describe the functions performed by the Recovery Termination Manager and recovery management components to minimize failure impact and enhance error correction 19.7 Select the appropriate IBM publication to provide further technical information (SRLs, Technical Bulletins, Self-study and other z/OS courses) 19.8 Describe the services provided by cross system extended services (XES) 19.9 Identify and explain the purpose of the cache, list, and lock structures 19.10 Plan the implementation of the global resource serialization STAR environment.0.2 pref			

Skills Performance Criteria

Job Role	IBM Z Administrator
Module	System Administrator Skills

Competency Outcomes	Assessment Criteria		Evidence Type	Sign Off Signature and Date	Education Module Reference
20.0 Be able to code job control statements with sound syntax to execute mainframe programs and access datasets following best practices and standards	20.1	Use JOB, EXEC, DD and COMMENT statements in a multistep job	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track
	20.2	Explain JCL errors, return codes, and ABENDs			
	20.3	Use the functions of system and data set utility programs			
	20.4	Use the COND parameter and conditional execution of job steps			
	20.5	Use various record formats supported by z/OS			
	20.6	Use blocked and unblocked data sets			
	20.7	Discuss system-determined block size			
	20.8	Use SMS-managed data sets			
	20.9	Differentiate between PDS and PDSE data sets			
	20.10	Describe a procedure			
	20.11	Differentiate between a cataloged procedure and in-stream procedure			
	20.12	Describe procedure modifications through overriding, adding, or nullifying parameters			
	20.13	Compare the PROC and EXEC statements for supplying symbolic parameters			

	20.14 Code basic JCL statements using proper syntax and coding rules, including JCL for: 20.14.1 Creating new data sets 20.14.2 Referencing existing data sets 20.14.3 Condition code testing 20.14.4 IF/THEN/ELSE/ENDIF constructs 20.14.5 Generation data groups 20.14.6 Output routing 20.14.7 Invoking a program and passing PARM parameters 20.14.8 Using the DISP parameter 20.15 Identify Storage Management Subsystem requirements and: 20.15.1 Code instream and cataloged procedures 20.15.2 Use symbolic parameters in procedures 20.15.3 Code procedure overrides and additions super 20.15.4 Use selected utility programs 20.15.5 Describe tape processing facilities 20.16 Code sort and merge control statements and associated JCL statements 20.17 Tailor existing JCL and submit batch jobs 20.18 Use symbolic parameters to modify procedures			
21.0 Be able to create and use programs written in the REXX language	21.1 Write and execute a program using the REXX language using various data parsing techniques and built-in REXX functions 21.2 Create user-defined internal and external functions and subroutines 21.3 Issue host commands from within REXX execs 21.4 Code programs that read and write data sets	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT		z/OS REXX Programming Workshop

	21.5 Use instructions and commands that manipulate the data stack 21.6 Use REXX debugging tools 21.7 Write error-handling routines to trap and recover errors 21.8 Issue host commands from within REXX execs and capture and process their output 21.9 Create ISREDIT macros in REXX 21.10 Use stem variables to manipulate complex data structures 21.11 Create REXX procedures that can interact with the z/OS operator's console 21.12 Explain how a CLIST differs from a REXX exec	☐EW ☐RPL		
22.0 Be able to exploit IBM utility programs such as IEBGENER, IDCAMS etc.	22.1 Code utility control statements appropriate for: 22.1.1 IEBGENER 22.1.2 IEBPTCH 22.1.3 IEHLIST 22.1.4 IDCAMS	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		IBM Z Fast Track
23.0 Be able to define an HCD definition to create a z/OS LPAR and connect peripheral devices	23.1 Identify and list the HCD definition process sequence 23.2 Use the HCD dialogs to define a configuration 23.3 Connect peripheral devices	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW		z/OS System Services Structure

		☐RPL		
24.0 Be able to install and implement IBM's z/OS Operating system	24.1 Create a z/OS implementation plan for the installation and configuration of a z/OS environment 24.2 Configure the z/OS system layout according to local requirements 24.3 Execute the installation jobs created by the installation dialog and any related customization task necessary to build an initial IPLable z/OS system 24.4 Perform the hardware and software configuration tasks required to IPL a z/OS system 24.5 Perform basic PARMLIB customization of the new z/OS base necessary to provide a stable platform for migration and testing of other products and applications on the new z/OS level 24.6 Document the z/OS system configuration for future installations	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		SMP/E for z/OS Workshop
25.0 Be able to install and implement a major Mainframe subsystem such as IMS, Db2 or CICS	25.1 Provide appropriate parameters for the Install 25.2 Define system data sets/databases 25.3 Initialize system data sets/databases 25.4 Define user authorization exits 25.5 Establish necessary security procedures 25.6 Perform the installation 25.7 Verify the installation	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		SMP/E for z/OS Workshop

26.0 Be able to Install and customize z/OS UNIX using IBM recommended methods	26.1 Execute the tasks required to prepare a z/OS installation for implementing z/OS UNIX 26.2 Execute the tasks to install the z/OS UNIX software features 26.3 Use the information provided in this class to perform the basic customization necessary to fully implement the z/OS UNIX kernel, the file system, the shell and utilities, and z/OS UNIX applications 26.4 Put in place the security required for z/OS UNIX resources and applications 26.5 Make appropriate definitions for the activation of TCP/IP sockets by z/OS UNIX 26.6 Identify and use the processes and data required for monitoring and tuning the z/OS UNIX environment	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		[SMP/E for z/OS Workshop](#)
27.0 Demonstrate the use of SMP/E to manage the deployment and lifecycle of mainframe software products	27.1 Use the SMP/E dialogs to install a product and its related service 27.2 Manage exception SYSMOD data 27.3 Use primary and secondary data sets as required by SMP/E 27.4 Analyze output from SMP/E processing and resolve commonly encountered problems 27.5 Use the REPORT command to determine software dependencies between zones 27.6 Use the BUILDMCS process to create a function SYSMOD from an installed product and its service 27.7 Use SMP/E functions to install software service automatically over the internet 27.8 Implement support for communication server FTP client	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		[SMP/E for z/OS Workshop](#)

	27.9	Use the RECEIVE ORDER command to order and install z/OS maintenance automatically over the Internet			
28.0 Perform and upgrade of a major product in a production like environment, evaluating any risks and taking actions to mitigate/ minimize these risks via proven back-out plan and knowledge of what could wrong including effective testing	28.1 28.2 28.3 28.4 28.5 28.6	Create an implementation plan Perform a risk assessment Create a back out plan Create a test plan Use change management processes to execute the implementation plan Perform testing	☐O ☐Q&A ☐P ☐RA ☐S ☐PD ☐A ☐MT ☐EW ☐RPL		SMP/E for z/OS Workshop

Outline of Related Instruction

Foundational Instruction

Training	Type	Formal Training Hours
Onboarding and Softskill/Business Software Training	ANY	56
Introduction to Computer Science • Algorithms • Data structures • Software Engineering • Writing Computer Programs	Virtual	40
IBM Z Fast Track (the following 3 courses can be taken instead):	Multiple	80
• An Introduction to the z/OS Environment (16 hours) • Requirements of an enterprise server • Application enablement • Enabling On Demand Business on z/OS • z/OS connectivity • Security in a z/OS environment • Systems management • System and data availability • System services • Z	Multiple	
• Fundamental System Skills in z/OS (40 hours) • z/Architecture and z/OS • ISPF/PDF • RACF • TSO/E • JCL • Procedures • Unix System Services • ISHELL and hierarchical file system	Multiple	
• z/OS JCL and Utilities (36 hours) • Syntax and coding rules for JCL • Conditional coding • Input and output • Storage management subsystem requirements • Procedures • Utility Programs • Sort and merge • ABENDs	Multiple	
z/OS REXX Programming Workshop • Writing functions and subroutines • Debugging and error handling • Executing host commands • Compound variables and the data stack	Multiple	36

Training		
• Reading and writing data sets in REXX • The parse instruction • REXX: REXX compiler, REXX in batch, MVS console commands		
[Introduction to the New Mainframe: z/OS Basics (An IBM Redbook Publication)](#)	Self-Study Reading	39.25
[IBM z/OS V2R2 Communications Server TCP/IP Implementation: Volume 2 Standard Applications (Chapter 3)](#)	Self-Study Reading	8

System Administrator Instruction

Training		Formal Training Hours
[z/OS Facilities](#) • Storage management • Managing work • Input/output processing • Data management • Job management • IPL and system initialization • Termination and recovery analysis • Installing and configuring • Communicating • Security in z/OS	Multiple	36
[z/OS System Services Structure](#) • Operating environment initialization • Task management • Addressability • Input/Output supervisor • Storage management • Recovery termination manager	Multiple	36
[SMP/E for z/OS Workshop](#) • SMP/E as a tool for system maintenance • SYSMOD, REPORT, BUILDMCS, RECEIVE, ORDER • Install products and services • Primary and secondary data sets • SMP/E problem resolution	Multiple	36

Note: Multiple means available in either Virtual or Classroom formats from providers.

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