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# Peter Enrico's 'WLM Performance & Re-evaluating Goals'

(Visit [www.epstrategies.com](http://www.epstrategies.com) for class schedule and pricing.)

A week of learning and doing!

**This outstanding 4.5-day seminar has the most complete, comprehensive, and useful materials on the subject of the z/OS Workload Manager.**

Even if you've been in goal mode for a while, this seminar is sure to give you a deeper understanding of WLM functions and abilities. *You will analyze your own WLM Service Definition and measurement data during class.* You will learn considerations for when to re-visit and re-evaluate goals over time, and how to better monitor, tune, and control how WLM manages your workloads. Since WLM is more than just understanding service classes and goals so you will also learn about the many other WLM functions that your system could take advantage of for workload balancing and systems management.

Peter Enrico is a recognized expert on WLM, having worked in the MVS Workload Management algorithm design and development teams during his tenure at IBM, and having helped many clients convert to goal mode. He has also helped many more to tune their Service Definitions and exploit new WLM functions.

## ***This class is for you...***

- If you want to perform an evaluation of *your own* WLM Service Definition and goals.
- If you started out with a skeleton or quick start policy and now want to ensure your WLM Service Definition is truly correct for your environment.
- If you are an experienced performance analyst, but want an in-depth understanding of WLM.
- If you are a novice performance analyst, or new to the field of z/OS, and need to learn about WLM to effectively do your job.
- If you want WLM performance management information and advice.
- If you want spend a week learning and improving the performance of your own installation.
- If you want the latest WLM updates

## ***Class Overview***

Understanding the basics of WLM, how WLM works and how it manages workloads is a big first step towards evaluating your WLM Service Definition and goals. So after the basics are covered, the class discusses how the z/OS and OS/390 Workload Manager actually works. You will be provided insights into the WLM algorithms and methods used by WLM to solve delays to improve response times and velocities. You will also be made aware of the often-misunderstood methods that WLM uses to manage various workloads such as CICS, IMS, WebSphere, DB2, system started tasks, SAP R/3, ADABAS, IDMS, and more. You will learn about enclaves and application environment and how these constructs are used by WLM and your workloads.

The attendee will learn how to effectively use the WLM controls of service classes and goals, including specific setup and recommendations for each of the many different workloads running on z/OS and OS/390. You will learn how to interpret WLM related measurement and during class you will analyze *your own* measurements!

Migrating to goal mode was just the first step. Over time, however, your workloads have changed or others were added; your systems change; your hardware changes. Such changes should cause you to reevaluate your WLM goals. During class you will learn a variety of methods to revisit and reevaluate your WLM Service Definition and goals. You will learn many specific recommendations targeted towards specific subsystems and workloads.



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## ***Class Participation***

***During this class you will analyze your own data and WLM Service Definition.*** Prior to class you will be requested to send Peter your WLM Service Definition and some performance data. Peter will prepare your data to help ensure your active analysis during the entire week of the class. Peter will be available for one-on-one discussions before class, during breaks, and after class. This class is a productive week of doing as well as learning.

Performance measurements, analysis, and tuning considerations are discussed throughout. A key strength of this seminar is that Peter does not just teach tuning recommendations, but why each recommendation exists. Class materials have extensive notes for later reference.

## ***Seminar Dates and Location and Prices***

For dates and locations and prices, please visit [www.epstrategies.com](http://www.epstrategies.com) for details, or call our office at 941-727-1666. Seminars are regularly offered in the USA, Europe, and Australia.

## ***Instructor***

Having worked extensively in the MVS performance measurement and tuning area, and with the MVS Workload Manager, Peter Enrico draws from his wealth of experience to help you understand WLM. Past students are always surprised and pleased with the WLM insights that Peter provides in the class. Peter is an effective instructor that will give you fresh insight to the MVS Workload Manager, and to the performance management of your workloads. In this class Peter will provide instruction in the manner in which he is known - practical information relevant to your jobs and explained clearly.

This seminar is constantly being updated with the latest IBM announcements and the latest performance tuning and management techniques.

## ***For More Information...***

For more information on this or other seminars, including prices and locations, please contact:

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Please do not hesitate to call if you would like more information or details on this seminar. Peter will be happy to talk with you.

## ***In-house***

All seminars are available for in-house instruction.



## Seminar Outline

The following is a high level outline for this seminar. Since the seminar is constantly being updated, actual seminar content and flow may vary slightly from this outline.

*Remember, throughout the class you will be actively analyzing your own WLM Service Definition and measurements.*

### **Part I: Introduction and Review of the WLM Concepts and Controls**

Don't think of this overview of WLM concepts and controls as being the same material you've been hearing from IBM, and others, for the past number of years. This overview is designed not just to level set with the basics, but also to provide you with additional information not detailed in the WLM manuals or commonly known.

- Service Definitions, Service Policies, Workloads, Service Classes, and Service Class Periods
- Goals – Response Time goals, Discretionary goals, Velocity goals, System goals
- Report classes – heterogeneous and homogeneous
- Classification rules
- Report classes
- Resource Groups
- Special protections for critical workloads
- Miscellaneous topics
- WLM update

### **Part II: Understanding How Workload Manager Works**

A big step towards evaluating your WLM Service Definition and goals is gaining an understanding of how WLM works. This section of the seminar does this to allow you to better evaluate and tune your WLM Service Definition and goals.

- Workload Manager algorithm basics, or – ‘How WLM works’
  - Basic terminology and concepts
    - Performance Index
    - Delays and Using indicators
    - Receivers, Donors, and Resources
    - Receiver value and Net Value
    - Plots and histories
  - Policy Adjustment and Resource Adjustment
  - Introduction to resources that WLM can manage
  - Introduction to WLM algorithms
  - The basics of WLM algorithms to solve MPL delays, CPU delays, Storage delays, I/O delays, etc..
- WLM Management of workloads
  - Understanding enclaves and application environments
  - Understanding the 5 major address space types and how each is uniquely managed by WLM
  - Understanding the 4 major transaction types and how each is uniquely managed by WLM
  - Information in this section is the foundation of goal recommendations and evaluation techniques for the different workloads (ie. CICS, IMS, TSO, STC, Batch, WebSphere, DB2, etc.)

### **Part III: Evaluating WLM Performance Measurements**

A correct understanding of WLM related measurements is needed to properly evaluate WLM goals and controls. However, many WLM measurements are not as straightforward as one might expect. This section of the class will explain the important WLM measurements, clear up common misunderstandings, and provide many new insights to measurements used to evaluate workload performance and goals.

- Understanding WLM related performance measurements
  - How to answer the basic performance monitoring questions when monitoring your workloads.
  - Understanding Address Space and Enclave oriented measurements
  - Understanding CICS and IMS transaction measurements



- Understanding the multiple lives and response times of transactions and address spaces managed by WLM
  - Understanding the components of transaction response times
  - Understanding CPU measurements for each address space, enclave, and workload type (SMF 30 and SMF 72)

### ***Part IV: Revisiting Workload Manager Goals Over Time***

This section discusses how to revisit goals over time. The techniques discussed in this section are continuously evolving and being developed. When possible, specific techniques are taught. Otherwise, high-level general concepts are discussed.

- Introduction to revisiting goals over time
- Considerations when to revisit and re-evaluate goals (and 'how' when possible)
  - Improperly set goals
  - Goals regularly being missed
  - Planning for environmental changes
  - Exploitation of new WLM functions
  - Adapting to changes to WLM and the system
  - Improperly tuned system
  - Business priorities and objectives change
  - When exploitation of non-WLM functions influence performance

### ***Part V: Effective Use of WLM Controls***

Since not all workloads are the same each workload type has specific WLM setup recommendations. This section of the class details key recommendations specific to each workload type and to your WLM setup in general.

- Effective Use of Workload Manager controls
  - General recommendations, tricks, and using miscellaneous controls
  - Approach to revisiting your WLM Service Definition settings and goals
- WLM Management of traditional workloads
  - TSO, UNIX System Services, system address spaces and started tasks, UNIX System Services
- WLM Management of CICS and IMS workloads
  - Understanding WLM CICS and IMS server management
  - Managing based on transaction goals versus region goals
- WLM Management of DB2 workloads
  - Includes DB2, DDF, Store Procedures, DB2 Query Parallelism
- WLM Management of WebSphere and IBM HTTP Web Server workloads
  - Includes WebSphere for z/OS and IBM HTTP Server
  - WLM Management of Web applications connecting into back end systems such as CICS and DB2
- WLM Management of Batch Workloads
  - Includes a discussion on WLM batch initiator management and Scheduling Environments
- WLM considerations for miscellaneous workloads and other facilities
  - IDMS, ADABAS, SAP R/3, and more
  - Intelligent resource director
  - Workload License Charges
  - More...

