BMC Mainframe: z/OS Communications Server Part 2 - Implementing TCP/IP under z/OS

COURSE ABSTRACT

COURSE CODE
» MGRS-ZCS2-2021

APPLICABLE VERSIONS
» Not Applicable

DELIVERY METHOD 🌐
» Instructor-led Training (ILT)

COURSE DURATION 🌐
» 4 Days

PREREQUISITES
» BMC Mainframe: z/OS Communications Server Part 1 - Implementing an APPN Network using SNA/VTAM
   Or equivalent experience
» A familiarity with UNIX on z/OS is also required and some z/OS systems programming experience is needed

RECOMMENDED TRAININGS
» NA

Course Overview

The course is developed and delivered by © RSM Technology.

This new, four-day course is the second part of the definitive z/OS Communications Server training programme. This course explains in detail how TCP/IP works in a z/OS environment. Installation, profile definition and implementation are all taught in depth. All versions of TCP/IP for z/OS are covered, along with all the servers. Additionally, all the essential and important configuration options are explained and examples are provided.

Extensive hands-on practical sessions, in which each student has their own system to work on, form the central part of the course. These sessions make up approximately 30% of the whole course. Each segment of the course also contains extensive review questions/exercises - thus ensuring that all students fully grasp each topic before moving on to the next.

Target Audience

» Network technicians
» Systems programmers
» Technical managers

Learner Objectives

» Describe the structure, operation and the addressing mechanisms used in a TCP/IP network
» List the major configuration steps involved in customising TCP/IP for z/OS and explain the Security Server customisation required in z/OS
» Explain the purpose and use of Virtual IP addressing (VIPA) and explain how to code for both a static and dynamic VIPA configuration
» Explain the purpose and use of Distributed vipas and the need for Sysplex Distributor
» Describe and define devices to TCP/IP for z/OS and explain how to define the TCP/IP for z/OS host IP address(es)
» Describe and define the purpose and customisation of the DATA dataset and RESOLVER
» Define the host name, domain name and DNS information
» Describe and define the HOSTS file and the SERVICES dataset
» Explain the configuration of the TN3270 server and the SNA gateway and explain the VTAM configuration required to support the gateway
» Implement a VTAM USS table for TN3270 users
» Describe and define the Telenet servers, INETD and SSHD
» Describe and define the operation and customisation of the FTP server and its major security features
» Explain the differences between SFTP and FTPS
» Explain and define the operation and customisation of the SMTP, ROUTED and OMPROUTE servers
» Describe the purpose and use of the major TCPIP, TSO and USS commands
» Explain how to start, stop and interpret a TCP/IP packet trace and a component trace using IPCS and WireShark
» Describe in overview how SNMP is implemented on z/OS and list the steps involved in customising SNMP under z/OS
» Explain and define the purpose of the Enterprise Extender
» Explain how the security product Policy Agent is used and why it is needed
» Explain and define the structures required in a Parallel Sysplex for TCP/IP High Availability

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COURSE ACTIVITIES

» Classroom Presentations
» Demonstration

BMC MAINFRAME INFRASTRUCTURE AND PLATFORMS LEARNING PATH

» https://www.bmc.com/education/courses/find-courses.html#filter/%7B%22type%22%3A%22edu-specific-types-159150236%22%7D

CERTIFICATION PATHS 🌐

» This course is not part of a BMC Certification Path

DISCOUNT OPTIONS 🌐

» Have multiple students? Contact us to discuss hosting a private class for your organization
» **Contact us for additional information** 🌐

Course Modules

TCP/IP Review
» What is TCP/IP?
» Why are we interested in TCP/IP?
» What does TCP/IP comprise?
» Internetworking principles
» IPv4 addressing
» IPv4 subnetting
» IPv4 variable subnetting
» Network Address Translation
» One to One NAT
» Network Address Port Translation (NAPT)
» TCP/IP protocol stack
» IPv4 Address Resolution Protocol
» IPv4 Dynamic Host Configuration Protocol
» Why IPv6?
» IPv6 addressing
» IPv6 prefixes and address types
» Global unicast address format
» Anycast address
» Multicast address
» Required host information
» Port numbers
» IPv4 Transport Protocol message formats
» IPv4 Internet Protocol: message format, packet format, header format

» Extension Headers
» IPv6 Routing Header
» IPv6 fragmentation header
» IPv6 options header
» Internet domain names
» Internet domain name hierarchy
» Common user application
» Common system applications

An Overview of TCP/IP on z/OS
» TCP/IP for z/OS
» TCP/IP access to SNA applications
» How the gateway works
» SNA access to TCP/IP applications
» Communications Storage Manager
» Device connectivity and attachments
» Direct vs indirect attachment
» Direct attachment problem
» Virtual IP addressing - the solution
» Sharing attachments across LPARs
» UNIX Systems Services considerations.

TCP/IP for z/OS Installation
» UNIX Systems Services prerequisites
» Security Server prerequisites
» Communications storage manager
» Datasets required

» TCP/IP and TN3270 procedures
» Required host information
» Customising the DATA dataset
» DATA dataset syntax
» Association with the TCP/IP stack
» Specifying the Host Name and Domain Name
» Specifying the name server parameters
» A typical DATA dataset
» RESOLVER: procedure, files, other statements
» CINET GLOBALTCPIPDATA
» TCPIP.DATA search order
» VTAM TRL Major Node
» Servers and devices
» HCD definitions
» Sysplex distributor
» z/OS libraries required
» 'Must Have' reference manuals
» Nice to Have' reference manuals

TCP/IP for z/OS - Command Overview
» Available TCP/IP commands
» The START and STOP commands
» The MODIFY command
» The DISPLAY command
» The VARY command;
» The OBEYFILE command

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COURSE ABSTRACT

» The NETSTAT and onetstat commands

» NETSTAT command options

Basic Profile Definitions
» Customising the PROFILE dataset
» PROFILE dataset syntax
» Device interface properties
» Statements that define an interface
» The basic DEVICE statement
» The basic LINK statement
» Defining LCS devices
» Defining CLAW devices
» OSAs, Hipersockets and Channel Attached Routers
» OSA diagnostic device
» QDIO and non-QDIO
» OSA Express CHPID definitions
» Adding an OSA Control Unit and device
» Adding OSAD device
» Hipersockets
» Hipersockets definition
» CHPID Type IQD
» MTU sizes
» Channel Attached Routers and Servers
» Defining MPCPTP devices
» Defining MPCIPA devices
» The HOME statement
» The START statement
» INTERFACE - IPAQENET OSA-Express QDIO interfaces statement
» Syntax for INTERFACE - IPAQENET OSA-Express QDIO
» Syntax for INTERFACE -- IPAQIDIO HiperSockets interfaces statement
» The routing statements
» Subnetting - a reminder
» The GATEWAY statement
» The BEGINROUTES statement
» The BSDROUTINGPARMS statement
» Variable subnets and GATEWAY
» Variable subnets and BEGINROUTES
» Operational statements

VIPAs and Sysplex
» VIPAs
» Static VIPA

» Dynamic VIPA
» Virtual IP addressing - a reminder
» Defining VIPA devices
» Specifying the source IP address
» Syntax for INTERFACE -- VIRTUAL interfaces statement
» Examples of the INTERFACE statement for VIPA
» IP solutions in a sysplex
» Communication paths in a Sysplex
» DynamicXCF transport choices
» IUTSAMEH
» XCF Groups and their usage
» Display XCF groups
» DYNAMICXCF
» DYNAMICXCF & HiperSockets
» Dynamic VIPA - introduction
» Dynamic VIPA takeover
» Stack-managed DVIPA
» Non- disruptive dynamic VIPA takeback
» Application-specific DVIPA
» IOCTL or Command-Activated DVIPA
» Dynamic VIPA statements
» MODDVIPA (EZBXFDVP) utility
» Dynamic VIPA usage
» When does the DVIPA move?
» Load balancing and availability
» Sysplex Distributor
» How the Sysplex Distributor works
» Backup capability
» Recovery
» The role of dynamic routing with Sysplex Distributor
» Sysplex Distributor and policy
» Sysplex Distributor and MNLB
» Connection Optimizing DNS
» nformation flow overview
» DNS weights
» DNS/WLM registration
» Starting the DNS server
» Distributed VIPA - introduction
» Distributed VIPA statements
» Single system IP perspective of the sysplex
» TCPSTACKSOURCEVIPA / SYSPLEXPORTS

» CFRM policy example

Other Datasets Needed
» The SITE dataset
» The SERVICES file

Server Customisation
» Configurable servers
» TN3270 server customisation steps
» Updating the TN3270 started task JCL
» TelnetGlobals statement
» Reducing demand for ECSA storage
» The TELNETPARMS statement
» The PORT statement
» The BEGINVTAM statement
» The VTAM application major node
» Defining a USS table
» Identifying the USS table in the PROFILE dataset
» The UNIX Telnet server
» Customising the INETD Server
» Starting INETD and Telnet
» SSHD UNIX file
» SSHD - Using ICSF and
» /dev/random)
» SSHD - Creating configuration files
» SHD - Creating SSHD server keys
» SSHD - Set up SSHD server userids
» SSHD - Create SSHD server started task
» SSHD - TCP configuration
» SSHD - Verify z/OS DNS / Resolver operation
» The FTP server
» FTPS and SFTP
» Pros and cons of FTPS and SFTP
» Customising the FTP.DATA dataset
» Customising the PROFILE & SERVICES datasets
» Starting FTP
» SYSLOGD
» SYSLOGD -/dev/console and /dev/log
» SYSLOGD - create the syslog daemon configuration file
» SYSLOGD - create empty syslog output file
» SYSLOGD - port and services assignments
» SYSLOGD started task JCL
» OMVS startup

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COURSE ABSTRACT

- » SYSLOGD RACF definitions
- » OMPROUTE
- » OMPROUTE - configuration file
- » OMPROUTE reserve the ports
- » OMPROUTE - update the RESOLVER configuration file
- » OMPROUTE - started task JCL
- » OMPROUTE services port numbers
- » OMPROUTE - RACF definitions
- » OMPROUTE - SYSLOGD;
- » OMPROUTE - static routes
- » OMPROUTE - Configure OSPF authentication
- » Customising other servers
- » Enterprise Extender
- » z/OS services for SNA traffic
- » PPN parameters in startup options
- » Implementation considerations
- » TCP/IP implementation
- » DYNAMICXCF
- » IUTSAMEH
- » DYNAMICXCF & HiperSockets;
- » Modifications to TCP/IP profile
- » Modifications to OSPF interface
- » Proof of initialisation of IUTSAMEH
- » VTAM implementation
- » Defining the XCA HPRIP major node
- » Defining model major nodes for EE connections and RTP pipes
- » Defining switched PUs for EE connections

TCP/IP Security
- » Why secure the TCP/IP network
- » Tasks that need protection with SERVAUTH Class
- » Policy based networking
- » SERVAUTH Resource Class responsibilities
- » SERVAUTH Resource Class

- » Protecting the TCPIP stack
- » Example of protecting the stack
- » Protecting your network access
- » Application considerations when using NETACCESS
- » Using the NETSTAT and PING commands to check protection
- » Protecting your network ports
- » RACF definitions for protecting network ports
- » Using the NETSTAT command to check PORT access
- » Protecting the use of socket options
- » What are network commands
- » Protecting network commands - z/OS TCPIP commands
- » Protecting network commands - NETSTAT and ONESTAT commands
- » Protecting network commands - EZACMD REXX program
- » Protecting FTP access
- » Other FTP profiles
- » Protecting TN3270 Secure Telnet Port
- » Protecting the MODDVIPA command
- » Introduction to policy based networking
- » The Policy Agent
- » RACF and PAGENT
- » Other address spaces that will need RACF profiles
- » Central policy server
- » SERVAUTH authorisation for Policy Client
- » Quality of Service
- » SNMP overview
- » SNMP in operation
- » IP filtering
- » IP Security
- » IKE protocols
- » CSFSERV resource class

- » Network Address Translation
- » Intrusion Detection Services
- » Application Transparent Transport Layer Security
- » TN3270 security
- » Secure FTP
- » Note to Auditors
- » Next step?

Problem Determination Considerations
- » Problem determination tools
- » The PING and OPING commands
- » The TRACERTE and the OTRACERT commands
- » TCP/IP SYSLOG output
- » TCP/IP packet trace overview
- » Starting a packet trace
- » The external writer procedure
- » Stopping a packet trace
- » Analysing a packet trace with IPCS
- » Non-z/OS packet traces
- » TCP/IP component trace overview
- » Starting and stopping a component trace
- » Analysing a component trace via IPCS
- » Analysing a component trace
- » Other available traces
- » Packet trace

Sample Definitions
- » Sample TCPIP.PROFILE dataset
- » Sample TCPIP.DATA dataset
- » Sample TCPIP.SERVICES dataset
- » Sample Inted Configuration file
- » Sample FTP Configuration file
- » Sample ROUTED Configuration file
- » Sample SMPT Configuration file

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