

# CICS, the z/OS Workload Manager and Performance

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## Presentation Overview

- z/OS Workload Manager – CICSplex SM WLM
- z/OS Workload Manager ...
  - Terms and Definitions, Goal Types, ...
  - Goal Importance, Measuring Goals, ...
- Enterprise Workload Manager (EWLM) Overview
- CICS and the z/OS Workload Manager
  - Working Together, Myths and Realities, ...
- CICS Tuning Parameters and z/OS WLM
- Monitoring and Performance Reporting
- Enterprise Workload Manager Control Center
- Summary

## z/OS Workload Manager – CICSplex SM WLM

- z/OS Workload Manager
  - Provides goal-oriented system resource management
    - WLM monitors the actual service versus the goal
    - System Resource Manager (SRM) manages the system resources to achieve the goals
  - Uses real time data to achieve the workload goal(s)
- CICSplex SM Workload Manager
  - CICS Workload Balancing
    - Determine which CICS region to run a transaction
  - CICS Workload Separation
  - Transaction Affinities
  - Abend avoidance, Health checking - MXT, SOS, ...

## z/OS WLM - Terms and Definitions

- **Service Definition**
  - Explicit definition of all the workloads and processing capacity in a Sysplex
    - Includes service policies, workloads, service classes, resource groups, and classification rules
  - Managed via the WLM ISPF Application
    - Service Definition stored in WLM Couple data set
- **Service Policy**
  - Set of performance goals for z/OS images using z/OS WLM
  - One ACTIVE service policy for an z/OS Sysplex
    - Switch between policies during different periods
  - z/OS V1R3 provides an Install Definition Utility ...
    - Install and activate new or changed service definition
    - Run as a batch job or a started task

## z/OS WLM - Terms and Definitions ...

- **Service Class**
  - Subset of a workload having the same service goals
    - Performance objectives, resource or availability requirements
  - A service goal is assigned to a service class
- **Report Class**
  - Work for which reporting information is to be collected separately
  - Possible to combine information from different service classes or even a single transaction

## z/OS WLM - Terms and Definitions ...

- **Goal**
  - Performance target for a workload -- For CICS ...
    - the goal is target percentile or average response time
- **Classification**
  - Categorize the work (transaction) into a service class
  - For the CICS subsystem, valid qualifiers are ...
    - SI - subsystem (applid) or SIG - subsystem group
    - UI - userid or UIG - userid group
    - TN - transaction or TNG - transaction group
    - LU - LU name or LUG - LU name group
    - PX - Sysplex name (New in OS/390 R10)

## z/OS WLM - Terms and Definitions ...

- **'Goal Mode'**
  - WLM and System Resource Manager (SRM) will dynamically balance the system resources according to the active service policy
  - z/OS V1R3, and higher, runs only in goal mode!
- **Performance Block --- z/OS WLM Control Block**
  - Communicates transaction state data to the z/OS WLM
  - Assists SRM in determining the service class topology
    - Which address spaces are servicing which service class
  - Not used in WLM/SRM decision making ...
    - Service Class Topology and Reporting purposes only!

## z/OS WLM - Terms and Definitions - Goal Types

- **Response Time**
  - Percentile Response Time
    - Response time target for percent of completions
  - Average Response Time
    - Average response time of ended transactions
- **Velocity**
  - Percentage of when the work wants to run, it is able to
    - Run with an acceptable level of delay
- **Discretionary**
  - Run the work when there are resources left to do so

## Goal Importance and Measuring Goals

### Setting Goal Importance

- **"Importance" of meeting a goal**
  - Relative value --- 1 (very important) to 5 (readily sacrificed)
  - Attempt to satisfy '1' goals before '2's, etc ...
  - Allows WLM to protect critical work and react to changing capacity

### Measuring Goals

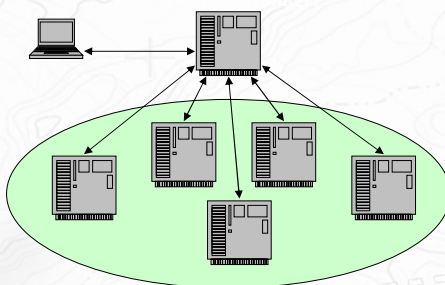
- **Performance Index**
  - Used to easily compare the different goal types
  - A calculated value that reflects how well the work in a service class is meeting it's goal ...
    - PI = 1 --- exactly meeting the goal
    - PI < 1 --- beating the goal
    - PI > 1 --- missing the goal

$$PI = \frac{\text{Actual}}{\text{Goal}}$$

## A high level overview of EWLM

- Enterprise Workload Manager (EWLM)
  - Provides dynamic policy-based workload management to help improve optimization of resources in multi-tiered heterogeneous application environments
  - Application Response Measurement (ARM)
- EWLM Domain Manager
  - Management focal point for each EWLM Management Domain
- EWLM Managed Server
  - Communicates between the operating system and the EWLM Domain Manager
  - Gathers resource usage and delay statistics data
- EWLM Control Center
  - Browser-based application for the EWLM administrator, analyst, and operator

## EWLM Management Domain



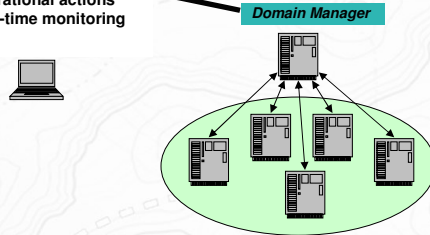
- Scope of EWLM performance management and reporting
- Set of servers communicating with a single domain manager
- Transactions classified on entry to domain
- Flexible scope ...
  - Servers supporting a business app.
  - Single tier
  - Single server to support testing

## EWLM Domain Manager

Provides a platform agnostic, global management component supporting thousands of distributed web servers, application servers, database servers, and transaction servers.

**UI**

- Topology visualization
- Drill-down
- Operational actions
- Real-time monitoring



- Coordinates policy actions across all servers in the management domain (e.g. "deploy", "activate")
- Aggregates server, application, and transaction statistics to construct the global view

## EWLM Control Center

- Browser-based application interface
- Ability to create and activate Domain Policy
- View server topology and applications
- Ability to view performance from a business perspective



## CICS and the z/OS WLM

- CICS Initialization
  - Connect to the z/OS Workload Manager (WLM)
    - EWLM=YES (CICS TS V3.2)
  - Allocate a Pool of Performance Blocks
    - Communicate transaction state data to the z/OS WLM
    - Sampled by the WLM every 250ms
  - Performance Block allocation is based on MXT
    - MXT + Maximum of (20 or (10% of MXT)) for system tasks
    - Do **NOT** over allocate MXT!
  - Performance Blocks are formatted in a CICS SDUMP
    - MN=3, XM=1
- CICS Termination (Shutdown)
  - Disconnect from the z/OS Workload Manager (WLM)

## CICS and the z/OS WLM ...

- Task Attach (initial dispatch)
  - Associate Performance Block with incoming transaction
  - Classify transaction or obtain from MRO/IPIC datastream
    - Any Incoming EWLM Correlator is passed on the Classify
  - Initialise Performance Block ...
    - Service Class token, EWLM Correlator, and Transaction state data
- Task Execution
  - CICS Dispatcher informs z/OS WLM of transaction status
    - Active, Waiting, Ready, Idle
    - Lock, Conv, I/O, Timer, Misc, Other\_product, ...
- Task Detach
  - Report or Notify the z/OS WLM of end of transaction
    - Report - signals transaction completion (Response Time)
    - Notify - signals partial transaction completion (AOR, FOR)



## CICS and the z/OS WLM – Notes ...

Whenever the state of a CICS task changes (Running, Suspended and Dispatchable) the CICS Dispatcher reflects the state change the WLM performance block for the task. A transaction can be in one of the following states:

**ACTIVE** - the task is Running, **WAITING** - the task is Suspended, **READY** - the task is Dispatchable, **IDLE** - the task is suspended (conversational transactions waiting for terminal input or suspended CICS system. The "WAITING-FOR" terms used in the workload activity report equate to the WLM\_WAIT\_TYPE on the CICS Dispatcher SUSPEND and WAIT\_MVS calls. Below is a brief description of the workload wait types used by CICS and their meaning:

- **LOCK** - Waiting on a lock. For example, waiting for:
  - A lock on a CICS resource
  - A record lock on a recoverable VSAM file or exclusive control of a record in a BDAM file
  - An application resource that has been locked by an EXEC CICS ENQ command.
- **IO** - Waiting for an I/O request or I/O related request to complete. For example:
  - File control, transient data, temporary storage, journal I/O, Waiting for I/O buffers or VSAM strings.
- **CONV** - Waiting on a conversation between work manager subsystems. For example: Waiting for a transaction routing, function shipping or distributed transaction processing (DTP) request to complete.
- **SESS\_LOCALMVS** - Waiting on the establishment of a session with another CICS region in the same z/OS image in the sysplex. e.g. MRO XM or IRC.
- **SESS\_NETWORK** - Waiting on the establishment of a session with another CICS region (which may, or may not, be in the same z/OS image). e.g. ISC LU6.2 or LU6.1.
- **SESS\_SYSPLEX** - Waiting on the establishment of a session with another CICS region in a different z/OS image in the sysplex. e.g. MRO XCF.
- **TIMER** - Waiting for a timer event or an interval control event to complete. For example, an application has issued an EXEC CICS DELAY or EXEC CICS WAIT EVENT command which has yet to complete.
- **OTHER\_PRODUCT** - Waiting on another product to complete its function. For example; when the work request has been passed to a DBCTL subsystem.
- **MISC** - Waiting on a resource that does not fall into any of the other categories.

For more information on the z/OS Workload Manager states and resource names used by CICS TS, see the CICS Problem Determination Guide.

## CICS and the z/OS WLM ...

- Region Classification
  - Define an execution velocity goal for the service class associated with the CICS Region(s)
  - Minimum and Simplest level of Classification for CICS Region(s)
- Transaction Classification
  - Transactions can be classified according to ...
    - Individual CICS applid (Subsystem Instance)
    - Transaction groups, Individual transactions, Userids, ...
  - Once you start defining CICS Subsystem rules
    - You must define rules for 'ALL' your CICS Regions!

## CICS and the z/OS WLM ...

- CICS Subsystem – Service Class examples ...

Service Class:	CICSPROD
Description:	Production CICS Transactions
Response Time:	90% .35 Second
Importance:	1
Service Class:	CICSTEST
Description:	Test CICS Transactions
Response Time:	1.5 second AVG
Importance:	4
Service Class:	CICSDFLT
Description:	Default CICS Transactions
Response Time:	5 second AVG
Importance:	5

## CICS and the z/OS WLM ...

- CICS Subsystem – Service Class examples ...

Subsystem Type . . . . . :CICS				
Description . . . . . :CICS Service Classes				
Type	-----Qualifier-----	-----Class-----		
	Name	Start	Service	Report
		DEFAULTS:	CICSDFLT	
1 SI	CICSP*		CICSPROD	
1 SI	CICST*		CICSTEST	

Subsystem Instance (Applid)

- Each transaction is 'Classified' into a Service Class
  - If no matching "Qualifier" – the default is used! "CICSDFLT"

## CICS and the z/OS WLM ...

- Transaction Classification ....
  - Simplest Transaction Classification is Subsystem Name!
    - Good CICS Applid naming conventions make it easier!
  - Separate transactions (if necessary) into multiple service classes, but ...
    - do not define "too many" service classes
    - Use Report Classes for reporting granularity
  - Consider putting transactions with different characteristics into different service classes! For example, do not mix ...
    - Routed with non-routed transactions
    - Conversational with pseudo-conversational
  - Define a "default" or "catcher" service class (e.g. CICSDFLT)
    - Nothing should be reported for this service class!

## CICS and the z/OS WLM ...

### Flow of Transaction Classification across the Sysplex

- Service Class token passed over MRO and IPIC links
  - Classification done once per unit-of-work (normally TOR)
    - In the CICS region where the transaction first arrives
  - Enables consistent classification across the sysplex
  - Transaction priority passed to AOR if requested by routing program
- Service Report Class token is **NOT** passed over ISC links
  - All ISC configurations!
  - Transaction either side of ISC link has a separate goal!
- Classification passed to non-CICS Resource Managers
  - Performance Block token in DFHUEPAR parameter list
    - Allows a Resource Manager to connect its activity to CICS
    - Provides a complete record of the transaction activity to z/OS WLM
- Where CICS passes the Service Class token today
  - CICS will now also pass the EWLM Correlator

## CICS and the z/OS WLM ...

- A number of functions which were considered by some customers as inhibitors to the migration from WLM compatibility to goal mode were addressed in OS/390 Release 10
- New options added to WLM Service Definition
  - Specify whether a CICS / IMS Region is to be managed by Transaction response time goals or the Region's velocity goal
  - Identify work as CPU Critical
  - Identify work as Storage Critical
- New qualifiers added to classification rules
  - System name, **Sysplex name**
  - Subsystem collection name
  - Scheduling Environment name

## CICS and the z/OS WLM ...

- You must classify the CICS Regions
  - Generally set to high velocity goal with a high importance
  - Rules used (JES, STC) depends on how CICS is started
- Region managed or Transaction managed?
  - Pre OS/390 R10
    - **First** CICS rule means that **ALL** CICS transactions are managed to transaction goals
  - OS/390 R10 and later releases
    - The classification rule for the region determines if region is managed by the region's velocity goal or to the transaction's response time goals
  - Default is to use the transaction's goal

## CICS and the z/OS WLM ...

- Region managed or Transaction managed? ...
  - Allows easier migration of CICS regions from velocity goal management to Transaction response time management
  - Allows test CICS regions to remain managed by velocity goals
    - Lower system overhead ...
      - Transaction management: PB's are scanned every interval (250 ms)
      - Region management only: PB's are scanned every 10th interval
    - Simplifies the WLM policy definition
- z/OS V1R2 Reporting Enhancements ...
  - Even if CICS regions are managed towards velocity goals ...
  - Response time distribution and subsystem work manager delay data are still gathered

## CICS and the z/OS WLM ...

- Problem
  - WLM may not react quickly enough to keep critical workload happy in the face of major workload change
    - e.g. Stock Market Open
- Setting CPU Critical
  - Assigned at the service class level
    - Restricted to single period service classes with velocity or response time goals
  - CPU Critical = YES means work in this service class runs at a higher CPU Dispatching Priority than all less important work even if this priority is not required to meet the goals
  - Guarantees CPU access to the most important work

## CICS and the z/OS WLM ...

- **Problem**
  - CICS region idle for a long period of time (e.g. over batch window), may be exposed to paging delay when it becomes active again
- **Setting Storage Critical**
  - Assigned at the address space or CICS transaction level through classification rules
  - Storage Critical = YES means address space keeps close to its high water mark of storage used even if storage not needed to meet goals

## CICS and the z/OS WLM - Myths and Realities

- **Myth: WLM reacts to every CICS transaction!**
  - Reality: WLM/SRM adjusts access to system resources every 10 seconds
    - Based on address space delays - CPU, Storage, ...
    - z/OS allocates resources to CICS regions at the address space level
- **Myth: You must classify every CICS transaction individually!**
  - Reality: You do NOT need classify every CICS transaction individually
- **Myth: WLM is a significant overhead in CICS**
  - Reality: WLM is NOT a significant overhead in CICS

## CICS and the z/OS WLM - Myths and Realities ...

- **Myth: WLM controls dispatching priority of CICS tasks**
  - Reality: CICS controls the dispatching of CICS tasks
- **Myth: Must use CICSplex SM**
  - Reality: You do NOT 'need' to use CICSplex SM
    - CICSplex SM WLM understands CICS transactions
    - z/OS WLM understands the Address Spaces
    - Dynamic Workload Management using CICSplex SM – Session 4139
- **Myth: CICS Monitoring Facility (CMF) must be active**
  - Reality: You do NOT need CMF to be active!

## CICS Tuning Parameters

- **How CICS Dispatcher processes tasks is affected by ...**
  - Transaction priority (user + terminal + transaction)
  - TRANCLASS and MXT limits, Priority Aging, ...
- **Ensure WLM goal and CICS are consistent!**
  - Transaction with aggressive goal executing with a low transaction priority
- **Avoid hitting CICS limit conditions ...**
  - TRANCLASS and MXT limit conditions - AORs, FORs
  - Session Allocation Queueing

Traditional CICS Performance tuning techniques still apply!

## Monitoring and Performance Reporting

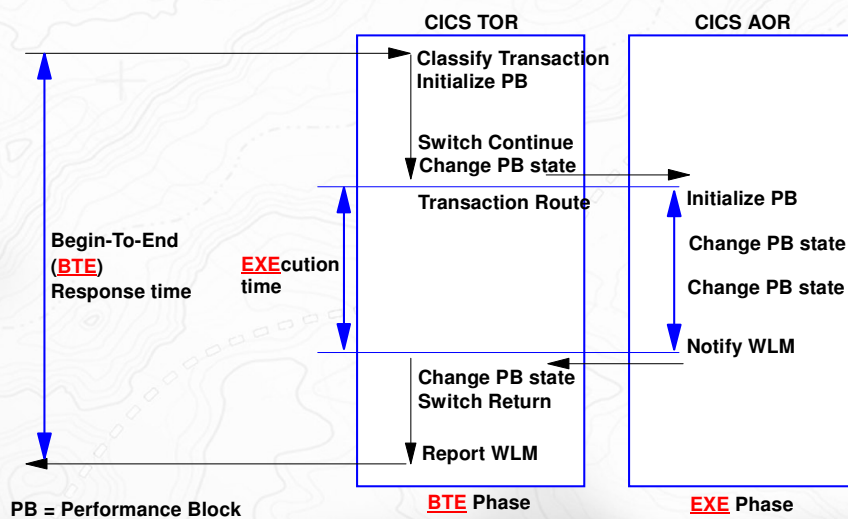
### Resource Measurement Facility (RMF)

- RMF reports provided ...
  - RMF Workload Activity Reports
    - Includes data for CICS, IMS and DFSMS subsystems
  - RMF Monitor III Reports ...
    - Sysplex Summary, Response Time Distribution, ...
    - Work Manager Delays, ...

### CICS Performance Analyzer (CICS PA)

- CICS PA reports provided ...
  - Workload Activity Reports
    - List, Summary, ...
      - Include EXECution phase records, peak percentile, ...
  - Performance Summary Reports
    - Response Time Distribution

## Monitoring and Performance Reporting ...





## Monitoring and Performance Reporting ...

REPORT BY: POLICY=HPTSPOL1 WORKLOAD=PRODWKLD SERVICE CLASS=CICSHR RESOURCE GROUP=\*NONE PERIOD=1 IMPORTANCE=HIGH

```

--TRANSACTIONS-- TRANSACTION TIME HHH.MM.SS.TTT
AVG 0.00 ACTUAL 000.00.00.114
MPL 0.00 QUEUED 000.00.00.036
ENDED 216 EXECUTION 000.00.00.078
END/SEC 0.24 STANDARD DEVIATION 000.00.00.270
#SWAPS 0
EXECUTD 216
    
```

```

-----RESPONSE TIME BREAKDOWN IN PERCENTAGE-----
SUB P TOTAL ACTIVE READY IDLE LOCK I/O CONV DIST LOCAL SYSPL REMOT TIMER PROD MISC SWITCHED TIME (%)
TYPE
CICS BTE 93.4 10.2 0.0 0.0 0.0 0.0 83.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 83.3 0.0 0.0
CICS EXE 67.0 13.2 7.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 46.7 0.0 0.0 0.0 0.0
    
```

Response Time = 0.114 = 100%

CICS BTE = 93.4%

Execution Time = 0.078 = 68.4%

Switched Time = LOCAL = CONV = 83.3%

CICS EXE = 67.0%

This is a sample RMF post processor (ERBRMFPP) output with option SYSRPTS (WLMGL(SCPER))

## Monitoring and Performance Reporting - Notes ...

The "Response Time Breakdown In Percentage" section of the RMF workload activity report contains the following headings:

ACTIVE - The percentage of response time accounted for by transactions currently executing in the region.

READY - percentage of response time accounted for by transactions that are not currently executing in the region but are ready to be dispatched.

IDLE - percentage of response time accounted for by transactions that are in a relatively "long" wait or CICS server type that are waiting for work. For example:

- transactions waiting on a principal facility (for example, conversational transactions waiting for terminal input from the user)
- the CICS terminal control (TC) transaction, CSTP, waiting for work
- the CICS inter-region control transaction, CSNC, waiting for transaction routing or function shipping requests
- CICS system transactions, such as CSSY or CSNE, waiting for work.

WAITING FOR - The percentage of response time accounted for by transactions that are not currently executing and are not ready to be dispatched. The WAITING FOR main heading is further broken down into a number of subsidiary headings. Where applicable, for waits other than those described for the IDLE condition described above, CICS interprets the cause of the wait, and records the "waiting for" reason in the z/OS Performance Block. The STATE section of the report covers the time that transactions are "switched" to another CICS region.

The SWITCHED TIME is the percentage of the response time accounted for by transactions in a TOR that are waiting on a conversation across an intersystem communication link (MRO or ISC). This information provides a further breakdown of the response time shown under the CONV heading. The SWITCHED TIME heading is then further broken down into a number of subsidiary headings, and covers those transactions that are waiting on a conversation. For more information on the RMF Workload Activity Reports, see:

*z/OS Resource Measurement Facility Report Analysis, SC33-7991*

*z/OS Resource Measurement Facility Performance Management Guide, SC33-7992*

## Monitoring and Performance Reporting ...

- CICS Monitoring Facility
  - Performance Class
    - Service Class and Report Class Names
    - Response Time is as reported to the z/OS WLM
    - MXT delay, TRANCLASS delay, ...
- CICS Statistics
  - Transaction Manager and Transaction Class
    - MXT and TRANCLASS limits and delays
  - Connection
    - Inter-system session queuing, queue limits, ...
  - Monitoring
    - z/OS WLM Information for the CICS Address Space ...
      - Service and Report Class name(s), Resource Group, Workload name
      - CICS Transaction Server for z/OS V3.2 ...
        - Goal type and value, CPU and Storage Critical, Importance, ...

## Monitoring and Performance Reporting ...

- CICS Performance Analyzer for z/OS (CICS PA)
  - Workload Activity List report correlates the CMF performance class data by Network Unit-of-Work id, highlighting ...
    - z/OS WLM Service Class and Report Class
    - WLM Reporting and completion phase (BTE or EXE)
  - Workload Activity Summary report
    - by z/OS WLM Service Class and Report Class ...
      - average and maximum response time, peak percentile, ...
  - Performance Summary report ...
    - Response Time Distribution

## Monitoring and Performance Reporting ...

VIR3M0 CICS Performance Analyzer  
Workload Manager Activity List

WKLD0001 Printed at 7:33:50 31/03/2004 Data from 14:18:57 11/05/2002 to 15:04:59 11/05/2002 Page 1918

Tran	Userid	SC	TranType	Term	ILName	Request	Program	T/Name	Fcty	Conn	Service	Report	APPLID	Task	T	P	C	Stop	Time	Response	A
TS1	CICUSER	TP	U	P199	SCSIP199	TR:PAA4		T/P199			CICSDFLT WASC	SCSCTA2		15918	T	BTE		14:59:33.90	.0037		
TS1	CICUSER	TP	U	T21	SCSCTA2	AP:	DSWTS1VW	S/P199	PTA2		CICSDFLT WASC	SCSCPAA4		24448	T	EXE	Y	14:59:33.90	.0024		
/FOR	CICUSER	TO	U	P199	SCSIP199	TR:PAA4		T/P199			CICSDFLT WASC	SCSCTA2		15929	T	BTE		14:59:35.91	.0138		
/FOR	CICUSER	TO	U	T21	SCSCTA2	AP:	DSWFORVW	S/P199	PTA2		CICSDFLT WASC	SCSCPAA4		24472	T	EXE	Y	14:59:35.90	.0027		

VIR3M0 CICS Performance Analyzer  
Workload Manager Activity Summary by Service Class

WKLD0001 Printed at 7:33:50 31/03/2004 Data from 14:18:57 11/05/2002 to 15:04:59 11/05/2002 Page 1920

Service Class	APPLID	Phase	#Tasks	Response Time		
				Average	Std Dev	90% Peak
CICSDFLT	SCSCPAA1	BTE	51	.0377	.1073	.1753
	SCSCPAA1	EXE	1533	.0316	.0781	.1316
	SCSCPAA4	BTE	17	111.043	457.767	697.900
	SCSCPAA4	EXE	8239	.0204	.0569	.0934
	SCSCPAA7	EXE	810	.0035	.0043	.0090
	SCSCLIA1	BTE	8816	.3441	20.0989	26.1108
	SCSCLIA2	BTE	6954	.4033	22.6318	29.4172
CICSDFLT	SCSCTA1	BTE	6624	.0356	.0792	.1371
	SCSCTA2	BTE	4680	.0412	.0891	.1555
	*Total*	BTE	27142	.3005	19.8410	25.7367
	*Total*	EXE	10582	.0207	.0587	.0960

## Enterprise Workload Manager Control Center ...

https://winmvs2d.hursley.ibm.com:19999 - MVS2DEWLM - IBM Enterprise Workload Manager - Microsoft Internet Explorer

Enterprise Workload Manager Control Center

Home | Log out | Preferences | Help User: cbaker Role: Administrator

Active service policy: [Service Policy](#) | Domain policy: [Chris Bakers Sample Domain Po...](#) | [Domain Settings](#)

- Set up
  - [Domain policies](#)
  - [Applications](#)
  - [Platforms](#)
- Manage
  - [Service policies](#)
  - [Managed servers](#)
- Monitor
  - [Exceptions](#)
  - [Service classes](#)
  - [Transaction classes](#)
  - [Process classes](#)
  - [Partition classes](#)
  - [Managed servers](#)
  - [Load balancers](#)
  - [Partitions](#)

### Welcome to the IBM Enterprise Workload Manager Control Center

Enterprise Workload Manager (EWLM) allows you to define business-orientated performance goals for an entire domain of servers, and then provides an end-to-end view of actual performance compared to the expected goal. EWLM allows you to monitor application-level transactions separate from operating system processes. In addition, EWLM can adjust system resources to ensure that performance goals are met.

- Begin working with the Control Center**  
Provides a series of tasks that guide you through using the Control Center.
- Description of how EWLM works**  
Describes the different types of work that EWLM monitors and manages. EWLM can monitor application-level transactions separate from operating system processes. In addition, learn how EWLM classifies work to measure the actual performance against the expected goal.
- Components of a domain policy**  
Describes the components of a domain policy.

Done Internet

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## EWLM Control Center – Service Class ...

Enterprise Workload Manager Control Center

Home | Log out | Preferences | Help User: cbaker Role: Administrator

Active service policy: [Service Policy](#) | Domain policy: [John Burgess Domain Policy](#) | [Domain Settings](#)

**Service Classes**  
View the performance of the service classes. Select a service class for more details.

Show workloads  
Interval: 28/06/2006 13:59:19 to 28/06/2006 14:03:30

Select	Service class	PI	Importance	Performance	Goal
<input checked="" type="radio"/>	CICSTRAN	0.50	High	98% in 00.500	80% in 00.500
<input type="radio"/>	EWLM Service Class	Not applicable	Not applicable	Not applicable	Discretionary
<input type="radio"/>	Web browsers	Not applicable	Not applicable	Not applicable	Discretionary
<input type="radio"/>	Web Hot	Not applicable	Not applicable	Not applicable	Discretionary
<input type="radio"/>	Web Low	Not applicable	Not applicable	Not applicable	Discretionary
<input type="radio"/>	Web Medium	Not applicable	Not applicable	Not applicable	Discretionary

Page 1 of 1      Total: 6   Filtered: 6   Displayed: 6

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## EWLM Control Center – Service Class ...

Enterprise Workload Manager Control Center

https://winmvs2a.hurstley.ibm.com:19999 - Details - Service class 'CICSTRAN' - Microsoft Internet Explorer Last refresh: 28/06/2006 14:04:52

**Details - Service class 'CICSTRAN'**  
View details about the performance of this service class.

Interval: 28/06/2006 13:59:19 to 28/06/2006 14:03:30

Attributes

Description: CICS service class  
Workload: EWLM Workload  
Goal type: Percentile response time  
Goal: 80% in 00.500  
Importance: High  
Transaction classes: DSW Transaction Class

Statistics

Performance: 98% in 00.500  
Performance index: 0.50

Transactions

Hop	Completed successfully	Failed	Stopped	Ended in unknown state	Not valid	In progress	Total
0	23,979	0	0	0	0	0	23,979
1	17,000	0	0	0	0	0	17,000
2	8,020	0	0	0	0	0	8,020

Page 1 of 1      Total: 3   Filtered: 3   Displayed: 3

Response time distribution chart

Response time distribution chart

24827 [ ] Response time distribution

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## EWLM Control Center – Application Topology ...

https://winmvs2a.hursley.ibm.com:19999 - Application topology - Service class 'CICSTRAN' - Microsoft Internet Explorer

Enterprise Workload Manager Control Center Last refresh: 28/06/2006 14:06:38

**Application topology - Service class 'CICSTRAN'**  
View the applications that are processing work in the class. Click an application to view the servers that are running the application. Then, click the server to view the application instances.

Interval: 28/06/2006 13:59:19 to 28/06/2006 14:03:30

```

    graph LR
      S1[CICS 1 servers] -- 17,000 --> S2[CICS 1 servers]
      S2 -- 8,020 --> S3[CICS 1 servers]
  
```

Close Export

Applet com.ibm.wlm.webui.applet.topology.EvmlApplicationTopology started

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## EWLM Control Center – Application Topology ...

https://winmvs2a.hursley.ibm.com:19999 - Application topology - Service class 'CICSTRAN' - Microsoft Internet Explorer

Enterprise Workload Manager Control Center Last refresh: 28/06/2006 14:06:38

**Application topology - Service class 'CICSTRAN'**  
View the applications that are processing work in the class. Click an application to view the servers that are running the application. Then, click the server to view the application instances.

Interval: 28/06/2006 13:59:19 to 28/06/2006 14:03:30

```

    graph LR
      S1[CICS 1 servers] -- 17,000 --> S2[CICS 1 servers]
      S2 -- 8,020 --> S3[CICS 1 servers]
  
```

**CICS**  
 CICS Top number: 0  
 Type: Application  
 Average response time: 00.066917  
 Standard deviation: 00.177000  
 Average active time: 00.040947  
 Average queue time: 00.022667  
 Successful transactions: 23,879  
 Failed transactions: 0  
 Stopped transactions: 0  
 Unknown transactions: 0  
 Not valid transactions: 0  
 Topology uncertainty count: 0  
 Reporting gap count: 0  
 Processor time: 11.949696  
 Processor using (%): 49.5%  
 Processor delay (%): 34.3%  
 Page delay (%): 0.0%  
 IO delay (%): 9.5%  
 Idle (%): 52.9%  
 Other (%): 6.7%  
 In progress transactions: 0  
 In progress elapsed time: None

Close Export

Applet com.ibm.wlm.webui.applet.topology.EvmlApplicationTopology started

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## EWLM Control Center – Application Topology ...

Hop number	Name	Type of node	Platform	Average response time	Standard deviation	Average active time	Average queue time	Successful transactions
0	CICS	Application		00.066917	00.177000	00.040947	00.022667	23,979
0	winmvs2a.hursley.ibm.com	Server	z/OS	00.066917	00.177000	00.040947	00.022667	23,979
0	IYCUZC01	Instance		00.054908	00.189000	00.031651	00.003131	1,460
0	IYCUZC02	Instance		00.034656	00.115000	00.031548	00.005195	1,402
0	IYCUZC07	Instance		00.147002	00.606000	00.146993	00.000498	48
0	IYCUZC04	Instance		00.065554	00.114000	00.046511	00.034103	9,713
0	IYCUZC03	Instance		00.073271	00.216000	00.038097	00.017648	11,356
1	CICS	Application		00.032644	00.144000	00.018210	00.006492	17,000
1	winmvs2a.hursley.ibm.com	Server	z/OS	00.032644	00.144000	00.018210	00.006492	17,000
1	IYCUZC01	Instance		00.042073	00.190000	00.017558	00.004666	8,673
1	IYCUZC02	Instance		00.020239	00.032000	00.017045	00.009427	7,303
1	IYCUZC07	Instance		00.041157	00.166000	00.035652	00.000154	822
1	IYCUZC04	Instance		00.000712	00.000000	00.000480	00.000185	1
1	IYCUZC03	Instance		00.000925	00.000000	00.000559	00.000266	1
2	CICS	Application		00.030772	00.177000	00.026821	00.000145	8,020
2	winmvs2a.hursley.ibm.com	Server	z/OS	00.030772	00.177000	00.026821	00.000145	8,020
2	IYCUZC07	Instance		00.030772	00.177000	00.026821	00.000145	8,020

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## EWLM Control Center – Application Topology ...

https://winmvs2a.hursley.ibm.com:19999 - Application topology - Service class 'CICSTRAN' - Microsoft Internet Explorer

Enterprise Workload Manager Control Center Last refresh: 28/06/2006 14:06:38

**Application topology - Service class 'CICSTRAN'**  
View the applications that are processing work in the class. Click an application to view the servers that are running the application. Then, click the server to view the application instances.

Interval: 28/06/2006 13:59:19 to 28/06/2006 14:03:30

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## Summary

- Understand your CICS transaction workload!
- Do not define "too many" service classes
  - Keep it simple and do not set unrealistic goals!
  - Adopt good CICS Region Applid naming conventions
- Ensure the WLM goal and CICS are consistent!
  - Avoid hitting CICS limit conditions - MXT, SOS, ...
- Monitoring and Performance Reporting
  - RMF Workload Activity Report - Can be confusing!
  - CICS PA Workload Activity Report(s)
- Traditional CICS tuning techniques still apply!

<http://www.ibm.com/servers/eserver/zseries/zos/wlm/>

<http://www.ibm.com/servers/eserver/zseries/zos/ewlm/>

## Appendix

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