Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

Session 11500: Introduction to WLM Management of CICS and IMS Workloads

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Abstract

- **Introduction to WLM Management of CICS and IMS Workloads**

  - CICS and IMS transactions can either be managed by the velocity goals assigned to the regions, or managed towards the response time goals assigned to the transactions. WLM management of the regions toward the goals of the transactions is known as WLM server management.

    During this presentation Peter Enrico will introduce the concepts of WLM server management, and provide guidelines to ensure an optional WLM setup for CICS and IMS transaction workloads. Guides and recommendation are a key ingredient of this presentation.

Current 2012 Class Schedule

(During class you will actually be analyzing your own data)

- WLM Performance and Re-evaluating of Goals
  - Instructor: Peter Enrico
  - September 17 – 21, 2012 Stamford, Connecticut, USA

- Essential z/OS Performance Tuning
  - Instructor: Peter Enrico and Tom Beretvas
  - September 10 –14, 2012 Minneapolis, Minnesota, USA

- Parallel Sysplex and z/OS Performance Tuning
  - Instructor: Peter Enrico
  - August 21 – 23, 2011 Online

- z/OS Capacity Planning and Performance Analysis
  - Instructor: Ray Wicks
  - Not scheduled at this time

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Options for Setting Up WLM Management for CICS and IMS Workloads

- Installation's have several choices for how WLM will manage their CICS and IMS workloads
  - Region Management:
    - Allow all regions to be managed towards velocity goals and importance levels
    - Response time goals of transactions have no influence
  - Transaction Management:
    - Allow all regions to be managed to meet the response time goals of the transactions they are serving.
    - The goals and importance levels of the regions are ignored.
  - Combination of Region and Transaction Management
    - Allows certain workloads to manage with 'Region Management' and other workloads to be managed with 'Transaction Management'
    - Usually used when Transaction Management is not effective for certain workloads
  - Transaction Management with Region Importance
    - Same as Transaction Management
    - Region's goal is ignored, but region's assigned importance level is considered

Key Lessons

- There is no right / best solution or option
  - For some installations transaction management is best
  - But for other installations, transaction management could be a disaster
- Keep your WLM setup for CICS and IMS workloads simple
  - Overly complicated setups could be a waste of time and lead to unpredictable WLM management
- If you choose to implement WLM transaction management, put thought into which transactions you classify, and what goals and importance levels you give these transactions
  - Guidelines are provided later in this presentation
- WLM management of CICS and IMS servers (via Transaction Management) is
  - Not as straight forward as WLM management of enclave servers,
  - but a whole lot better than the management of non-participant servers
    - such as IDMS, ADABASE, VTAM, DB2, VSAM RLS, CICS CTG, etc.

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Key Lessons

- All WLM will ever know about CICS and IMS transactions is as follows:
  - Transaction end (so WLM knows number ended, and the rate of ended)
  - The response time of the transactions
  - Which regions processed the transactions
  - WLM never knows about resource consumption such as CPU, storage, and I/O
- Always separate WLM managed servers and non-WLM managed servers into separate service classes
  - This is true for CICS and IMS address spaces managed via Transaction Management
  - This is true for enclave servers as well
    - Such as WAS Servant regions
    - Such as WLM Stored Procedure address spaces
- WLM transactions management of CICS and IMS are basically the same
  - True... there are slight differences, but concepts very close
  - This presentation uses WLM management of CICS as the primary example
  - But remember that WLM management of IMS works pretty much the same way

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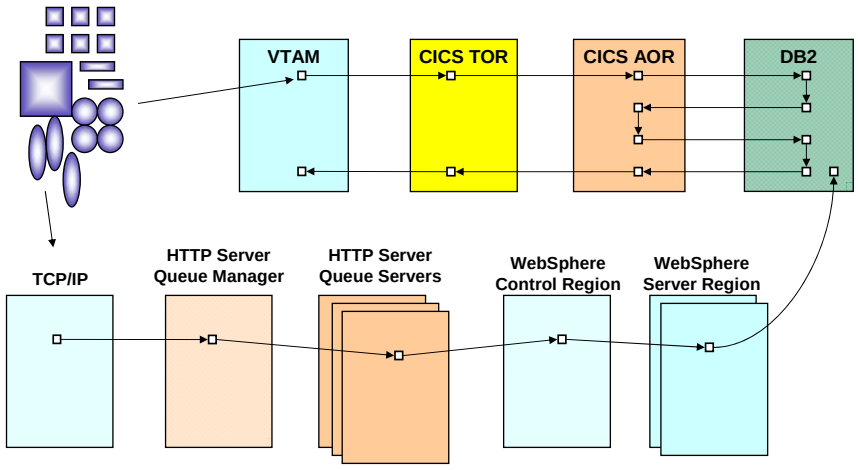
What are Servers (From WLM's Point of View)

- From WLM's point of view, Servers are address spaces are processing distinct requests on behalf of clients



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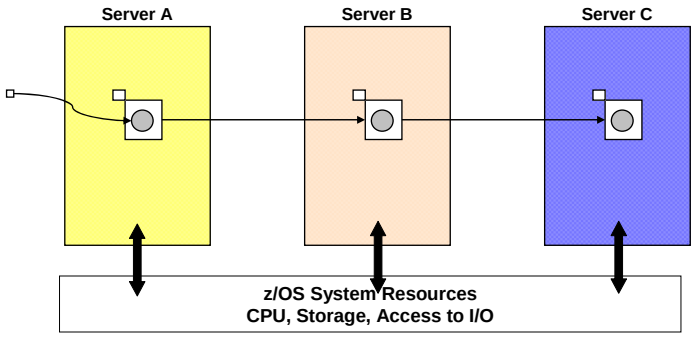
WLM's Interest in Servers

- Installations need the ability to set goals for the their transactions
- WLM needs a way to manage these servers according to the performance goals of the transactions that these regions are serving
  - If transaction X is missing its goal, should WLM help the address space or task?



Objective of WLM Management of CICS & IMS

- Allow assignment of goals to the transactions and let the WLM determine which regions need the resources to meet these goals.

Region Goals

IMP 1, Velocity 60

Transaction Goals

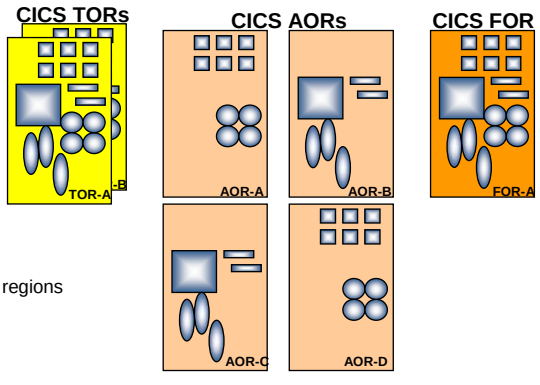
IMP 1, RT .5 sec, 90%

IMP 1, RT .75 sec, 90%

IMP3, RT 2 sec, 90%

IMP 3, Avg RT 3 sec

IMP 5, RT 20 sec, 85%



To meet the RT goals of ▫ the following regions must be managed:

- CICS TOR-A, TOR-B
- CICS AOR-A, AOR-D
- CICS FOR-A

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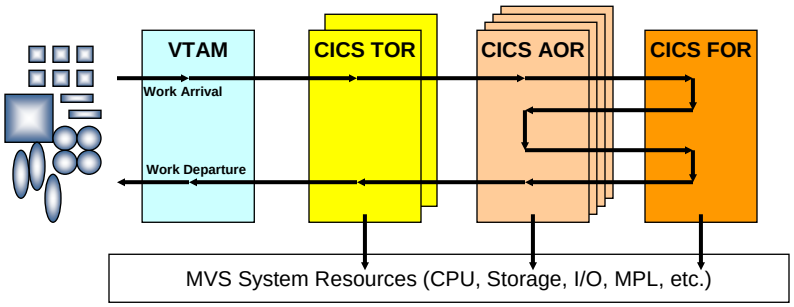
What is WLM Server Management?

- The ability of WLM to manage CICS and IMS regions according to the performance goals of the transactions that these regions are serving
- CICS and IMS use services to let WLM know
  - Transaction Start
  - Which address spaces are involved in processing a transaction
  - Transaction End



Option 1 - Region Management

Manage regions towards their assigned goal

CICS and IMS transactions are not assigned goals

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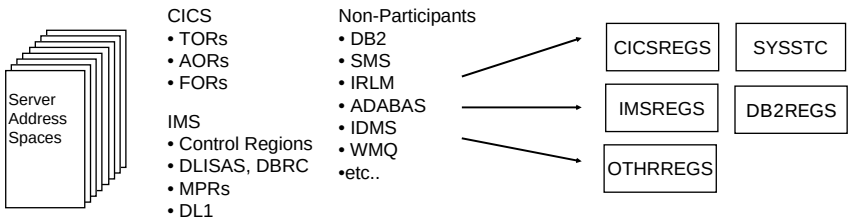
Option 1 - Region Management

- Assign velocity goals to regions, but
  Do not assign goals to any CICS or IMS transactions
  - Regions will be managed toward velocity goals
  - Transaction goals are ignored
  - Regions are not seen as 'servers', but are seen as long running address spaces
- WLM will manage regions according the assigned velocity goal
  - Your job is to ensure that goals for regions are sufficient to meet the response time objectives of the transactions they serve
- Can still assign transactions to report classes

Option 1 - Region Management

- Assign regions appropriate velocity goals and importance levels
  - Do not use response time goals for regions
  - Do not assign regions to SYSTEM or SYSSTC service classes
- Typical setup : Separate into different service classes...
  - the CICS regions from IMS regions
  - the regions of different workloads (example: Test versus production)
  - the CICS and IMS regions from other server regions
    - Away from DB2, ADABASE, IDMS, VTAM, CICS CTG, WMQ, WAS, etc.



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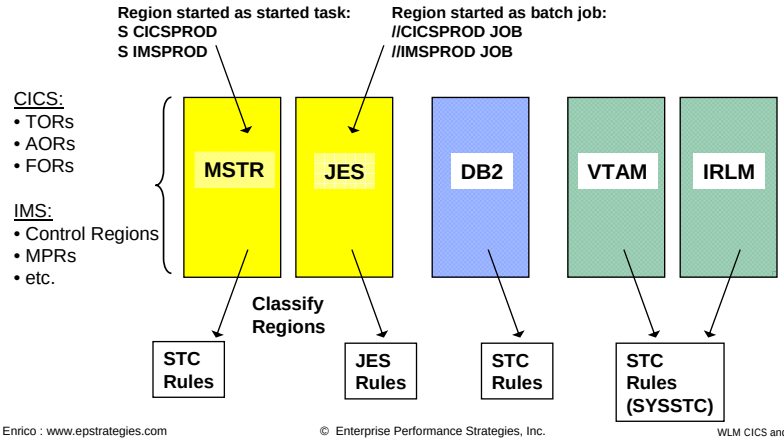
Classification and Goals - Regions

- Classification of CICS and IMS regions is dependent upon how the regions are started
  - Assign high importance velocity goals
  - Ensure sufficient goal and importance to meet response time objective of transactions



Option 1 – Still Classify Transactions to Report Classes

- Below is an example of the CICS classification rules if you want to ensure that the regions are managed towards region goals and not transaction goals
  - Note the service class column is blank
  - You can get as fancy as you like with the classification rules and the report class column

```
Subsystem-Type  Xref  Notes  Options  Help
------------------------------------------------------------------------------
                  Modify Rules for the Subsystem Type       Row 1 to 3 of 3
Command ===> _____________________________________________ SCROLL ===> PAGE

Subsystem Type . : CICS        Fold qualifier names?   Y  (Y or N)
Description  . . . CICS Transactions

Action codes:   A=After     C=Copy        M=Move     I=Insert rule
                B=Before    D=Delete row  R=Repeat   IS=Insert Sub-rule
                                                        More ===>
          --------Qualifier--------               -------Class--------
Action    Type       Name     Start                Service     Report
                                          DEFAULTS: ________    RCCICSA
  ____  1  SI         CICP*    ___                  ________    RCCICSP
  ____  1  SI         CICT*    ___                  ________    RCCICST
  ____  1  SI         CICD*    ___                  ________    RCCICSD
****************************** BOTTOM OF DATA ******************************
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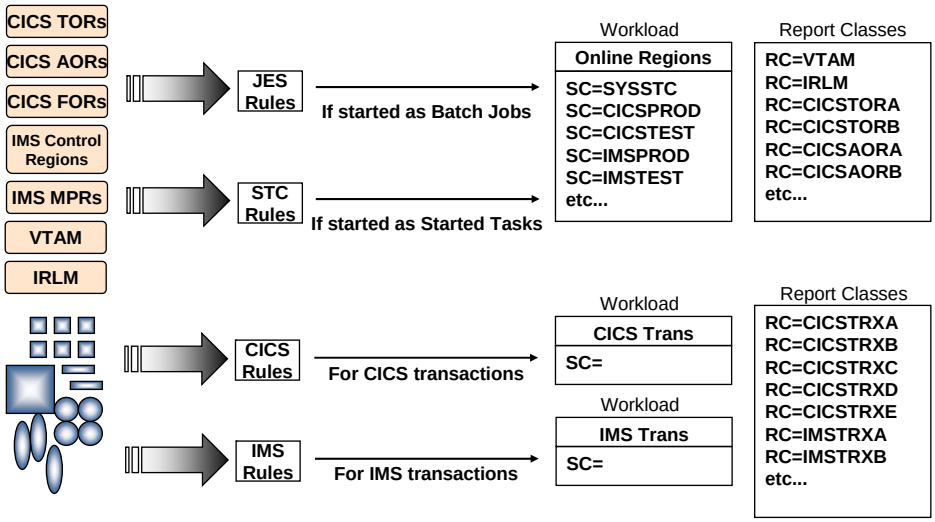
Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

Option 1 - Guidelines & Recommendations

- Always assign velocity goals to regions
- Group regions together into service classes
  - May want to assign more aggressive goals or higher importance levels to CICS TORs and IMS control regions
- Use report classes
  - Assign each region to its own unique report classes
  - Assign transactions to their own unique report classes
    - But setup service classes for the transactions
- Monitor and Tune
  - Monitor address spaces performance
    - Tune region velocity goals to help ensure transaction objectives are met
  - Using appropriate CICS and IMS transaction measurements, monitor performance of transactions
    - Use these measurements to tune region velocity goals
    - Use these measurements as possible goals if you later decide you want to manage the regions those transaction goals.

Summary Option 1 - Region Management

- Assign goals to regions, but don't assign goals to their transactions



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Option 2 - Transaction Management

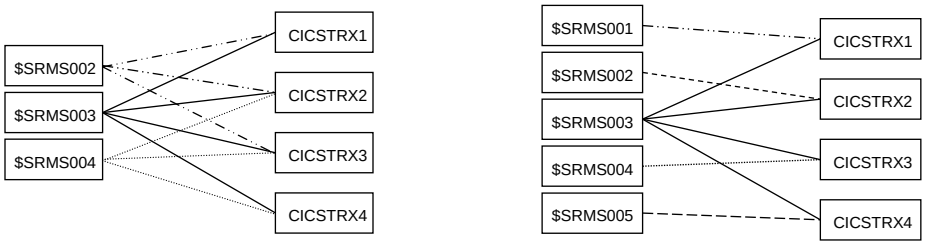
Assign regions velocity goals for management during startup, shutdown, and periods of inactivity

Assign transactions response time goals

WLM manages regions to meet the response time goals of the transactions they are serving, and ignores the goals of the regions

Option 2 - Transaction Management

- Assign velocity goals to regions, and
  Assign response time goals to CICS or IMS transactions
  - Initially, regions will be managed toward assigned velocity goals
  - When WLM 'sees' regions processing transactions
    - Ignores assigned goal of region
    - Instead manages region towards response time goal of transactions region is serving
- WLM will manage regions to meet the goals of the transactions
  - Your job is to ensure that goals for transactions are sufficient so regions can be managed to meet the response time objectives of the transactions they serve



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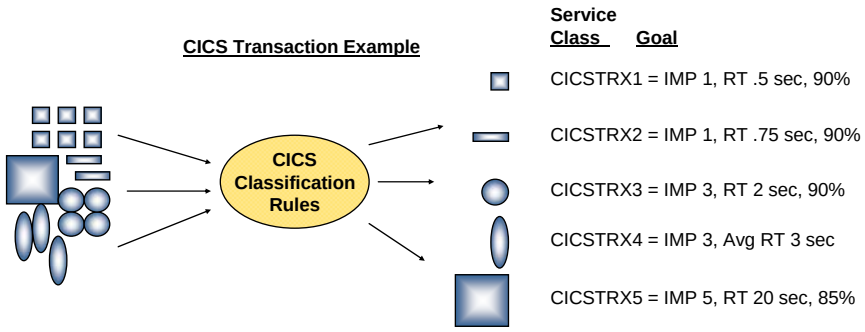
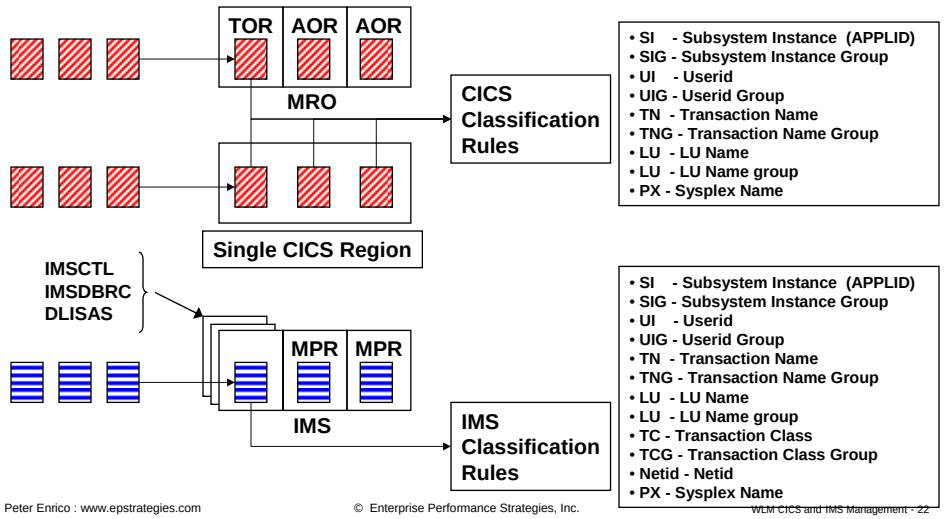
Classification of CICS & IMS Transactions

- CICS and IMS transactions can be classified to service classes
  - Use either average or percentile response time goals



Guidelines for CICS and IMS Transactions

- Classifying CICS and IMS transactions
  - Where transactions start is where the transactions are classified



Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

Option 2 – Transaction Classification Example

- Below is an example of the CICS classification rules
  - Note the service class column is not blank
  - You can get as fancy as you like with the classification rules and the report class column, but make sure the service class column is simple. Do not break the transactions up into too many service classes

```
Subsystem-Type  Xref  Notes  Options  Help
------------------------------------------------------------------------------
                Modify Rules for the Subsystem Type       Row 1 to 3 of 3
Command ===> _____________________________________________ SCROLL ===> PAGE

Subsystem Type . : CICS        Fold qualifier names?   Y  (Y or N)
Description  . . . CICS Transactions

Action codes:   A=After     C=Copy        M=Move     I=Insert rule
                B=Before    D=Delete row  R=Repeat   IS=Insert Sub-rule
                                                        More ===>
          --------Qualifier---------               -------Class--------
Action    Type       Name     Start                 Service     Report
                                                DEFAULTS: CICSDEF     RCCICSA
  ____  1  SI         CICP*    ___                   CICSPROD    RCCICSP
  ____  1  SI         CICT*    ___                   CICSDEV     RCCICST
  ____  1  SI         CICD*    ___                   CICSDEV     RCCICSD
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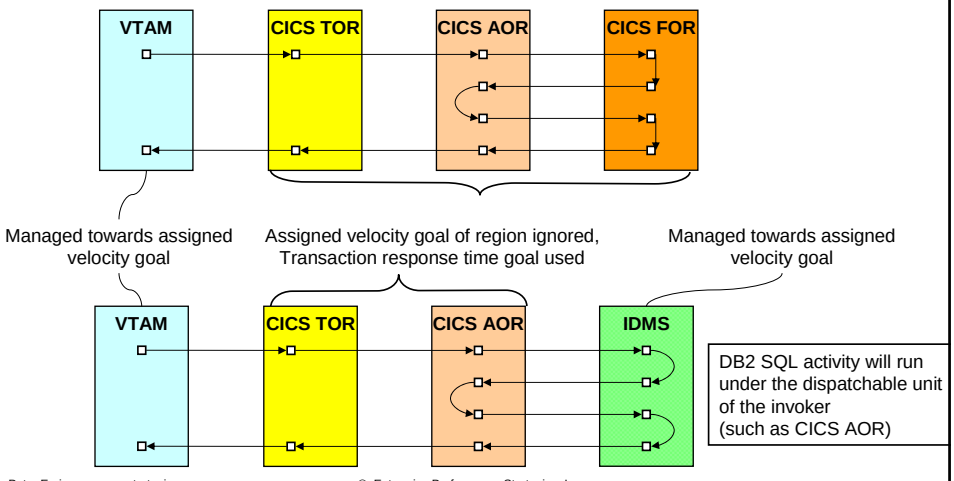
Transaction Flow and Management

- DB2 and other subsystems are 'non participants', but may be in the flow
  - When transaction management turned 'on', WLM will not manage address spaces other than CICS or IMS towards CICS and IMS transaction goals



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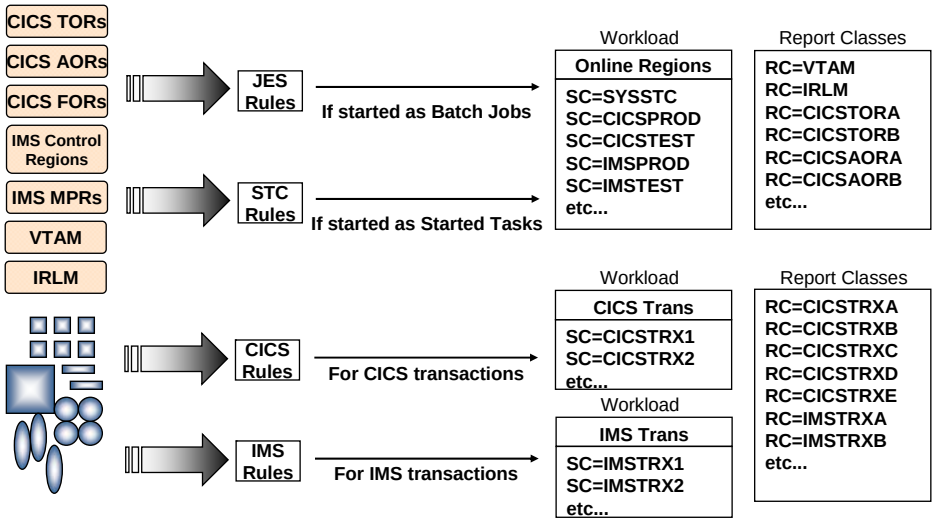
Summary Option 2 - Transaction Management

- Assign goals to regions, but assign goals to their transactions



Option 3 - Combination of Region and Transaction Management

Use Region Management for some workloads

Use Transaction Management for other workloads

Controlled by WLM classification options

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Option 3 - Mixture of Approaches 1 and 2

- You have the ability to choose if a region is to be managed towards region's goal or goals of the transactions being served
- Can optionally allow regions to be exempt from transaction response time management
  - Classification rule for region determines if regions is to be managed towards region's velocity goal, or to the transaction's response time goal
  - 'Manage Region Using Goals of'... control
    - Default is to use the transaction's response time goal
- History
  - When WLM was first introduced, migration to transaction management was an 'all or nothing' migration
  - When support for compatibility mode (i.e. non-WLM mode) was being phased out, some customers forced IBM to give them the option to not use transaction management.

Manage Regions Using Goals of....

- 'TRANSACTION' or 'REGION' classification rule control
  - Only valid for STC and JES classification rules
  - Only applies to CICS and IMS regions
  - When regions are classified as 'TRANSACTION'
    - WLM will manage regions towards goals of the transactions regions serve
  - When regions are classified as 'REGION'
    - WLM will manage regions towards assigned velocity goal of region

```
Modify Rules for the Subsystem Type        Row 1 to 2 of Command
 ===> _____________________________________________ SCROLL ===> PAG

  Subsystem Type . : STC          Fold qualifier names?   Y  (Y or N)
  Description  . . . IBM-defined subsystem type
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                 B=Before   D=Delete row   R=Repeat   IS=Insert Sub-rule

              -------Qualifier---------      ----Class-------   Storage   Manage Region
   Action     Type       Name     Start       Service  Report   Critical  Using Goals Of
                                  Default:    STCLOW
     ____  1  SY         SYS1     ___         ONLPROD  ________  NO        TRANSACTION
     ____  2    TN         CICSTEST ___       ONLTEST  ________  NO        REGION
     ____  2    TN         CICS*    ___       ONLPROD  ________  YES       TRANSACTION
```

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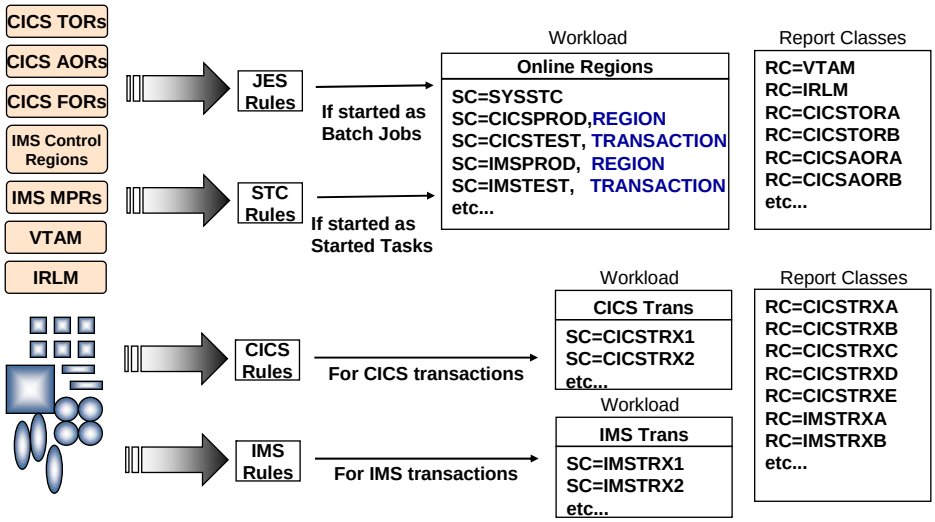
Summary Option 3 - Combination of Region and Transaction Management

- Assign goals to both regions and their transactions



Option 4 - Transaction Management with Region Importance

Manage regions to meet the response time goals of the transactions they are serving, but consider the assigned importance level of the regions

So full Transaction Management, but region importance level is used, but region goal is ignored

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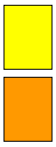
Option 4 - Transaction Management with Region Importance

- Option recently available in 2012, so check your APAR listing and z/OS updates
- WLM will factor in the importance level of the regions when managing them to meet the goals of the transactions they are serving
  - Sometimes you may want WLM to favor CICS TORs or IMS Control regions more
- Example 1: All regions assigned the same importance level
  - Works no different than previous WLM CICS and IMS transaction management
    - Service class CICSREGS Velocity 60, Importance 1

- Example 2: Separate certain regions into different service classes
  - Goal mostly irrelevant since it will be ignored
  - Different importance levels allow WLM to favor management of high importance regions over lower important regions
    - Service class CICSTORS Velocity 60, Importance 1
    - Service class CICSAORS Velocity 60, Importance 2



IMP 1, Velocity 60

IMP 2, Velocity 60

Manage Regions Using Goals of….

- ' BOTH' classification rule control
  - Only applies to CICS and IMS regions
  - Causes region's importance level to be considered during transaction management, but still causes region's goal to be ignored
    - Otherwise both importance level and goal are ignored

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Modify Rules for the Subsystem Type        Row 1 to 2 of Command
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  Subsystem Type . : STC          Fold qualifier names?   Y  (Y or N)
  Description  . . . IBM-defined subsystem type
  Action codes:  A=After    C=Copy         M=Move     I=Insert rule
                 B=Before   D=Delete row   R=Repeat   IS=Insert Sub-rule

              -------Qualifier---------      ----Class-------   Storage   Manage Region
   Action     Type       Name     Start       Service  Report   Critical  Using Goals Of
                                  Default:    STCLOW
     ____  1  TNG        CICSTEST  ___        ONLTEST  ________  NO        REGION
     ____  1  TN         CICST*    ___        CICSTORS ________  YES       BOTH
     ____  1  TN         CICSA*    ___        CICSAORS ________  YES       BOTH
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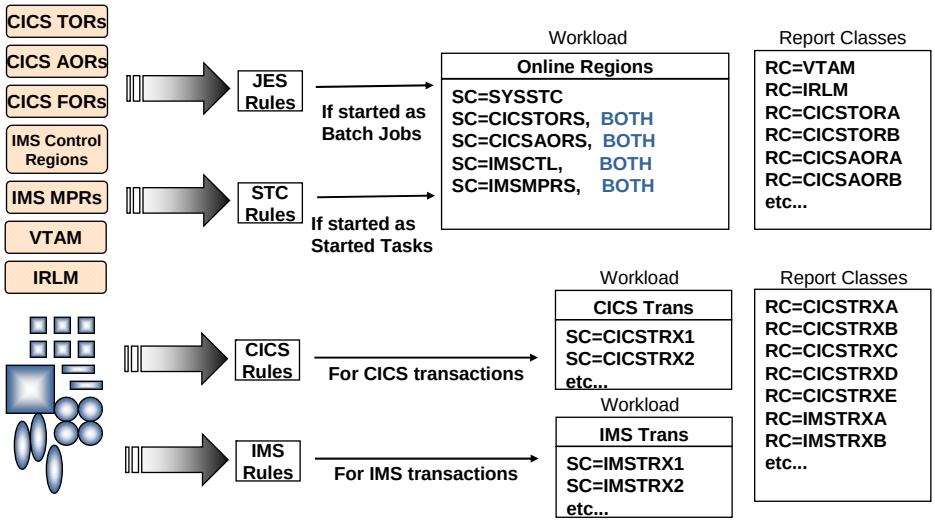
Option 4 – Transaction Management with Region Importance

- Assign goals to both regions and their transactions



Nuts and Bolts

When CICS and IMS Transaction Management is used, regions are managed to meet the goals of the transaction they are serving, the goals of the CICS and IMS regions are

ignored!

Region's importance level may be considered if 'BOTH' option used

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Objective of WLM Management of CICS & IMS

- Allow assignment of goals to the transactions and let the WLM determine which regions need the resources to meet these goals.

Region Goals

IMP 1, Velocity 60

Transaction Goals

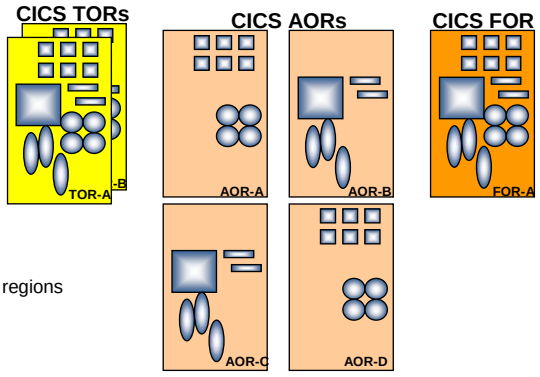
IMP 1, RT .5 sec, 90%

IMP 1, RT .75 sec, 90%

IMP3, RT 2 sec, 90%

IMP 3, Avg RT 3 sec

IMP 5, RT 20 sec, 85%

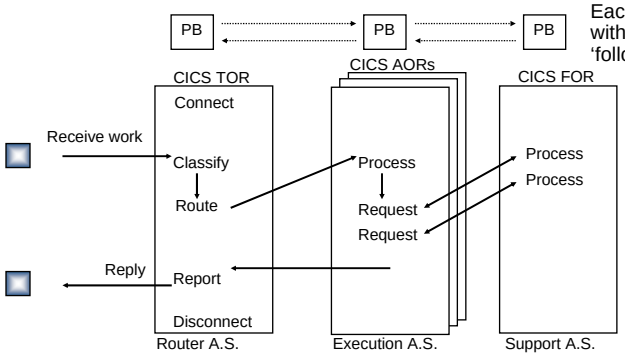


To meet the RT goals of ▢ the following regions must be managed:

- CICS TOR-A, TOR-B
- CICS AOR-A, AOR-D
- CICS FOR-A

WLM needs an awareness of which regions are processing which transactions, and how often

- CICS and IMS exploit WLM Work Manager services
  - Regions '***Connect*** (ie 'register') to WLM during startup & obtain current service policy
  - At transaction startup, region uses WLM '***Classify*** to associate incoming transaction with a service class
  - At transaction end, region uses WLM '***Report*** to signal end and report response time
  - Other important services to make this all work



Each transaction is 'associated' with a Performance Block(s) that 'follows' the transaction.

Note: IMS looks a little different, but similar concept

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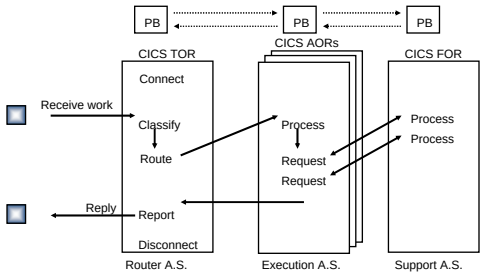
WLM Sampling and CICS MAXTASK Parameter

- Beware of excess sampling overhead due to CICS MAXTASK parameter!
  - In a CICS environment, one PB is pre-allocated for each possible task as set by the CICS MAXTASK parameter
- All PBs are sampled every 1/4 second
  - Could cause lots of WLM sampling overhead!
  - Check CICS MAXTASK parameter to make sure it is not set unnecessarily high
    - Set to your system's true high water mark
  - Mostly resolved, but still watch MAXTASK



WLM Maintains a Server History

- Used to establish which transactions each region is processing

Service Class Goal

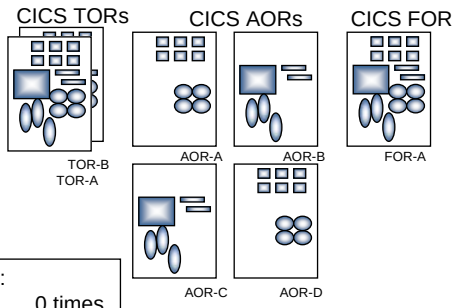
CICSTRX1 = IMP 1, RT .5 sec, 90%

CICSTRX2 = IMP 1, RT .75 sec, 90%

CICSTRX3 = IMP 3, RT 2 sec, 90%

CICSTRX4 = IMP 3, Avg RT 3 sec

CICSTRX5 = IMP 5, RT 20 sec, 85%



TOR-A served:	
• CICSTRX1 =	1000 times
• CICSTRX2 =	1500 times
• CICSTRX3 =	400 times
• CICSTRX4 =	100 times
• CICSTRX5 =	5 times

AOR-B served:	
•CICSTRX1 =	0 times
• CICSTRX2 =	500 times
• CICSTRX3 =	0 times
• CICSTRX4 =	50 times
• CICSTRX5 =	20 times

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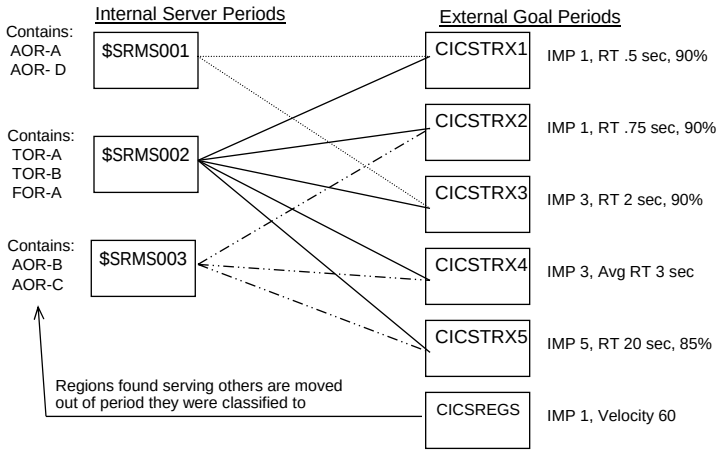
WLM Builds the Server Topology

- WLM maintains a 'server topology' reflecting what regions are serving which transactions
  - Allows WLM to always understand
    - Which address spaces to help in order to meet the goals of the transactions
    - Which transaction goals will be helped/hurt by giving/taking resources to/from servers
- WLM CICS and IMS server topology consists of
  - 'External goal periods'
    - Transaction response time periods being served
  - 'Internal Server periods' (a.k.a. dynamic internal periods)
    - Internal periods created by WLM to 'hold' the serving address space
    - Named $SRMSxxx
  - Lots of counts and relationship indicators
    - How often external goal period was served by an dynamic internal period
    - How often dynamic internal period was serving a external period
    - Aggregation of state samples
    - more...

WLM Server Topology CICS Example

- Server Topology - CICS Example



Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

What SERVER = YES / NO means

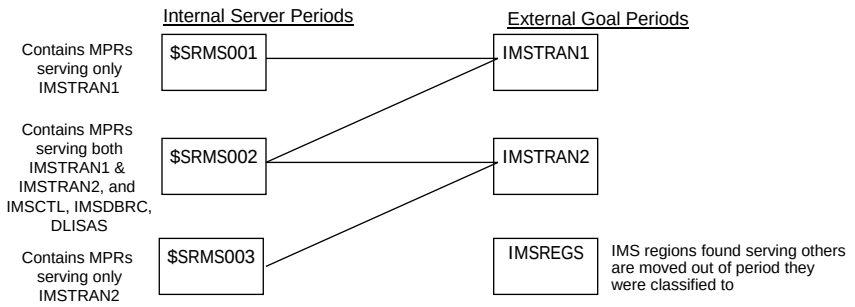
- Many real time reporting tools will report if an address space is being treated as a server in using these topology algorithms
  - SERVER = Yes
    - Server goal is ignored and address space is being managed towards goal of served transactions
  - SERVER = No
    - Sever address space's goal is being honored
- Example of SDSF Report

```
SDSF DA SYSA  SYSA     PAG    0 SIO     0 CPU  28/ 27  LINE 1-138 (138)
 COMMAND INPUT ===>                                    SCROLL ===> PAGE
 NP   JOBNAME  STEPNAME PROCSTEP   JOBID    OWNER  C SYSNAME  POS SR DP WORKLOAD SRVCLASS SP RESGROUP SERVER

      CICSPA   CICSPA   CICS130  STC00001 $SCICPA    SYSA     NS     F7 STC      CICSSTC   1          YES
      CICSPC   CICSPC   CICS130  STC04298 $SCICPC    SYSA     NS     F7 STC      CICSSTC   1          YES
      CICS9G   CICS9G   CICS130  STC04312 $SCIC9G    SYSA     NS     F7 STC      CICSSTC   1          YES
      CICS     CICS     CICS130  STC04314 $SCIC0     SYSA     NS     F7 STC      CICSSTC   1          YES
      CICSPB   CICSPB   CICS130  STC01919 $SCICPB    SYSA     NS     F7 STC      CICSSTC   1          YES
      DB2PDBM1 DB2PDBM1 IEFPROC  STC00640 DB2PDBM1   SYSA     NS     FD ONLINE   DBPROD    1          NO
      DB2PSPAS DB2PSPAS IEFPROC  STC00675 DB2PSPAS   SYSA     NS     FD ONLINE   DBPROD    1          NO
      CICSPD   CICSPD   CICS130  STC00467 $SCICPD    SYSA     NS     FD STC      CICSSTC   1          YES
      DB2PDIST DB2PDIST IEFPROC  STC00660 DB2PDIST   SYSA     NS     FD ONLINE   DBPROD    1          NO
      DB2PIRLM DB2PIRLM          STC00634 DB2PIRLM   SYSA     NS     FD ONLINE   DBPROD    1          NO
      DB2PMSTR DB2PMSTR IEFPROC  STC00632 DB2PMSTR   SYSA     NS     FD ONLINE   DBPROD    1          NO
```


WLM Server Topology IMS Example

- Server Topology - IMS Example

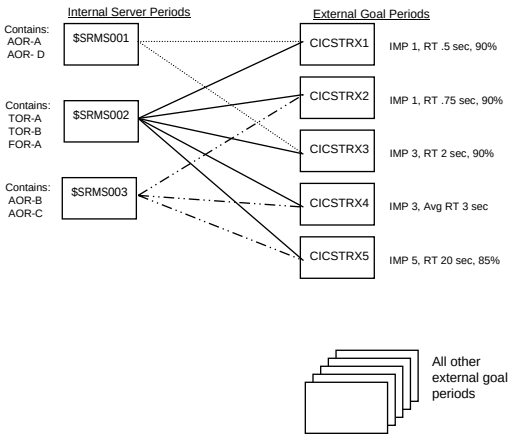


Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

WLM Policy Adjustment Example

- Policy Adjustment - Example

1. 'Select receiver' picks CICSTRX1
2. 'Find bottleneck' sees CICSTRX1 has no delay samples (because no address spaces in period)
3. 'Find bottleneck' looks at $SRMSnnn periods serving CICSTRX1 for largest delay
4. 'Find bottleneck' determines that largest delay state is in $SRMS002
   - Goal receiver = CICSTRX1
   - Resource receiver = $SRMS002
5. Policy adjustment gives resources (CPU, I/O, storage, etc..) to address spaces in $SRMS02 to help CICSTRX1



WLM Measurement Reporting Notes

- CICS Transactions
  - The only WLM measurements available for CICS transactions will be
    - ENDED, ENDED per second, Response Times, Response Time distribution
  - No resource measurements at the transaction level available
    - So no CPU, Storage, or out measurements
- CICS Regions
  - Even though the goals for the regions are ignored, and the regions are actually managed in separate $SRMSxxx service class periods, all measurements are still accumulated to the service class they are classified to
    - This is why it it is strongly recommended you classify 'Server = Yes' regions to different service classes not managed as WLM servers
    - Measurement screwed up or miss leading

Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

CICS and IMS Report Example

```
                                        W O R K L O A D   A C T I V I T Y
                                                                                                   PAGE  16
    z/OS V1R12           SYSPLEX EPSPLEX           DATE 07/09/2012          INTERVAL 09.59.886   MODE = GOAL
                         RPT VERSION V1R12 RMF     TIME 09.20.00

                                  POLICY ACTIVATION DATE/TIME 06/28/2012 06.15.08
------------------------------------------------------------------------------------------------------------ SERVICE CLASS PERIODS

REPORT BY: POLICY=WLMEPS     WORKLOAD=CICS      SERVICE CLASS=CICSHIGH RESOURCE GROUP=*NONE      PERIOD=1 IMPORTANCE=2
                                                CRITICAL     =NONE

-TRANSACTIONS-  TRANS-TIME HHH.MM.SS.TTT
AVG       0.00  ACTUAL                48
MPL       0.00  EXECUTION              0
ENDED     3841  QUEUED                 0
END/S     6.40  R/S AFFIN              0
#SWAPS       0  INELIGIBLE             0
EXCTD        0  CONVERSION             0
AVG ENC   0.00  STD DEV              293
REM ENC   0.00
MS ENC    0.00

          RESP  -------------------------------- STATE SAMPLES BREAKDOWN (%) -------------------------------  ------STATE------
SUB    P  TIME  --ACTIVE-- READY IDLE  -----------------------------WAITING FOR-----------------------------  SWITCHED SAMPL(%)
TYPE       (%)   SUB  APPL              I/O PROD MISC LOCK CONV                                              LOCAL SYSPL REMOT
CICS  BTE 20.1K  0.2   0.0   0.0  0.0   0.0 62.2 37.4  0.0  0.2                                                0.2   0.0   0.0
CICS  EXE 88.8  11.3   0.0   0.2 85.6   2.9  0.0  0.0  0.0  0.0                                                3.1   0.0   0.0
DB2   BTE 11.3   8.4   0.0   0.0  0.0  56.6  0.0  9.6 25.3  0.0                                                0.0   0.0   0.0
DB2   EXE  3.8  17.9   0.0   0.0  0.0  75.0  0.0  3.6  3.6  0.0                                                0.0   0.0   0.0

GOAL: RESPONSE TIME 000.00.01.000 FOR  95%

         RESPONSE TIME EX   PERF
SYSTEM         ACTUAL%    VEL% INDX

SYS1              100      N/A  0.5

                                               ----------RESPONSE TIME DISTRIBUTION----------
   ----TIME----    --NUMBER OF TRANSACTIONS--    -------PERCENT-------  0    10   20   30   40   50   60   70   80   90   100
   HH.MM.SS.TTT    CUM TOTAL         IN BUCKET    CUM TOTAL   IN BUCKET  |....|....|....|....|....|....|....|....|....|....|
<  00.00.00.500         3812              3812         99.2        99.2  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<= 00.00.00.600         3821                 9         99.5         0.2  >
```

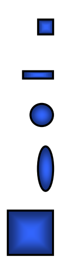
Good data, but no resource data

State Data usually garbage and useless… Ignore!

Valid Response Time Distribution Data

CICS Regions Processing All Transactions

- Common scenario: an environment when all transactions are processed by all regions
  - Usually stand-alone CICS regions
  - Could be MRO when all regions process all transaction
- Many users mistakenly take care in setting goals for each type of transaction



IMP 1, RT .5 sec, 90%

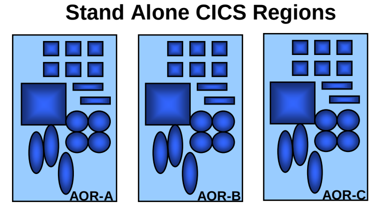
IMP 1, RT .75 sec, 90%

IMP3, RT 2 sec, 90%

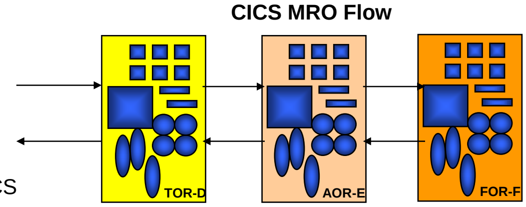
IMP 3, Avg RT 3 sec

IMP 5, RT 20 sec, 85%

Stand Alone CICS Regions



CICS MRO Flow



To meet the RT goals of ■ all the CICS regions need to be managed

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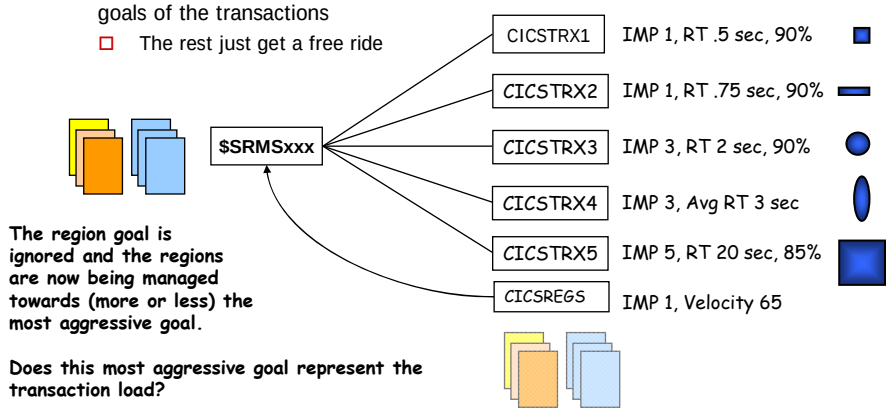
Note: Our WLM performance workshop is a week of both learning and analyzing your own WLM environment and measurements.

Example of this Misadventure

- CICS regions that processes all transactions
  - WLM admin categorizes and classifies the different transactions and assigns goals
  - Then it turns out that all regions process all transactions
  - The net effect is that WLM will just manage the regions to the most aggressive goals of the transactions
    - The rest just get a free ride



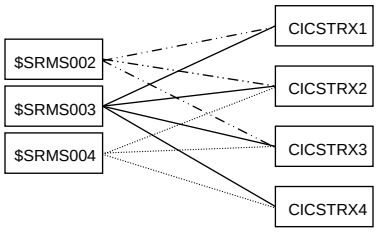
The region goal is ignored and the regions are now being managed towards (more or less) the most aggressive goal.

Does this most aggressive goal represent the transaction load?

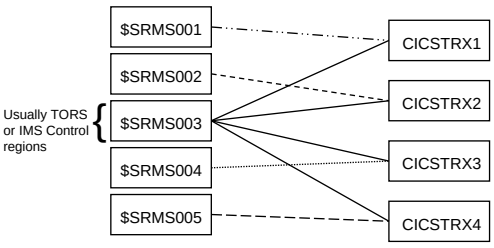
Additional Considerations

- Heterogeneous versus homogeneous transaction mix in regions
  - IMS or CICS MRO when regions serving heterogeneous set of service classes
    - Lose the true benefit of WLM server management - managed to strictest goal
  - Best if can separate transactions into different regions
    - Decreases free rides
  - AOR cloning with dynamic transaction routing is very effective

Lots of free rides possible



Preferred server topology



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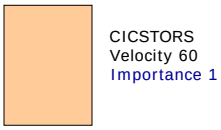
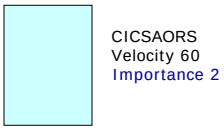
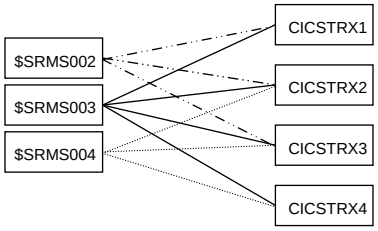
Additional Considerations

- When Importance level assigned to regions is considered, WLM will consider this importance level when managing the regions in the $SMFSxxx periods

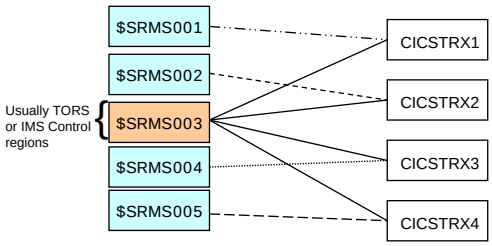




Lots of free rides possible

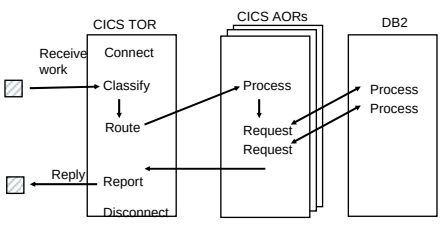


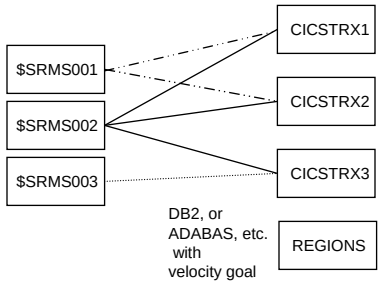
Preferred server topology



Additional Considerations cont...

- Transaction still affected by what other goal periods achieve
  - Non-participant (non-exploiters) of WLM server management services
    - ADABASE, IDMS, WMQ, CICS CTG, etc.
    - Note: DB2 runs XMEM so gets regions CPU DP
  - Performance Index reflects system response time achieved (including time spent in database region)
    - Yet no $SRMSnnn period to give resources to if delay in database region





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Key Classification Recommendations

Best Way to Setup for Transaction Management

- Carefully choose a set of transactions to influence WLM's management of the regions
  - Hopefully a set of high importance transactions
- Carefully choose a second set of transactions to influence WLM's management of the regions
- Classify all other transactions to a lower importance response time goal service class and let them be 'drag along' for management
- Make heavy use of WLM report classes

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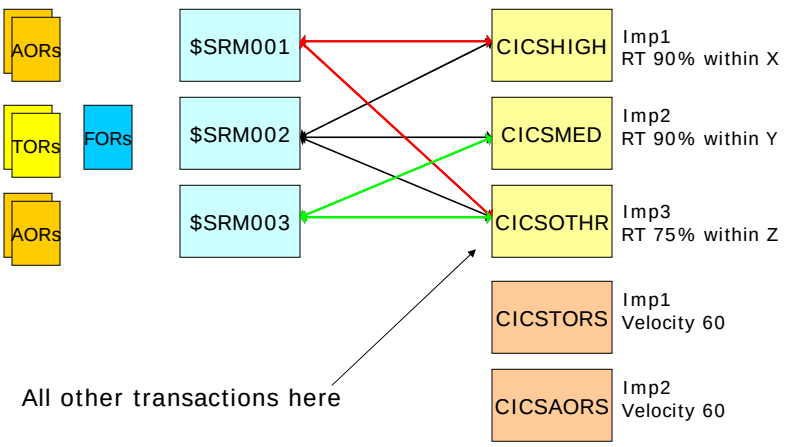
Example of a Topology



Number One Recommendation

- Start simple, and grow to just a few transaction service classes
  - Unless you are using report classes, use few classification rules
    - Could use TNG if many transactions are to be classified alike
  - Setup in a way that makes the most business sense
  - Could set up using a 'production' versus 'test' approach
- Create just a few service classes for your CICS and/or IMS transactions
- Have 1, 2, or 3 of these service classes contain transactions that you want WLM to use to manage the CICS and/or IMS workload
- Then classify all other transactions to some ‘OTHRTRAN’ type service class
  - Simple goal, low importance
- This way WLM will manage the workloads towards the goals of the key transactions and all others get a ‘free ride’

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Guidelines for Transaction Classification

- A successful migration to CICS or IMS transaction goals will depend on your understanding of these characteristics of your CICS or IMS workload.
  - Transactions of interest?
  - Transactions that are predictable / repeatable
  - Transactions for which there are 'enough' of them and which have a consistent / regular flow during periods of interest
  - Transactions that are not long running or never ending
  - Transactions that are CPU sensitive transactions
  - Transactions that are indicative of the health of the workload
  - Transactions that are not mirror transactions
  - Transactions that are not distributed, flow to different systems, or have a lot of unknown time
  - Transactions that flow through the regions (i.e. at least one transaction per region)
  - Transactions that are part of your workload / application, and not CICS or IMS system or internal transactions

Guidelines for Transaction Classification

- Use percentile response time goals (over average response time goals) when possible
- Assign transactions to single period service classes assigned response time goals
  - Cannot assign transactions velocity or discretionary goals
  - Average RT goals enable CICS CP/SM to route base on goals
  - Percentile goals enable CP/SM to revert to shortest queue routing algorithm
- Period durations are meaningless. Transactions will never transition to second period
  - Transactions do not use up service; the regions do! So they are unable to transition
  - Multiple period service classes are useless
- Unless additional changes are made to classification of regions
  - Classification of transactions is 'all or nothing'
  - Cannot just turn on transaction classification for some transactions
- Make use of report classes!
  - Great for monitoring individual types of transactions

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Conclusion

- There is no right / best solution or option
  - For some installations transaction management is best
  - But for other installations, transaction management could be a disaster
- Keep your WLM setup for CICS and IMS workloads simple
  - Overly complicated setups could be a waste of time and lead to unpredictable WLM management
- If you choose to implement WLM transaction management, put thought into which transactions you classify, and what goals and importance levels you give these transactions