

WLM Goal Mode Enhancements OS/390 R10



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Session Objectives

- Define the problems solved
- Define the functional content
- Explain migration issues
- Explain delivery stages

Problems

CICS/IMS Response Time Management Not Always Useful

- Some CICS/IMS regions cannot be effectively managed using transaction response times
 - ▶ Conversational transactions
 - ▶ Low activity coupled with tight responsiveness requirements

CICS/IMS Resource Guarantees Missing

- No guarantee that loved ones will always be given preferential access to physical resources (CPU and/or storage)
 - ▶ unable to meet very stringent SLAs reliably

CICS/IMS Management Granularity

- Once any CICS/IMS regions are switched to transaction response time goal management, all regions must be managed the same way
 - ▶ Customers partition their regions into production and test
 - ▶ Really want to manage production regions to transaction response times
 - ▶ Test regions just need to make progress... response times not managed closely

Classification

- All classification rules and goals are sysplex-wide
 - ▶ Yet some customers "partition" their sysplex into production CICS/IMS/batch and development/test functions
 - Really want goals assigned based on system it is executing on
 - ▶ Conflicts with subsystem control scopes
 - JESplex for job class

Tools to Build Solutions

Four New Tools

- ✓ **Ability to guarantee relative CPU priority**
- ✓ **Ability to proactively protect storage**
- ✓ **Ability to manage some CICS/IMS regions based on transaction response times while managing others with velocity goals**
- ✓ **Additional classification criteria**

CPU Protection

- Problem: in goal mode, no way to guarantee dispatch priority of "loved ones" is higher than other work
 - Usually only an issue for customers with very tightly monitored CICS/IMS regions
- Solution: allow loved ones to be identified so that their dispatching priority is always above that of less important work

CPU Protection Specification

...part of the service class definition

...restricted to single period service classes with velocity or response time goals

Modify a Service Class

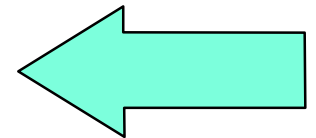
Service Class Name . . : APPPRIME

Description

Workload Name

Base Resource Group . .

CPU Critical YES



Storage Protection

- Problem: in goal mode, no way to guarantee "loved ones" are storage isolated proactively
- Solution: allow loved ones to be identified
 - Assigned protective storage isolation
 - Regions with low overnight activity protected from page faults when interactive users return in the morning
 - Regions always protected from sudden changes in storage demand (runaways)

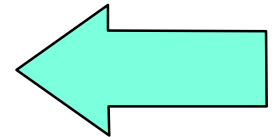
Storage Protection Specification

...new column (scroll right) on classification rule

...only displayed if allowed for current subsystem type

...restricted to single period service classes

| -----Qualifier----- | | | Storage |
|---------------------|--------|--|----------|
| Type | Name | | Critical |
| TN | COMBL* | | NO_ |
| UI | COMBLD | | NO_ |
| UI | CICS11 | | YES |
| UI | SRVLIB | | NO_ |
| PF | 99 | | NO |
| TC | B | | NO |
| TC | C | | NO |



Both CPU and Storage Protection

- Available to any address space
 - ▶ Allows protection of low activity regions that cannot be managed as servers
 - ▶ Allows protection of regions running conversational transactions
 - ▶ Guarantees preferential resource access

Both CPU and Storage Protection

- Also available for CICS/IMS transaction service classes
 - ▶ You don't have to know transaction topology (which regions serve which transaction service classes)
 - ▶ If transaction topology changes, WLM adjusts

Both CPU and Storage Protection

- Also available for CICS/IMS transaction service classes
 - ▶ You protect transaction service classes, WLM protects the regions serving them
 - CPU protection is always by service class
 - Storage protection assigned in CICS/IMS subsystem type classification rules...since individual transactions cannot be managed, protection is for entire service class

CICS/IMS Region Management

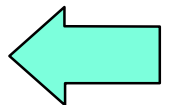
- Problem: in goal mode, CICS/IMS transaction management is all or nothing
 - Unable to manage production regions only
 - Sampling overhead incurred even if data is not used for management

- Solution:
 - Allow ineligible regions to be identified
 - Each region can be managed either by transaction response times or velocity goal
 - Sample velocity regions less frequently

CICS/IMS Region Management Specification

- ...new column (scroll right) on classification rule
- ...only displayed if allowed for current subsystem type

| -----Qualifier----- | | | Manage Regions |
|---------------------|----|--------|----------------|
| Type | | Name | to Goals Of |
| TN | | COMBL* | TRANSACTION |
| | UI | COMBLD | TRANSACTION |
| | UI | CICS11 | REGION |
| UI | | SRVLIB | TRANSACTION |
| PF | | 99 | TRANSACTION |
| TC | | B | TRANSACTION |
| TC | | C | TRANSACTION |



New Classification Attributes

- System name, system name group
 - ▶ Assign goals based on execution system

- Sysplex name
 - ▶ Assign goals based on execution sysplex
 - ▶ Easier to use a single service definition across multiple sysplexes

New Classification Attributes

- Scheduling environment name
 - ▶ Requested by every customer currently using scheduling environments

- Subsystem collection name
 - ▶ A general way to talk about " subsystem name " that includes the effect of subsystem clusters
 - ▶ JES2 MAS name, JES3 JESplex name
 - Single job class can have multiple definitions within a sysplex

Solutions

Vocabulary

- Loved ones: transactions with very stringent service level agreements, and management wants "guarantees" of good treatment all the time.
- Conversational transactions: response times reported by CICS or IMS do not reflect end user response time, because multiple transactions are reported as one completion.

Example 1

- Problem:
 - ▶ Protect non-conversational loved ones

- Assume:
 - ▶ Regions serving them are managed as servers, and transactions run often enough that WLM always manages the regions as servers

Example 1

■ Solution:

- ▶ Protect loved ones' service classes
 - Storage critical in CICS/IMS classification rules for loved ones
 - and/or
 - CPU critical on the loved ones' service class(es)

- ▶ Do not make regions storage or CPU critical

Example 2

- Problem: protect conversational loved ones

- Solution:
 - ▶ JES/STC classification rules for regions serving the loved ones
 - Manage regions to goal of = REGION
 - Storage critical = YES
 - ▶ Regions' service class
 - CPU critical = YES

Example 3

- Problem: protect loved ones which execute very infrequently

- Solution:
 - ▶ JES/STC classification rules for regions serving the loved ones
 - Manage regions to goal of = REGION
 - Storage critical = YES
 - ▶ Regions' service class
 - CPU critical = YES

Example 4

- Problem: manage loved ones as servers, but manage test regions based on velocity rather than transaction response times

- Solution:
 - ▶ JES/STC classification rules for test regions
 - Manage regions to goal of = REGION
 - Make sure service class assigned provides adequate access to resources

Example 5

- Problem: protect loved ones from losing their frames to batch work overnight when the on-lines are quiet

- Solution:
 - ▶ JES/STC classification rules for loved ones' regions
 - Storage critical = YES

Details, Details

Interactions and Dependencies

■ Hardware

- ▶ Nothing new required

■ Software

- ▶ JES2/JES3 R10 + OS/390 R10 needed for classification by subsystem collection name
- ▶ JES2 R4/JES3 R8 + OS/390 R10 needed for classification by scheduling environment name
 - JES will classify without scheduling environment name, and SRM will reclassify when job is selected
- ▶ RMF M1/M3 via PTF on R10

Reporting

- SMF 30 (all subtypes)
 - ▶ CPU and storage protection specifications
 - ▶ Region/transaction mgmt specification
 - ▶ Subsystem collection name
 - ▶ Current state of CPU and storage protection

- Sysevent REQASD/REQFASD
 - ▶ Same as SMF 30

Reporting

- IWMPQRY (used by RMF M1, M3)
 - ▶ CPU and storage protection specifications

- IWMRQRY (used by RMF M3)
 - ▶ Region/transaction mgmt specification
 - ▶ Current state of CPU and storage protection

- Sysevent REQASCL, IWMECQRY
 - ▶ Subsystem collection name
 - ▶ Scheduling environment name

Reporting

- CICS/IMS Region Management and RMF M1 WLMGL
 - ▶ Goal = REGION address spaces
 - do not contribute response time data to service classes
 - do still contribute data to "Service classes served" and "Subsystem Delay Data" sections

Migration Issues

- Exploitation of any new function causes a new functionality level in the service definition (functionality level 011)
 - ▶ standard procedure
 - ▶ migration/compatibility PTF coming
 - ▶ normal operational consequences
 - earlier systems using the service definition can participate, but cannot activate a policy or edit the service definition

Migration Issues

- Functionality level 011 also imposes new restrictions on the service definition
 - ▶ Service classes used for CICS and/or IMS transactions cannot be used by other subsystem types
 - ▶ Multiperiod service classes must have periods whose importances do not decrease...later periods must be no more important than earlier ones

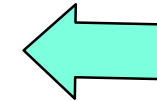
Migration Issues...

Manually invoking the new validation from the Utilities pull-down

```

File  Utilities  Notes  Options  Help
----- E-----
Funct e 3  1. Install definition
Comma e   2. Extract definition
      e   3. Validate definition
Defin e   4. Activate service policy
      e   5. Allocate couple data set
Defin e   6. Allocate couple data set using CDS val
Descr D-----

```



Select one of the following options. . . . _ 1. Policies

Migration Issues...

What you see when this new validation fails:

```
File  Notes  Options  Help
-----
      Errors found during validation Row 1 to 14 of 14
Command ===>

IWMAM911E  The CICS/IMS service class CICSIMS is
           referenced by a rule in subsystem TEMP.
IWMAM913I  4 errors and 0 warnings were found...
***** Bottom of data *****
```

Migration Issues

- Running pre-R10 JESx on OS/390 R10
 - ▶ Classification by system/sysplex name works
 - ▶ Classification by scheduling environment name and/or subsystem collection name not supported

- Pre-OS/390 R10 systems ignore rules with new qualifier types (also true in the past)

- SRM may reclassify jobs using different classification parameters than JES uses

Migration Issues

- Recommendation: do not use classification by scheduling environment name and/or subsystem collection name until all systems are both OS/390 R10 and JESx R10

- If you choose to ignore the recommendation
 - ▶ WLM/JES will not abend, but...
 - ▶ Don't call level 2 about batch mgmt problems
 - ▶ Don't be surprised if batch jobs run in different service classes based on where they are classified and where they run

Migration Issues

- CPU protection
 - ▶ Only OS/390 R10 systems honor it

- Storage protection
 - ▶ Only OS/390 R10 systems honor it
 - ▶ When assigned to batch jobs, honored if execution system is running OS/390 R10

- CICS/IMS region management
 - ▶ Same requirements as storage protection

Migration Issues

- CICS/IMS region management
 - ▶ Customers wanted flexibility to mix goal=region and goal=transaction
 - ▶ We provided it

 - ▶ Recommendation: If you mix them, make sure that the TOR/CTL region is managed with goal=transaction
 - ▶ If TOR/CTL is goal=region, WLM will never see response times for the transactions, so the AORs etc cannot be managed effectively

Delivery

■ Externals

- ▶ Address space-related externals in ServerPac for R10 with GA-level service tape
 - WLM Administrative application
 - SMF 30
 - Classification by system name/group, sysplex
- ▶ Enclave externals available via PTF at R10 GA

■ Internals

- ▶ Available via PTF circa R10 GA

**Hang in there,
almost done!**

Session Summary

- CICS and IMS requirements
 - ▶ Granularity of transaction management
 - ▶ Proactive protection of loved ones
 - also benefits other address spaces

- Classification
 - ▶ Assign goals by execution system/sysplex
 - ▶ Recognize subsystem (JES) cluster boundaries

- Functionality level change with exploitation

Errors in Handouts

- Page 37 speaker notes: replace second bullet (save/install) with
 - ▶ Errors prevent install, warnings do not.
 - ▶ Errors can be overridden on save paths.

Appendix

- MVS Planning: Workload Management
GC28-1761
- Workload Management Services
(primarily for coders)
GC28-1773
- System Management Facilities (SMF)
GC28-1457

PTF Numbers

- Part of ServerPac
 - ▶ OW43587 - Functionality level 011 externals, new classification attributes for address spaces
 - ▶ OW43586 - Migration/compatibility for above

- Available at/near R10 GA
 - ▶ OW45239 - Validity checking of svdef
 - ▶ OW43810 - Storage critical
 - ▶ OW43812 - CICS/IMS Region Management
 - ▶ OW43813 - New classification attributes for enclaves, IPCS support
 - ▶ OW43585 - CPU critical