BMC Mainframe: z/OS Performance & Tuning with Workload Manager

COURSE ABSTRACT

COURSE CODE
» RSMT-ZPWM-2021

APPLICABLE VERSIONS
» Not Applicable

DELIVERY METHOD
» Instructor-led Training (ILT)

COURSE DURATION
» 3 Days

PREREQUISITES
» z/OS System Fundamentals Workshop - Part 1
» z/OS System Fundamentals Workshop - Part 2

RECOMMENDED TRAININGS
» NA

Course Overview

The course is developed and delivered by © RSM Technology.

This course gives technical support personnel in a z/OS installation a clear understanding of the tasks involved in effective performance management. It covers conceptual performance issues as well as the significant technical considerations, such as parameters and I/O configurations.

The course also provides a comprehensive overview of the Workload Manager functions. All the key features are described and explained during this course. The course also includes a number of practical online exercises.

As well as covering conceptual performance issues the course concentrates on the significant technical considerations of I/O tuning.

Target Audience

This course is suitable for all Systems Programmers and Performance Analysts working in the Z Systems environment.

Learner Objectives

» Explain system performance requirements
» Explain the role of a performance person
» Apply basic MVS tuning
» Explain the important WLM considerations
» Evaluate a WLM setup
» Utilise RMF reports to tune MVS
» Define service policies, service classes and classification rules
» Describe the mechanisms for managing and balancing any workload in a WLMPlex
» Explain the implications of using Workload Managed Batch and Resource Affinity Scheduling
» Utilize the latest technology to optimise I/O performance
» Decide on what to monitor
» Utilise RMF to tune MVS I/O

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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

What is Performance?

- What is performance?
- The performance issues
- Performance related activities
- Performance management
- A transaction
- Transaction delay time components
- Measuring delays
- MVS tuning and the Systems Programmer
- Three kinds of tuning
- Corrective tuning
- Preventive tuning
- Negative tuning
- Knowing your system

z/OS Data-In-Memory

- Data spaces and hiperspaces in MVS
- Data Space & Hiperspace use in MVS
- VLF, LLA, DLF and Hiperbatch
- VLF and DLF
- What is VLF?
- Setting up VLF
- VLF macros
- Example of VLF parameters
- What is LLA?
- Running LLA in MVS
- LLA module staging
- Example of LLA parameters
- Data Lookaside Facility and Hiperbatch
- Using DLF and Hiperbatch
- The DLF Connect/Disconnect exit
- Coupling Facility exploitation
- IBM software that uses Coupling Facility
- VSAM Record Level Sharing
- CICS VSAM file accessing applications

Input/Output Processing

- Why I/O processing?
- What is I/O?
- MVS support for I/O processing software
- MVS and I/O processing
- Application I/O
- The application program
- The DD statement
- Going to the Access Method
- The Access Method
- Getting the channel program started
- EXCP - an IOS Driver
- IOS 'Front End'
- Actually starting the I/O
- The I/O engine at work
- The Channel Sub-System (CSS)
- Hardware System Area (HSA)
- "The I/O Farm"
- The I/O Interrupt
- IOS Post processing
- Back to the Access Method
- The I/O process from A to Z
- Starting the I/O
- Going back from starting the I/O
- I/O complete
- Caching concepts
- Read Hit
- Write commands
- Write Hit
- Read Miss
- Write Miss
- Cache modes
- Review questions - Input/Output processing

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Hardware I/O Performance

- What is FICON?
- FICON features
- System attachment considerations
- FICON guidelines
- The IOSQ time problem
- Overcoming restrictions
- Multiple allegiance and Parallel Access Volumes
- PAV and cache
- PAV RMF support
- Managing PAVs
- What are PAV limitations?
- Intelligent Resource Director (IRD)
- IRD LPAR CPU management
- IRD LPAR CPU management (2)
- Dynamic Channel Path Management (DCM)
- DCM requirements
- DCM definitions and concepts
- Configuring DCM
- RMF Channel Path Activity report
- DCM and the I/O queueing report
- I/O priority prior to IRD
- I/O priority queuing
- WLM I/O priority management
- UCB & DASD CU I/O priority
- CSS I/O priority
- Enabling Channel Subsystem Priority Queuing
- Review questions

RMF Reports for I/O

- Resource Measurement Facility
- CACHE - Cache Subsystem Activity reports
- CHAN - Channel Path Activity report
- DEVICE - device activity report
- Monitor I shared DASD
- Monitor I shared tape activity report
- FCD - FICON director activity report
- IOQ - I/O queuing activity report (1)
- PAGESP -Page/Swap data set activity report
- PAGING - Paging activity reports
- VSAM RLS activity by storage class
- VSAM RLS activity by data set
- RMF I/O performance exercise

Workload Management Overview

- The Workload Manager (WLM)
- WLM Goal Mode and Parmlib members
- WLM concepts; Service Policies
- Multi-system workload management
- Workload reporting
- Building the service definition
- Service Policy
- Creating workloads
- Creating resource groups
- Creating service classes
- Goal types
- Creating Service Classes
- IBM specified subsystems
- Work qualifiers
- Subsystems and work qualifiers
- Classification Groups
- System-provided Service Classes
- Defining service policy overrides
- Specifying overriding Goals for a Service Class
- The Service Definition
- Classification rules for subsystems
- Implementing WLM
- Create performance objectives
- Manuals on WLM

How WLM works

- WLM components
- WLM Considerations
- Dispatchable Units (DUs)
- SRB types & priorities
- SRB scheduling with IEAMSCHD
- SRB Enclaves
- Dispatcher queues
- Performance Index
- Donor and receiver determination
- Dispatching Priority Control
- Dispatching Priority Assignment
- INITTMP
- Swap control
- Work Requests to WLM
- Server Topology
- Monitoring environment - CICS & IMS
- Enclave management
- DASD I/O priority management
- Sysplex I/O Priority Management
- Parallel Access Volumes (PAV)
- Policy Adjustment Function
- Resource Adjustment Function
- Workload management services

Workload Manager Applications

- TSO workloads
- Emergency TSO Service Class
- WLM Batch Initiators
- Scheduling Environment
- WLM or JES Initiators?
- Batch workloadsBatch workload Goals
- Special Service Classes
- STC default Service Classes
- STC Service Class considerations
- SYSSTC Service Class
- DB2 Address Spaces
- DDF enclaves
- Classification rules for DDF
- DDF Goal types
- DB2 Stored Procedures
- Sysplex Query Parallelism
- CICS - Types of Goals
- CICS Region Management Goal
- CICS Transaction Management Goal
- Transaction goal rules
- Unix System Services (USS)
- Why USS uses WLM
- UNIX Services fork and spawn function calls
- USS Service Classes
- USS Classification rules
- Definitions for OMVS subsystem type work

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Understanding RMF Reports

- Resource Measurement Facility
- SMF Records
- Monitor II
- Monitor III
- Postprocessor Reports
- Workload activity report reporting options
- Workload activity report - Goal mode
- RMF monitor I service class period report Goal mode
- Monitor I workload group and service class period report
- CACHE - Cache subsystem summary report
- CHAN - Channel path activity report
- DEVICE - Device activity report
- Monitor I shared DASD activity
- Monitor I shared tape activity report
- FCD - FICON Director activity report
- IOQ - I/O Queuing activity report
- HFS - Hierarchical File System global statistics report
- HFS - Hierarchical File System statistics report
- OMVS - OMVS kernel activity report
- PAGESP -Page/Swap data set activity report
- PAGING - Paging Activity report
- VSAM RLS activity by storage class
- VSAM RLS activity by data set

zFS Performance

- USS workloads
- USS & VLF
- Environmental variables
- Cache sizes
- Resource limit management
- PARMLIB issues
- Monitoring USS
- USS performance tools