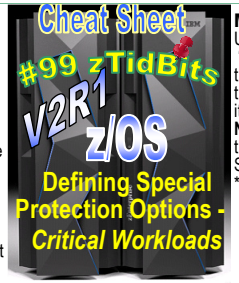

* Several options are available to help **performance administrators** protect critical work.
  - Applicable to several subsystem types such as CICS and IMS work which will benefit from the feature enhancements described here:
  - ➢ Long-term storage protection
  - ➢ Long-term CPU protection
  - ➢ Long-term I/O protection
  - ➢ Modifications of transaction response time management

The logic used by WLM is based on supply and demand (DONOR /RECIEVER) resource sharing and workload importance.

Note: The use of these options limits WLM's ability to manage the system. This may affect system performance and/or reduce the overall throughput. WLM's quality to manage all system resources is restrained, therefore you should consider implementation under specific circumstances.

Long-Term Storage Protection

When you assign long-term storage protection to critical work, WLM restricts storage donations to other work.

* This option can be useful for work that needs to retain storage during long periods of inactivity because it cannot afford paging delays when it becomes active again.
* With long-term storage protection assigned, this work will lose storage only to other work of equal or greater importance that needs the storage to meet performance goals.
* You assign long-term storage protection with the WLM "Storage Critical" option, found by scrolling right on the WLM **"Modify Rules for the Subsystem Type" panel** shown here. →

Note: A past term used for this type of resource protection - "storage fencing".

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

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---------      Storage    Manage Region
 Action    Type       Name     Start     Critical   Using Goals Of
  ____  1  TN         COMBL*   ____      NO           N/A
  ____  2  UI         COMBLD   ____      NO           N/A
  ____  2  UI         COMFTP   ____      YES          N/A
```

Storage Critical for address spaces:

You can assign storage protection to all types of address spaces using classification rules for subsystem types ASCH, JES, OMVS, STC, and TSO. By specifying YES in the "Storage Critical" field for a classification rule, you assign storage protection to all address spaces that match that classification rule.

* An address space must be in a service class that meets two requirements, however, before it can be storage-protected:
  - The service class must have a single period.
  - The service class must have either a velocity goal, or a response time goal of over 20 seconds.

Note: These 2 requirements only apply to the address spaces classified under subsystem types described above. When an address space which has the storage critical attribute joins an enclave, it looses the storage critical attribute.

Storage Critical for CICS and IMS transactions : For CICS and IMS work, you can assign long-term storage protection by Specifying YES in the "Storage Critical" field in the rules for specific transactions.

Note: Once you specify YES for one transaction in a CICS/IMS service class, *all CICS/IMS transactions in that service class* will be storage-protected. If a CICS or IMS region is managed as a server by WLM (managed to the response time goals of the transactions it serves) and *any* of the transaction service classes it serves is assigned storage protection, then the CICS/IMS region itself is automatically storage-protected by WLM.

* As an alternative to assigning storage protection based on specific transaction service classes, you can instead choose to assign storage protection to the region in which the transactions run by adding or modifying the STC or JES classification rule that assigns the service class to the region.

These options restrain the normal operation of Workload Manager. Use with Caution !

Because storage protection can be *implicitly* applied to an entire transaction service class, and because WLM may or may not be honoring a customer's storage or CPU protection assignment at any given time, there are seven different "states" that can be reported and Can be found in SMF type 30 and type 79.1 records records. States that apply to an entire service class are also reported in SMF 72.3 records.

Long-Term CPU Protection → Enhanced

When you assign long-term CPU protection to critical work, you ensure that less important work will generally have a lower dispatch priority.

Note: There are some rare exceptions, such as when other work is promoted because it is holding an enqueue for which there is contention.

* This protection can be valuable for work which is extremely CPU-sensitive, such as certain CICS and IMS transactions.

```
                        Create a Service Class              Row 1 to 2 of 2

Service Class Name . . . . . . APPC9     (Required)
Description  . . . . . . . . . _____________________________
Workload Name  . . . . . . . . APPC      (name or ?)
Base Resource Group  . . . . . _____     (name or ?)
Cpu Critical . . . . . . . . . YES       (YES or NO)
I/O Priority Group . . . . . . NORMAL    (NORMAL or HIGH)


Specify BASE GOAL information. Action Codes: I=Insert new period,
E=Edit period, D=Delete period.
```

Limit use of CPU critical

– Intended to be used when rapid workload shifts happen regularly and WLM will not be fast enough in adjusting priorities.

– CPU Critical only protects that work from lower importance work, no protection from work at same or higher importance, better to have the right goal

* Use the CPU Critical option on the **Modify a Service Class panel** to assign long-term CPU protection to a specific service class.
* You can assign CPU protection to service classes handling address space-oriented work, enclave work, or CICS/IMS transactions, but the service class *must* have only one period, and it cannot have a discretionary goal.
  - If a CICS or IMS region is managed as a server by WLM (managed to the response time goals of the transactions it serves) and any of the transaction service classes it serves is assigned CPU protection, then the CICS/IMS region itself is automatically CPU-protected by WLM.

Long-Term IO Protection → New

When you assign a service class to I/O priority group HIGH, you ensure that work managed by this service class always has a higher I/O priority than work managed by service classes assigned to I/O priority group NORMAL.

This protection can be valuable for work which is extremely I/O-sensitive.

* Use the "I/O Priority Group" field on the **"Create a Service Class" panel** and specify HIGH to assign long-term I/O protection to a specific service class.

Note: I/O priority group HIGH is ignored by workload management unless I/O priority groups are enabled.

```
                        Create a Service Class              Row 1 to 1 of 1

Service Class Name . . . . . . CICSHI    (Required)
Description  . . . . . . . . . _____________________________
Workload Name  . . . . . . . . CICSWKLD  (name or ?)
Base Resource Group  . . . . . _____     (name or ?)
Cpu Critical . . . . . . . . . NO        (YES or NO)
I/O Priority Group . . . . . . HIGH      (NORMAL or HIGH)

Specify BASE GOAL information. Action Codes: I=Insert new period,
E=Edit period, D=Delete period.
```

When running CICS/IMS with response time goals, and CPU critical is necessary, designate both regions and transactions as CPU Critical. Note – this handles idle periods and restarts.

Modifications of Transaction Response Time Management

Use the "Manage Region Using Goals Of:" field in the "Modify Rules for the Subsystem Type" panel to declare that a specific CICS/IMS region will not be managed to the response times of the CICS/IMS transactions that it processes.

Note: Other regions are not affected by what is in this column, and that this option can only be used in STC and JES classification rules.

* If you specify TRANSACTION in this field (the default), the region will be managed as a CICS/IMS transaction server by WLM. If you specify REGION in this field, the region will be managed to the performance goal of the service class assigned to that region (address space).
  - In other words, it will *not* be managed as a CICS/IMS transaction server by WLM.
  - If you specify BOTH in this field, the region will also be managed to the performance goal of the service class assigned to that region, but it will nevertheless track all transaction completions so that WLM can still mange the CICS service classes with response time goals.

Note: Option BOTH should only be used for CICS TORs. All AORs should remain at the default TRANSACTION.

```
                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
Action codes:  A=After    C=Copy        M=Move     I=Insert rule
               B=Before   D=Delete row  R=Repeat   IS=Insert Sub-rule
                                              <=== More
          -------Qualifier---------      Storage    Manage Region
 Action    Type       Name     Start     Critical   Using Goals Of
  ____  1  SY         SYST1    ____      NO         TRANSACTION
  ____  2  TN         CICSTEST ____      NO         REGION
  ____  2  TN         CICS*    ____      YES        TRANSACTION
  ____  2  TN         TOR      ____      NO         BOTH
  ____  2  TN         AOR*     ____      NO         TRANSACTION
```

The following table summarizes the effects of the storage protection, CPU protection, and exemption from transaction response time management options:

When you…	WLM …
Assign CPU protection to a service class used to manage address spaces and / or enclaves	Protects any address space or enclave managed according to the goals of that service class. Address spaces being managed as servers are managed according to the goals of the served transactions.
Assign storage protection to an ASCH, JES, OMVS, STC or TSO address space.	Protect any address space which matches the classification rule, regardless of its server status. Address spaces currently running in multi-period servie classes or in service classes with a short response time goal (20 seconds or less) are excluded from protection.
Assign CPU or storage protection to a CICS or IMS transaction.	Protects any regions recognized as serving that CICS / IMS transaction, unless you prevent WLM from managing the regions as servers. Note – once storage protection is assigned to any transaction in a service class, then *all* transactions in the same service class become storage protected.
Manage a CICS or IMS region using the goals of the region.	Is prevented from managing the region according to the response time goals of the transactions it is running. It does not recognize the region as a server. The region is managed using the goal of the service class assigned to the region. Transaction response time data is not reported in the service classes to which the transactions are classified, but is still reported in their report classes, if assigned.
Manage a CICS or IMS Region using the goals of both region and transaction.	Manages the region using the goal of the service class assigned to the region. This also ensures that the region tracks all transaction completions correctly so that it can still manage the CICS service classes with response time goals. NOTE: The option should only be used for CICS TORs. All AORs should remain at the default (TRANSACTION). In addition, the service class for the CICS TORs should be defined with a higher importance than the the service class for the CICS transactions.
Issue the RESET QUIESCE command	Will no longer enforce CPU protection. All other options remain unchanged.
Issue the RESET SRVCLASS= or RESET RESUME	Will assign CPU protection if the target service class has the CPU protection attribute. All other options remain unchanged.