

IBM White Paper

PeopleSoft and OS/390 DB2 Performance Management Using the Workload Manager

**Terry Elliott
BI/ERP Center
Foster City, CA**

**Tom Kennelly
ERP Technical Sales
Philadelphia, PA**

**Version: 1.1
April 7, 1999**



Table of Contents

TABLE OF CONTENTS	2
EDITION NOTICE (APRIL 1999)	3
SCOPE	3
TARGET AUDIENCE.....	3
ACKNOWLEDGMENTS	3
CONTRIBUTORS	3
FEEDBACK	3
COPYRIGHT 1999 IBM CORPORATION. ALL RIGHTS RESERVED.	3
TRADEMARK ACKNOWLEDGEMENTS	4
REFERENCES	4
INTRODUCTION	5
OBJECTIVES	5
NOTES ON PERFORMANCE MANAGEMENT.....	6
WORKLOAD MANAGER AND OS/390 DB2	6
INTRODUCTION	6
DDF FEATURE OF DB2 AND DATABASE ACCESS THREADS	7
DDF AND WLM WORKLOAD CLASSIFICATION.....	8
DDF SERVER THREADS AND WLM PERFORMANCE PERIODS	9
DB2 ACCOUNTING INFORMATION	11
WLM COMPATIBILITY MODE.....	11
PEOPLESOFT DB2 CONNECT “CONNECTION” TO OS/390 DB2/DDF	12
DISCLAIMER	12
2-TIER	12
3-TIER	14
SAMPLE WORKLOAD DEFINITION FOR DDF	16
PEOPLESOFT OS/390 BATCH.....	17
SUMMARY OF THE <i>IBM CUSTOMER’S</i> WLM SERVICE DEFINITION	18
APPENDIX.....	19
IBM CUSTOMER’S WLM SERVICE DEFINITION	19
<i>WLM Workload and Service Class Definitions</i>	19
<i>WLM Service Policy</i>	21
<i>WLM Classification Rules for Subsystems</i>	21
<i>WLM Report Classes</i>	23
SAMPLE RMF REPORTS.....	24
GLOSSARY	25



Edition Notice (April 1999)

This is Version: 1.0.

Scope

This document provides information on the Workload Manager (WLM) for personnel involved in the tuning of PeopleSoft and OS/390 DB2. The WLM techniques described in this document are applicable to remote database connections from PeopleSoft to the distributed data facility (DDF) feature of DB2.

Target Audience

This document is intended for systems programmers experienced in performance and tuning in an OS/390 DB2 environment.

Acknowledgments

Thanks to an *IBM Customer* for providing the Workload Manager Service Definition listed in the Appendix. Legalese prevents revealing the actual customer name in this an unclassified document.

Contributors

The authors want to thank Jim McCoy and Kathy Walsh for their contributions to this document.

Feedback

Please send feedback to: telliott@us.ibm.com.

Copyright 1999 IBM Corporation. All Rights Reserved.

Neither this documentation nor any part of it may be copied or reproduced in any form or by any means or translated into another language, without the prior consent of the IBM Corporation.

IBM makes no warranties or representations with respect to the content hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose.

IBM assumes no responsibility for any errors that may appear in this document. The information contained in this document is subject to change without any notice. IBM reserves the right to make any such changes without obligation to notify any person of such revision or changes. IBM makes no commitment to keep the information contained herein up to date.



Trademark Acknowledgements

PeopleSoft is a registered trademark of PeopleSoft, Inc.

IBM, DB2, MVS/ESA and OS/390 are registered trademarks of the International Business Machines Corporation.

Tuxedo is a registered trademark of Novell, Inc., exclusively licensed to BEA Systems, Inc.

BEA Tuxedo is a trademark of BEA Systems, Inc.

References

1. OS/390 V2R5 MVS Planning: Workload Management – GC28-1761
2. OS/390 V2R5 MVS Workload Management Services – GC28-1773
3. OS/390 V2R5 MVS Initialization and Tuning Guide – SC28-1751
4. OS/390 V2R5 MVS Initialization and Tuning Reference – SC28-1752
5. DB2 for OS/390 V5 Administration Guide – SC26-8957
6. <http://www.s390.ibm.com/wlm/>



Introduction

Many customers are very sophisticated in the usage of the Workload Manager (WLM) with current OS/390 workloads. When these customers begin using PeopleSoft it adds a distributed database component to be managed as part of the OS/390 workload. The distributed data facility (DDF) feature of DB2 provides capabilities that allow WLM to manage the distributed database workload with methods similar to those that are already in place.

Objectives

This paper describes ways to use the MVS Workload Manager (WLM) to do performance management in a PeopleSoft OS/390 DB2 environment. WLM provides performance management by matching resources to work according to business goals. In addition WLM provides input for RMF resource usage reports. The discussion throughout this document is about ways that WLM can classify a workload for servicing and reporting that is introduced into an OS/390 DB2 system through the distributed data facility (DDF) feature of DB2. As an example, consider three users with DB2 authorization ids of *boss*, *super* and *worker*, executing OS/390 DB2 SQL remotely from their workstations. If the workstations have database connectivity with DB2 Connect to DDF then WLM can be used to manage the three users work. A WLM average response time performance goal of 1 second, 2 seconds and 5 seconds, respectively, could be assigned to the users. In the event insufficient resources are available for WLM to meet all three goals, an importance of high, medium and low could be assigned to the three goals and WLM would manage to meeting the goal that has been assigned the highest importance over the other goals. For reporting purposes all three could be aggregated together into a single WLM report class. As an alternative all three could have been given an average response time goal of 2 seconds but separate report classes could have been specified and RMF could report the resource usage of each. A discussion of the details of using service and report classes with WLM to manage a PeopleSoft workload in an OS/390 DB2 environment is contained in the remainder of this document.



Notes on Performance Management

A trade-off is always made between optimal application design and the minimum CPU resource required to put the application into production with the exception possibly of the most trivial of applications. This is particularly true of applications that execute complex SQL. This comment is here to make sure that the reader understands that WLM won't make up for either 1) poorly written SQL or 2) inefficient access path selection by DB2. However, WLM may make it easier to identify applications that contain poorly written SQL or are using inefficient DB2 access paths. Performance management as used in this document is managing to meet today's Service Level Agreements and Performance Objectives.

Workload Manager and OS/390 DB2

Introduction

This section summarizes some of the details of using the WLM for Performance Management of a DDF DB2 Workload. Complete details can be found in the OS/390 V2R5 MVS Planning: Workload Management Manual and the Performance Monitoring and Tuning Section of the DB2 for OS/390 V5 Administration Guide.

If there are any "brains" in MVS then they must be in the System Resources Manager (SRM) Component. The details of SRM are in Chapter 3.0 of the OS/390 V2R5 MVS Initialization and Tuning Guide. SRM has a very complex interface that requires you to translate your business objectives about what work needs to be done into the extremely technical terms of SRM. WLM was "invented" so that short of being a highly skilled MVS Systems Programmer one could successfully communicate business objectives to MVS. As an example, the business objective of having 95% of CICS transactions beginning with the characters "ABC" complete in 2 seconds could be implemented by running the CICS transactions "ABC*" in a WLM service class that has been defined with a response time (2 seconds) with percentile (95) performance goal. There are more details with WLM to be sure but the implementation with SRM is much more complicated as can be seen by reviewing the SRM reference above.

There are WLM functions for DB2 that apply to parallel queries and stored procedures but only those functions applicable to DDF are covered in this document.



DDF feature of DB2 and Database Access Threads

DB2 DDF takes advantage of a new function in MVS/ESA SP 5.2 and later releases called Enclaves. Enclaves enable MVS to manage and report on DDF transactions by providing the DDF transactions an anchor to which they can be managed. This can be thought of as being similar to the way an address space is an anchor for other types of transactions such as TSO or batch. These enclaves allow the DDF transactions to be managed separately from the DDF address space and also managed separately from one another. Enclaves allow WLM to manage individual DDF transactions by allowing DDF threads to be assigned to service classes. DDF transactions of differing characteristics can now be associated with different workload manager goals. Deciding what goals to assign to enclaves for DDF transactions will be very dependent on what type of DDF work is being processed.

A database access thread (DBAT) or DDF Server Thread is created when a SQL request is received from PeopleSoft. These DDF Server Threads are enclave SRBs and this is the underlying detail of using WLM to do performance management of a PeopleSoft workload.



DDF and WLM Workload Classification

To WLM, remote SQL requests to DDF/DB2 are a demand for service. These remote SQL requests to DDF/DB2 and other MVS work is divided into workloads using WLM. Within a workload, work with similar performance characteristics is grouped into service classes. You create a service class for a group of work with similar:

- Performance goals
- Resource requirements
- Business importance to the installation.

WLM manages a service class as a single entity when allocating resources to meet performance goals. A service class has a performance goal that is specified as one of the following: average response time, response time with percentile, velocity and discretionary. The name of the goal with the exception of velocity, possibly, gives an indication of its meaning. Velocity is roughly the ratio of time consuming resources to the sum of the time consuming resources and time waiting but ready to consume resources. An importance level can also be assigned to the performance goal. Importance indicates how vital it is that the performance goal be met relative to other performance goals. Because some work has variable resource requirements, WLM provides performance periods where you specify a series of varying goals and importance's within a service class. By using multiple performance periods within a service class, you can favor short-running units of work that use fewer resources while giving fewer resources over time to long running units of work.

WLM classification rules are the rules to define work to run in a particular service class and optionally a report class. A work qualifier is what identifies a work request to the system.

WLM work qualifiers for DDF server threads are the following:

1. AI Accounting information.
2. CI The DB2 correlation ID of the DDF server thread.
3. CN The DB2 collection name of the first SQL package accessed.
4. LU The VTAM LUNAME of the system that issued the SQL request.
5. NET The VTAM NETID of the system that issued the SQL request.
6. PK The name of the first DB2 package accessed by the DRDA requester.
7. PN The DB2 plan name associated with the DDF server thread.
8. PRC Stored procedure name.
9. SI Subsystem instance. The DB2 server's MVS subsystem name.
10. UI User ID. The DDF server thread's primary authorization ID.



DDF Server Threads and WLM Performance Periods

A database access thread (DBAT) or DDF server thread that does not hold any cursors or database resources (such as storage) is known as an inactive thread. To allow a thread to become inactive (what might be called a 'sometimes active' thread), the following conditions must be true: the DDF THREADS field of the DB2 installation panel DSNTIPR must contain INACTIVE. The ZPARM is CMTSTAT. The package being run must have been bound with RELEASE (COMMIT) as an option. There must be no open cursors defined WITH HOLD. When these conditions are met, the DDF server thread can become inactive when a COMMIT is issued. PeopleSoft commits frequently for both 2-Tier and 3-Tier even with the DB2 Connect parameter, AUTOCOMMIT=0, thus the threads do become inactive. A ROLLBACK makes a thread become inactive even if there are open cursors defined WITH HOLD because ROLLBACK closes all cursors. Each time a thread becomes inactive, WLM resets the information it maintains on that thread. The next time that thread is activated, WLM begins managing to the goal you have set for the first or only performance period in that service class.



Lets look at a simple approach to workload management with a PeopleSoft workload. Suppose the only criteria you have is that the performance goal becomes less stringent as the work consumes more CPU resource. A HR query about benefits will execute quickly and consume a minimum amount of CPU resource. On the other hand a PSnVision report will run a long time and will consume a large amount of CPU resource. A WLM set up that allows for multiple performance periods based upon resource consumption follows:

Example:

DDF/PeopleSoft Workload definition with one Service Class

Service Class Definition with 2 Performance Periods

Period 1 – importance = high, duration = 1 second,
goal=average response of 2 seconds

Period 2 – importance = medium, goal=velocity of 50

The HR query begins in performance period 1 and completes meeting the performance goal before the period duration resource is consumed. The PSnVision report also begins in performance period 1 but will not be complete with the consumption of 1 CPU second. After it consumes 1 CPU second it will run to completion in performance period 2 which has a less stringent performance objective. Since performance period 2 has a lower importance than performance period 1, WLM will manage to meet the goal in period 1 if there are insufficient resources to meet the performance goals of both periods. The duration for a service class performance period is actually specified in services units but the explanation here is easier using CPU seconds.

An important consideration for applications accessing database systems is concurrency. DB2 uses Locks to control concurrent access to data by multiple requestors. In PeopleSoft and in other DB2 applications –911 SQL codes result because of timeouts where another requestor holds a needed Lock. Care has to be exercised and the overall application must be considered before using workload groupings for service classes and performance periods. The immediate reaction may be to assign long running queries to service class performance period with goals of lessor importance. If these long running queries are holding lots of Locks needed by the work assigned the goals of greater importance then this work will spend all its time trying to recover from timeouts caused by waits on Locks and no real work will ever get done!

The example shown above uses integer values to simplify the discussion. In reality PeopleSoft period 1 requires a much lower first period response time.



DB2 Accounting Information

For these 'inactive threads' there is a DB2 accounting record (IFCID 003) written at each COMMIT. PeopleTools 7.54 takes advantage of the enhanced DDF Client/Server Monitoring introduced by DB2 V5 APAR PQ07043 and DB2 Connect 5.2. In both 2-Tier and 3-Tier connections the client OPRID and workstation name are passed to DB2. The workstation name is the NT environment variable COMPUTERNAME. Also for 2-Tier the executable name is passed and for 3-Tier the Domain name is passed to DDF. This information is stored as part of the DB2 correlation header. See DB2 mapping macro DSNDQWHC and fields QWHCEUID, QWHCEUTX and QWHCEUWN.

WLM Compatibility Mode

In compatibility mode, threads are given a service class by the classification rules in the active WLM service policy. The MVS ICS maps service classes (SRVCLASS) to a performance group number (PGN), which determines the performance group of the enclave. When WLM operates in compatibility mode, take the following actions to establish performance objectives for DDF threads:

1. Define a WLM policy with service classes and classification rules for subsystem DDF. Also define a default service class to DDF transactions because enclaves with no service class are associated to the performance group (PGN) of the DDF address space. While in compatibility mode the goals are not used but the classification is performed.
2. Install the policy in the WLM couple data set (CDS).
3. Define MVS performance groups (PGNs) for DDF threads in the IPS PARMLIB member.
4. Create MVS ICS PARMLIB definitions to map the service classes assigned in the workload manager classification rules to the corresponding performance groups, using SUBSYS=DDF and the SRVCLASS keyword. The subsystem default performance group for SUBSYS=DDF is ignored.
5. Activate the updated parmlib members (SET IPS=xx, ICS=yy).

Each of the PGN values in the MVS ICS must be defined in the IPS PARMLIB member. The PGN definition can include information on the performance period, which is used by SRM to change the performance objective of a DDF thread based on the amount of processor resource the DDF thread consumes. See the section, Special Considerations for Subsystems Using Enclaves, in the OS/390 V2R5 MVS Initialization and Tuning Guide for additional details for running with WLM compatibility mode.



PeopleSoft DB2 Connect “Connection” to OS/390 DB2/DDF

The discussion on WLM that follows applies when DB2 Connect is the database connectivity software from either the PeopleSoft client workstation in 2-Tier or from the PeopleSoft Application Server (Tuxedo) in 3-Tier to the OS/390 DB2 Server. The discussion also assumes PeopleSoft 7.0x or 7.5x.

Disclaimer

An installation may choose to lower the importance of a query the longer it runs, and set response time objectives for short DDF transactions that do not consume over a certain amount of service. This allows an installation to manage online DDF OLTP like transactions together with long running batch-oriented query and reporting transactions. These two types of transactions can be managed separately from the DDF address space and they can also be managed separately from one another. Determining the duration to set to DDF transaction service class periods will involve trial and error. Installations have been able to figure out over time how to set durations for TSO periods to get '80% complete in period 1' through trial and error. A similar sort of discovery will have to be done for DDF transactions. These duration values will vary from installation to installation depending on whether the DDF transactions are small or large, and how critical they are in terms of the installation's business objectives.

The discussion that follows on 2-Tier and 3-Tier workloads is meant to illustrate the use of various features of WLM and is not meant to be a recommendation of specific WLM parameters for a PeopleSoft workload.

2-Tier

In a PeopleSoft 2-Tier environment the client and the database server are the primary components. The PeopleSoft 2-Tier environment sends SQL requests from the client workstation to the OS/390 DB2 server. The database connectivity, DB2 Connect, in the 2-Tier environment uses the executable name as the DB2 correlation id (CI). The IBM Customer's WLM service definition in the appendix uses wild carding “*” with the CI or executable name for the DDF work qualifiers

*Workload PSOFTDDF - PeopleSoft DDF Transactions

1 service class is defined in this workload.

* Service Class PSOFTDDF - PeopleSoft DDF

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 60



* Workload PSOFTSQR - PeopleSoft SQR Processing

1 service class with 5 performance periods is defined in this workload.

* Service Class PSOFTSQR - PeopleSoft SQR Processing

Base goal:

#	Duration	Imp	Goal description
1	2000	4	Execution velocity of 40
2	4000	4	Execution velocity of 30
3	20000	5	Execution velocity of 20
4	50000	5	Execution velocity of 10
5		5	Execution velocity of 5

* Subsystem Type DDF - Distributed Data Facility work

Classification:

Default service class is DB2

Default report class is PSOFTDDF

#	type	Qualifier name	Starting position	Service Class	Report Class
1	SI	DB2A		PSOFT	PSOFT
2	CI	PSQE*		PSOFTSQR	DB2AQRY
2	CI	PSNV*		PSOFTSQR	DB2ANVS
2	CI	PST*		PSOFTDDF	DB2A2TR
2	CI	PSS*		PSOFTDDF	DB2A2TR
2	CI	SQR*		PSOFTSQR	DB2ASQR
2	CI	psqe*		PSOFTSQR	DB2AQRY
2	CI	psnv*		PSOFTSQR	DB2ANVS
2	CI	pst*		PSOFTDDF	DB2A2TR
2	CI	pss*		PSOFTDDF	DB2A2TR
2	CI	sqr*		PSOFTSQR	DB2ASQR
2	CI	*			DDFDFLT

As usual the disclaimer applies to the example above. However, two points about the subsystem classification: WLM searches the list from the top to bottom so put the heaviest used transactions at the top of the list. The qualifier, “*”, with the report class DDFDFLT can be monitored and any work that appears in it can be reclassified as appropriate.

The PeopleSoft Access ID is the user id (UI) DDF work qualifier from above. Access ID’s could be used to categorize work in a 2-Tier environment if multiple or unique Access Ids are used in the 2-Tier environment. A combination of CIs and UIs could be used as well. More details are presented below in the 3-Tier environment.



3-Tier

In a PeopleSoft 3-Tier environment the Application Server is an additional component and is built upon Tuxedo, a message based middle-ware product. The Application Server has several server processes each with a database connection to the OS/390 DB2 server. The server processes with database connectivity are:

- PeopleSoft Tuxedo authentication(PSAUTH)
- PeopleSoft Application Server Manager(PSAPPSRV)
- PeopleSoft Quick Server Manager(PSQCKSRV)
- PeopleSoft Message Agent Server Manager(PSAPISRV)
- PeopleSoft SQL Access(PSSAMSRV)
- PeopleSoft Query Server Manager(PSQRYSRV)

PSQRYSRV is new with PeopleTools 7.54 and will also be in PT7.05 that is planned for May of this year. When the database connectivity is DB2 Connect to DB2/DDF each connection is made using the server process name as a DB2 correlation id (CI). As discussed earlier the CI can be used to qualify DDF work. The IBM Customer's Service Definition in the appendix uses the server process names, PSAPPSRV, PSQCKSRV, PSAUTH, PSSAMSRV as workload qualifiers to direct the work from each server process to a service class that has been defined with the same name. The example below is a few lines from the complete WLM service definition in the Appendix. It is here to show the WLM definitions to get DDF work qualified by a CI into a service class for processing. The example is from a WLM print out of the service definition. See the section, Using the WLM ISPF Application, in the OS/390 V2R5 MVS Planning: Workload Management manual to see details.

* Workload PSAPPSRV - PeopleSoft 3-Tier APP Server

1 service class is defined in this workload.

* Service Class PSAPPSRV - PeopleSoft 3-Tier APP Server

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 70

* Subsystem Type DDF - Distributed Data Facility work

Classification:

Default service class is DB2

Default report class is PSOFTDDF

Qualifier #	Qualifier type	Qualifier name	Starting position	Service Class	Report Class
1	SI	DB2A		PSOFT	PSOFT
2	CI	PSAPPSRV		PSAPPSRV	DB2A3TR



This example has a single performance period. As noted before multiple periods can be specified in a service class for work that has variable resource requirements and for which the performance goals change as the work uses more resources. The service class could have been defined with up to eight performance periods. The example here has 2 performance periods. A service class performance period except for the last one must have duration in service units specified.

* Service Class PSAPPSRV - PeopleSoft 3-Tier APP Server

Base goal:

#	Duration	Imp	Goal description
1	5000	2	Execution velocity of 70
2		4	Execution velocity of 50

In this partial example the DB2 Primary Authorization ID is used as another qualifier for a PeopleSoft workload. This example would be applicable where there are 2 domains with Access Ids of ACCESS_1 and ACCESS_2. The HR and Financial workload could be split between the 2 domains and then each serviced by a different service class as suggested in the example below.

* Subsystem Type DDF - Distributed Data Facility work

Classification:

Default service class is DB2

Default report class is PSOFTDDF

Qualifier #	Qualifier type	Qualifier name	Starting position	Service Class	Report Class
1	SI	DB2A		PSOFT	PSOFT
2	CI	PSAPPSRV		PSAPPSRV	DB2A3TR
3	UI	ACCESS_1		PSAPPHR	DB2HR
3	UI	ACCESS_2		PSAPPFI	DB2A3TR

As usual the disclaimer applies to the example above. These examples are only intended to suggest ways to use WLM to manage a PeopleSoft workload. The user needs to understand the workload, the business objectives associated with the workload and how to use WLM. Then the user needs to monitor with RMF and other monitoring tools and make adjustments as necessary.



Sample Workload Definition for DDF

Without any input on the workload or business objectives this sample is a suggestion for getting started with WLM and a PeopleSoft workload. It is unlikely an installation will have hundreds of different business goals. Therefore, if service classes are defined only as needed by different types of work, this will allow the definitions to MVS to be simple. Besides the argument for simplicity, there is a good technical reason to keep the number of service classes down. WLM is deciding how to allocate system resources based on sampling. As more work is combined into a service class, there are more entities contributing samples. So there is no need to go far back into time to obtain a statistically significant set of samples. This means WLM can make better decisions more quickly, and therefore be more responsive, rather than depending on sampled data from several minutes ago. Recalling the disclaimer above and noting the keep it simple philosophy here the suggested starting point is a single workload definition for DDF that contains only 1 or 2 service classes with each service class having 1 or 2 performance periods. Since workload characterization is a very important issue, report classes will be used to provide reporting within the service classes. Finally a naming convention should be adopted when implementing WLM. The name should be meaningful and perhaps indicate whether it is the name for a workload, service class or report class.

* Workload DDF - PeopleSoft

2 service classes are defined in this workload.

* Service Class PS3_Tier - PeopleSoft 3-Tier

Base goal:

#	Duration	Imp	Goal description
1	5000	2	85% complete within 00:00:00.300
2		3	Execution velocity of 30

* Service Class PS2_Tier - PeopleSoft 2-Tier

Base goal:

#	Duration	Imp	Goal description
1	5000	3	85% complete within 00:00:00.300
2		4	Execution velocity of 20



* Subsystem Type DDF - Distributed Data Facility work

Classification:

Default service class is DB2

Default report class is PSOFTDDF

Qualifier # type	Qualifier name	Starting position	Service Class	Report Class
1 SI	DB2			PSOFT3TR
2 CI	PSAUTH		PS3_Tier	PSAUT3TR
2 CI	PSAPPSRV		PS3_Tier	PSAPP3TR
2 CI	PSQCKSRV		PS3_Tier	PSQCK3TR
2 CI	PSSAMSRV		PS3_Tier	PSSAM3TR
2 CI	PSAPISRV		PS3_Tier	PSAPI3TR
2 CI	PSQRYSRV		PS3_Tier	PSQRY3TR
2 CI	PSQE*		PS2_Tier	PSQE
2 CI	PSNV*		PS2_Tier	PSNV
2 CI	PST*		PS2_Tier	PST
2 CI	PSS*		PS2_Tier	PSS
2 CI	SQR*		PS2_Tier	SQR
2 CI	psqe*		PS2_Tier	PSQE
2 CI	psnv*		PS2_Tier	PSNV
2 CI	pst*		PS2_Tier	PST
2 CI	pss*		PS2_Tier	PSS
2 CI	sqr*		PS2_Tier	SQR
2 CI	*			DEFAULT

As usual the disclaimer applies to the example above. These examples are only intended to suggest ways to use WLM to manage a PeopleSoft workload. The user needs to understand the workload, the business objectives associated with the workload and how to use WLM. Then the user needs to monitor with RMF and other monitoring tools and make adjustments as necessary.

PeopleSoft OS/390 Batch

The COBOL, SQR and Application Engine (AE) batch jobs whether submitted through the PeopleSoft Process Scheduler or some other way are MVS batch jobs. The service class can be assigned based on WLM rules which include attributes such as Job Class, Job Name, Job Priority, Userid, Job Accounting Information, and PERFORM= specification on the JOB statement. The attributes apply to both JES2 and JES3 except for Priority, which applies to JES2 only. See the OS/390 V2R5 MVS Planning: Workload Management manual for details.



Summary of the *IBM Customer's* WLM Service Definition

Specifically for the PeopleSoft workload, the *IBM Customer* has defined services classes for 3-Tier PSxxxSRV (xxx = app,sam,api,qck) and PSAUTH and a single report class, DB3x3TR (x =a,b,c for DB2 Subsystem), for 3-Tier. For 2-Tier they have defined service class PSOFTSQR with qualifiers PSQE*, PSNV* and SQR* (these are executables for psQuery, nVision and SQR and each has separate reporting class) and a second service class PSOFTDDF with qualifiers PST* and PSS* and these are grouped into a single reporting class. Beside servicing the workload as described above they can report CPU consumption on 3-Tier (online production), on psQuery, on nVision, on SQR and on other 2-Tier work



Appendix

IBM Customer's WLM Service Definition

This service definition has been edited to only show those parts that are applicable to the PeopleSoft workload.

* Service Definition

15 workloads, with 25 service classes
 0 resource groups
 1 service policy
 3 classification groups
 9 subsystem types
 58 report classes
 0 application environments

CPU coefficient of 1.0
 IOC coefficient of 0.5
 MSO coefficient of 0.0000
 SRB coefficient of 1.0

WLM Workload and Service Class Definitions

.
.
.

* Workload PSAPPSRV - PeopleSoft 3-Tier APP Server

1 service class is defined in this workload.

* Service Class PSAPPSRV - PeopleSoft 3-Tier APP Server

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 70

* Workload PSAUTH - PeopleSoft 3-Tier Auth Server

1 service class is defined in this workload.

* Service Class PSAUTH - PeopleSoft 3-Tier AUTH Server

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 80



* Workload PSOFT - PeopleSoft DB2 Workload

1 service class is defined in this workload.

* Service Class PSOFT - PeopleSoft Databases

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 75

* Workload PSOFTDDF - PeopleSoft DDF Transactions

1 service class is defined in this workload.

* Service Class PSOFTDDF - PeopleSoft DDF

Base goal:

#	Duration	Imp	Goal description
1		3	Execution velocity of 60

* Workload PSOFTSQR - PeopleSoft SQR Processing

1 service class is defined in this workload.

* Service Class PSOFTSQR - PeopleSoft SQR Processing

Base goal:

#	Duration	Imp	Goal description
1	2000	4	Execution velocity of 40
2	4000	4	Execution velocity of 30
3	20000	5	Execution velocity of 20
4	50000	5	Execution velocity of 10
5		5	Execution velocity of 5

* Workload PSQCKSRV - PeopleSoft 3-Tier Quick Server

1 service class is defined in this workload.

* Service Class PSQCKSRV - PeopleSoft 3-Tier Quick Server

Base goal:

#	Duration	Imp	Goal description
1		2	Execution velocity of 80

* Workload PSSAMSRV - PeopleSoft 3-Tier SAM Server

1 service class is defined in this workload.

* Service Class PSSAMSRV - PeopleSoft 3-Tier SAM Server

Base goal:

#	Duration	Imp	Goal description
1		3	Execution velocity of 60
		.	
		.	
		.	



WLM Service Policy

* Service Policy

Since there is only one service policy the workload and service classes are not repeated here as they normally would be in an ISPF Print of the WLM Service Definition.

WLM Classification Rules for Subsystems

.
.
.

* Subsystem Type DDF - Distributed Data Facility work

Classification:

Default service class is DB2

Default report class is PSOFTDDF

Qualifier # type	Qualifier name	Starting position	Service Class	Report Class
1 SI	DB2A		PSOFT	PSOFT
2 CI	PSAPPSRV		PSAPPSRV	DB2A3TR
2 CI	PSQCKSRV		PSQCKSRV	DB2A3TR
2 CI	PSSAMSRV		PSSAMSRV	DB2A3TR
2 CI	PSAUTH		PSAUTH	DB2A3TR
2 CI	PSQE*		PSOFTSQR	DB2AQR Y
2 CI	PSNV*		PSOFTSQR	DB2ANVS
2 CI	PST*		PSOFTDDF	DB2A2TR
2 CI	PSS*		PSOFTDDF	DB2A2TR
2 CI	SQR*		PSOFTSQR	DB2ASQR
2 CI	psqe*		PSOFTSQR	DB2AQR Y
2 CI	psnv*		PSOFTSQR	DB2ANVS
2 CI	pst*		PSOFTDDF	DB2A2TR
2 CI	pss*		PSOFTDDF	DB2A2TR
2 CI	sqr*		PSOFTSQR	DB2ASQR
2 CI	*		PSOFTSQR	DB2ADDF
1 SI	DB2B		PSOFT	PSOFT
2 CI	PSAPPSRV		PSAPPSRV	DB2B3TR
2 CI	PSQCKSRV		PSQCKSRV	DB2B3TR
2 CI	PSSAMSRV		PSSAMSRV	DB2B3TR
2 CI	PSAUTH		PSAUTH	DB2B3TR
2 CI	PSQE*		PSOFTSQR	DB2BQR Y
2 CI	PSNV*		PSOFTSQR	DB2BNVS
2 CI	PST*		PSOFTDDF	DB2B2TR
2 CI	PSS*		PSOFTDDF	DB2B2TR
2 CI	SQR*		PSOFTSQR	DB2BSQR
2 CI	psqe*		PSOFTSQR	DB2BQR Y
2 CI	psnv*		PSOFTSQR	DB2BNVS
2 CI	pst*		PSOFTDDF	DB2B2TR
2 CI	pss*		PSOFTDDF	DB2B2TR
2 CI	sqr*		PSOFTSQR	DB2BSQR
2 CI	*		PSOFTSQR	DB2BDDF
1 SI	DB2C		PSOFT	PSOFT
2 CI	PSAPPSRV		PSAPPSRV	DB2C3TR



2	CI	PSQCKSRV	PSQCKSRV	DB2C3TR
2	CI	PSSAMSRV	PSSAMSRV	DB2C3TR
2	CI	PSAUTH	PSAUTH	DB2C3TR
2	CI	PSQE*	PSOFTSQR	DB2CQRY
2	CI	PSNV*	PSOFTSQR	DB2CNVS
2	CI	PST*	PSOFTDDF	DB2C2TR
2	CI	PSS*	PSOFTDDF	DB2C2TR
2	CI	SQR*	PSOFTSQR	DB2CSQR
2	CI	psqe*	PSOFTSQR	DB2CQRY
2	CI	psnv*	PSOFTSQR	DB2CNVS
2	CI	pst*	PSOFTDDF	DB2C2TR
2	CI	pss*	PSOFTDDF	DB2C2TR
2	CI	sqr*	PSOFTSQR	DB2CSQR
2	CI	*	PSOFTSQR	DB2CDDF

.
.
.



WLM Report Classes

```
.  
. .  
. .  
* Report Class DB2ADDF - DB2A Peoplesoft Unclassified  
* Report Class DB2ANVS - DB2A PeopleSoft N-vision  
* Report Class DB2AQR Y - DB2A Peoplesoft QUERY Threads  
* Report Class DB2ASQR - DB2A Peoplesoft SQRW Threads  
* Report Class DB2A2TR - DB2A Peoplesoft 2-Tier Threads  
* Report Class DB2A3TR - DB2A Peoplesoft 3-Tier Threads  
* Report Class DB2BDDF - DB2B Peoplesoft Unclassified  
* Report Class DB2BNVS - DB2B PeopleSoft N-vision  
* Report Class DB2BQR Y- DB2b Peoplesoft QUERY Threads  
* Report Class DB2BSQR - DB2B Peoplesoft SQRW Threads  
* Report Class DB2B2TR - DB2B Peoplesoft 2-Tier Threads  
* Report Class DB2B3TR - DB2B Peoplesoft 3-Tier Threads  
* Report Class DB2CDDF - DB2C Peoplesoft Unclassified  
* Report Class DB2CNVS - DB2C PeopleSoft N-vision  
* Report Class DB2CQR Y - DB2c Peoplesoft QUERY Threads  
* Report Class DB2CSQR - DB2C Peoplesoft SQRW Threads  
* Report Class DB2C2TR - DB2C Peoplesoft 2-Tier Threads  
* Report Class DB2C3TR - DB2C Peoplesoft 3-Tier Threads  
* Report Class PSAPPSRV - PeopleSoft 3-Tier APP Server  
* Report Class PSAUTH - PeopleSoft 3-Tier Quick Server  
* Report Class PSOFT - PeopleSoft DB2 Workload  
* Report Class PSOFTDDF - PeopleSoft DDF Workload  
* Report Class PSOFTSQR - PeopleSoft SQR Processing  
* Report Class PSQCKSRV - PeopleSoft 3-Tier Quick Server  
.  
.  
.  
***** End Of Service Definition *****
```




Glossary

active service policy. The service policy that determines workload management processing if the system is running in goal mode. See goal mode.

classification rules. The rules workload management and subsystems use to assign a service class and, optionally, a report class to a work request. A classification rule consists of one or more of work qualifiers such as subsystem type, subsystem instance, userid, accounting information, transaction name, transaction class, source LU, netid, and LU name.

compatibility mode. A mode of processing, in which the IEAIPSxx and IEAICSxx parmlib members determine system resource management. See also goal mode.

distributed data facility (DDF). An optional feature that allows a DB2 application to access data at other DB2s and at remote relational database systems that support IBM's Distributed Relational Database Architecture (DRDA).

duration. The length of a service class performance period in service units.

enclave. A transaction that can span multiple dispatchable units (SRBs and tasks) in one or more address spaces and is reported on and managed as a unit.

execution velocity. A service goal naming the rate at which you expect work to be processed for a given service class or a measure of the acceptable processor and storage delays while work is running.

goal mode. A mode of processing where the active service policy determines system resource management. See also compatibility mode.

importance level. The degree of importance of a service goal relative to other service class goals, in five levels: lowest, low, medium, high, highest.

performance management. The process workload management uses to decide how to match resources to work according to performance goals and processing capacity.

performance period. A service goal and importance level assigned to a service class for a specific duration. You define performance periods for work that has changing performance requirements as work consumes resources.

report class. A group of work for which reporting information is collected separately. For example, you can have a report class for information combining two different service classes, or a report class for information on a single transaction.

service class. A group of work which has the same performance goals, resource requirements, or business importance. For workload management, you assign a service goal and optionally a resource group to a service class.

service definition. A definition of the workloads and classification rules in an installation. The definition includes workloads, service classes, systems, resource groups, service policies, and classification rules.



service policy. A named set of performance goals workload management uses as a guideline to match resources to work. See also active service policy.

service unit. The amount of service consumed by a work request as calculated by service definition coefficients and CPU, SRB, I/O, and storage service units.

velocity. A service goal naming the rate at which you expect work to be processed for a given service class or a measure of the acceptable processor and storage delays while work is running.

workload. A group of work to be tracked, managed and reported as a unit. Also, a group of service classes.

workload management mode. The mode in which workload management manages system resources on an MVS image. The mode can be either compatibility mode, or goal mode.

work qualifier. An attribute of incoming work. Work qualifiers include: subsystem type, subsystem instance, userid, accounting information, transaction name, transaction class, source LU, netid, and LU name.