Understand how the new features
in CICS can improve the management
of workloads and security

August 2011

IBM CICS System Management: New features in Version 4.2

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CICS icon of progress: http://www.ibm.com/ibm100/us/en/icons/cics/

Executive Summary

CICS® Transaction Server (CICS TS) is IBM®'s general-purpose transaction processing software for z/OS®. It is a powerful application server that meets the transaction-processing needs of both large and small enterprises. It builds on z/OS and System z® facilities to provide high availability and scalability at a low cost per transaction; it supports large transaction volumes with a fast and consistent response time.

CICS TS for z/OS handles billions of transactions a week. Companies around the world rely on their CICS systems in their daily operation. The administration, management of workload and efficient operation of these systems is also very important and many customers rely on the use of CICSPlex® System Manager, the CICS Explorer™, or both for this purpose.

The latest release of CICS, CICS TS Version 4.2, includes:

- Significant enhancements to CICSPlex SM workload management (WLM).
- Managing unit of work affinities with Distributed Program Link (DPL).
- The ability to discover and view CICS system initialization parameters.
- Enhanced password phrase security.
- An increased number of VSAM LSR pools to provide improved performance when accessing certain files.

Introduction

With the need to handle increasing volumes of transactions, enterprises are having to implement extensive and more complex system configurations that often consist of web front ends, WebSphere® Application Servers, WebSphere MQ®, WebSphere Message Broker, CICS, DB/2®, IMS™, and other products. The tasks of systems management, security administration, problem determination, and workload management then become rather challenging. The CICS TS Development team recognise this and constantly look for ways to enhance the overall use and management of CICS TS.

CICS TS 4.2, which was made generally available on June 24th, 2011, introduces numerous enhancements that address requirements from key customers and which are designed to aid and simplify the task of systems management for the next generation of IT professionals. For example, CICSPlex System Manager has been significantly enhanced to:

- Introduce link neutral WLM algorithm types that do not take the connection type into account.
- Provide the ability to specify a WLM algorithm type at a transaction group level.
- Take into account unit of work affinities with distributed programming links (DPLs).
- Provide the ability to view CICS system initialization parameters.

This paper discusses these enhancements in turn.

CICSPlex SM link neutral dynamic routing algorithms

Prior to CICS TS 4.2, CICSPlex SM WLM supported two dynamic routing algorithms:

- Queue mode

  Target regions for transactions routed through queue mode are selected on the basis of their current task load, their health state, the link type between the router and the target, and the existence of any active Run Time Analysis (RTA) events and any abend compensation probabilities defined in the workload management specification (WLMSPEC) or transaction groups (TRANGRPs) associated with the workload.

- Goal mode

  Target regions for transactions routed through goal mode are selected on the basis of the response time goal (either average or percentile) for the transaction being routed, as specified by the workload manager component of z/OS. If a specific target cannot be identified through the goal algorithm execution, then the queue algorithm is applied to the remaining set of target regions.

Note that if there are any transaction affinities outstanding for the transaction being routed, the affinity target region is selected regardless of the algorithm being executed.

CICS TS 4.2 introduces two link neutral WLM dynamic routing algorithms:

- Link neutral queue algorithm (LNQUEUE)

  Target regions for transactions routed through link neutral queue mode are selected on the basis of their current task load, their health state, and the existence of any active RTA events and any abend compensation probabilities defined in the WLMSPEC or TRANGRPs associated with the workload. This is the same as the standard queue algorithm, but the link type factor is not included in the calculation of the routing weight for a target region.

- Link neutral goal algorithm (LNGOAL)

  Target regions for transactions routed through goal mode are selected on the basis of the response time goal (either average or percentile) for the transaction being routed, as specified by the workload manager component of z/OS. If a specific target cannot be identified through the goal algorithm execution, then the new link neutral queue algorithm is applied to the remaining set of target regions. Again, this is the same as the standard goal algorithm, but the link type factor is not included in the calculation of the routing weight for a target region.

As before, note that if there are any transaction affinities outstanding for the transaction being routed, the affinity target region is selected regardless of the algorithm being executed.

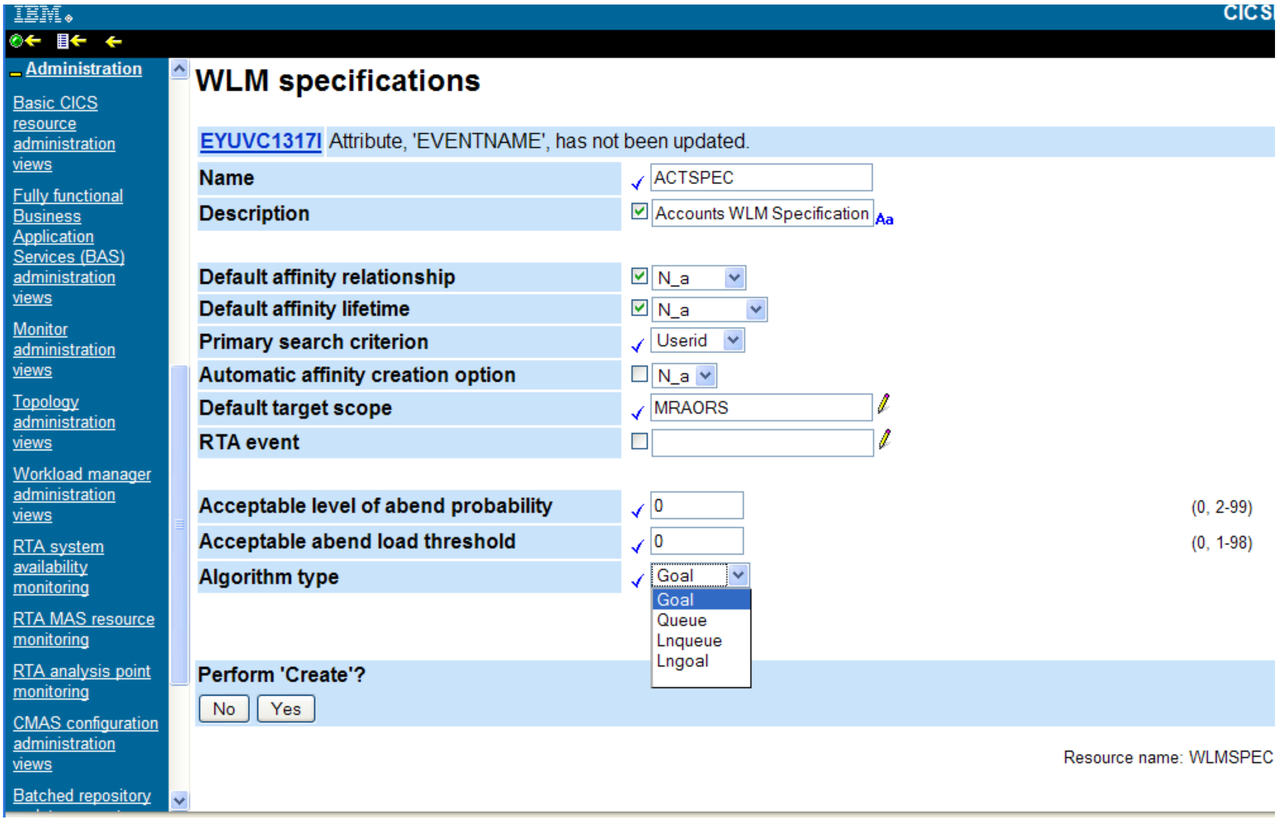
Link neutral algorithms are beneficial for the routing of dynamic transactions that, for example, may require services from MVS™ subsystems. With the standard routing algorithms, routers focus dynamic traffic on the systems with the fastest links, which by implication probably reside in the same LPAR. This could cause such subsystems to become overloaded in the local MVS image, whereas remote MVS images participating in the workload would be relatively under-utilized. By assigning these transactions to a TRANGRP that specifies a link neutral algorithm (discussed in the next section), dynamic traffic is routed to the local and remote LPARs on a relatively even basis, therefore spreading the load across those subsystems.

The intention of the link neutral algorithm types is to isolate the connection factor from the rest of the routing weight calculation. The effect of this is that the most remote target regions (most likely connected with the slowest telecommunications links) are just as favorable as locally connected MRO regions (or even the routing region itself if it is part of the routing target scope). Use of the LNQUEUE or LNGOAL algorithm at the WLMSPEC level can therefore affect every dynamically routed transaction. The consequence of this is that WLM may not necessarily choose the best target region for your dynamically routed traffic. This might therefore have a detrimental effect on the overall workload throughput.

If a link neutral algorithm is desired for a specific transaction set, an algorithm type can be specified in a WLM TRANGRP definition. This is described in the following section.

Specifying dynamic routing algorithms at the transaction group level

Prior to CICS TS 4.2, CICSPlex SM WLM allowed the specification of a single dynamic routing algorithm at the WLMSPEC level:


IBM
CICS
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Topology administration views
Workload manager administration views
RTA system availability monitoring
RTA MAS resource monitoring
RTA analysis point monitoring
CMAS configuration administration views
Batched repository
Goal
Queue
Lnqueue
Lngoal
No
Yes

WLM specifications

EYUVC1317I Attribute, 'EVENTNAME', has not been updated.

Name	✓	ACTSPEC	
Description	☑	Accounts WLM Specification	
Default affinity relationship	☑	N_a	
Default affinity lifetime	☑	N_a	
Primary search criterion	✓	Userid	
Automatic affinity creation option	☐	N_a	
Default target scope	✓	MRAORS	
RTA event	☐		
Acceptable level of abend probability	✓	0	(0, 2-99)
Acceptable abend load threshold	✓	0	(0, 1-98)
Algorithm type	✓	Goal	

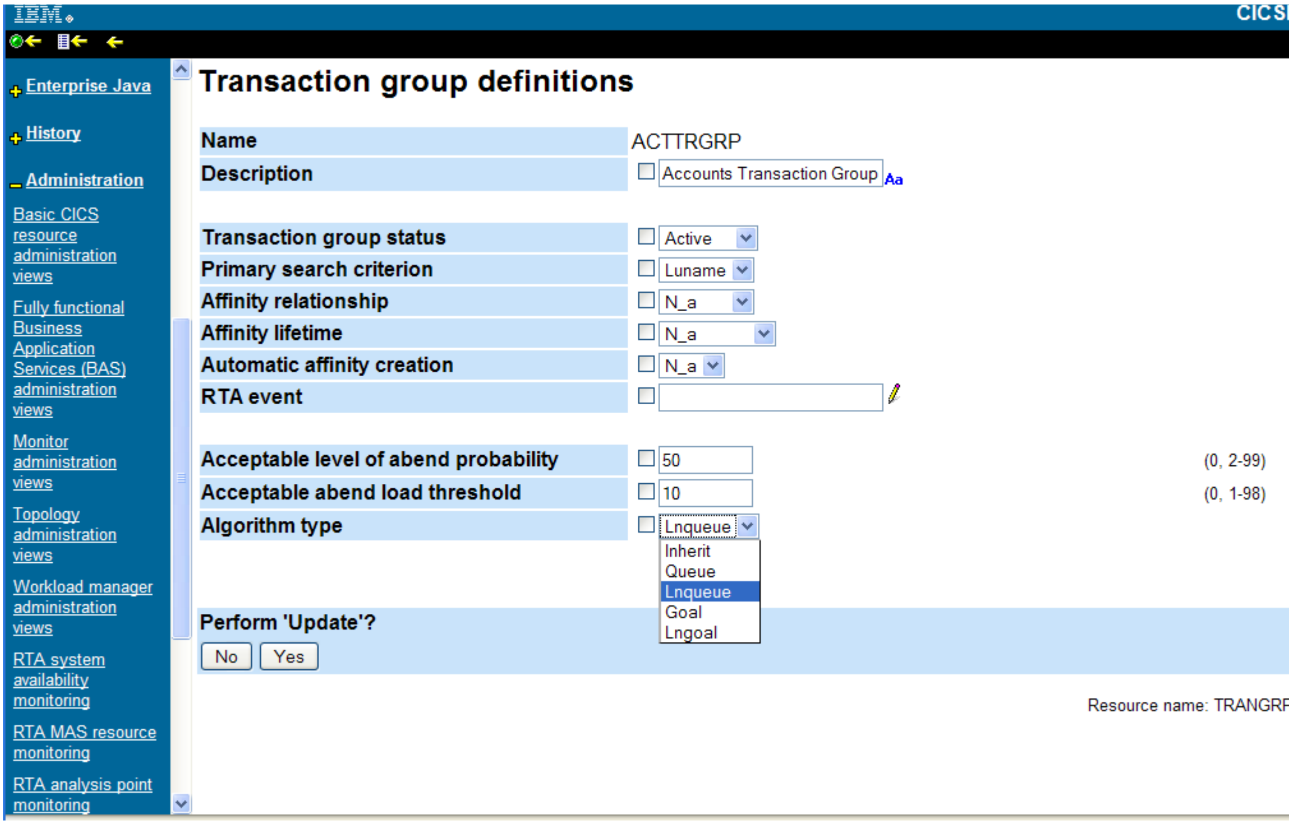
Perform 'Create'?

Resource name: WLMSPEC

Figure 1. Algorithm types on a WLM specification definition

This had the effect of applying the same dynamic routing algorithm to every dynamically routed transaction in the workload. In addition, if the algorithm needed to be changed within the same workload, all regions participating in the workload had to be simultaneously quiesced to allow the workload to be refreshed with the new algorithm specification.

It is now possible to specify an algorithm type at the CICSPlex SM WLM TRANGRP level:


IBM
CICS
Enterprise Java
History
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Topology administration views
Workload manager administration views
RTA system availability monitoring
RTA MAS resource monitoring
RTA analysis point monitoring

Transaction group definitions

Name	ACTTRGRP	
Description	□ Accounts Transaction Group	
Transaction group status	□ Active	
Primary search criterion	□ Luname	
Affinity relationship	□ N_a	
Affinity lifetime	□ N_a	
Automatic affinity creation	□ N_a	
RTA event	□	
Acceptable level of abend probability	□ 50	(0, 2-99)
Acceptable abend load threshold	□ 10	(0, 1-98)
Algorithm type	□ Lnqueue	

Inherit
Queue
Lnqueue
Goal
Lngoal
Perform 'Update'?
No
Yes

Resource name: TRANGRF

Figure 2. Algorithm types on a transaction group level

Specifying an algorithm in this way allows alternative algorithms to be applied to specific transaction codes within the same workload. A new SET command has been implemented in conjunction with this function to enable the immediate dynamic modification of the algorithm type directly against the TRANGRP. Therefore, it is possible to modify the algorithm type at run time without the need to quiesce and restart any regions in the workload. There is a one-to-one relationship between an installed workload definition (WLMDEF) and TRANGRP. The ability to discard and re-install a TRANGRP through its associated WLMDEF has been retained, but using the SET command directly against the TRANGRP is a more efficient change mechanism.

At the WLMSPEC level, a default algorithm must be specified for the workload. This algorithm is applied to all dynamic transaction codes that are not encompassed by a TRANGRP associated with the same workload. The algorithm types that can be specified at the WLMSPEC level are:

• QUEUE	Queue mode
• LNQUEUE	Link neutral queue mode
• GOAL	Goal mode

- LNGOAL Link neutral goal mode

Transactions that are to be evaluated by an alternative algorithm type need to be associated with a TRANGRP that identifies that algorithm type. The algorithm types that can be specified at the TRANGRP level are:

- INHERIT The algorithm type specified in the WLMSPEC for the workload is used.
- QUEUE Queue mode.
- LNQUEUE Link neutral queue mode.
- GOAL Goal mode.
- LNGOAL Link neutral goal mode.

Note: When migrating CICSPlex SM data repositories to CICS TS 4.2, to allow current settings to be retained, the algorithm type for existing TRANGRPs is set to INHERIT.

The following diagram shows the relationship between CICSPlex SM WLM resources. The algorithm type can be specified as an attribute on a WLMSPEC or a TRANGRP definition.

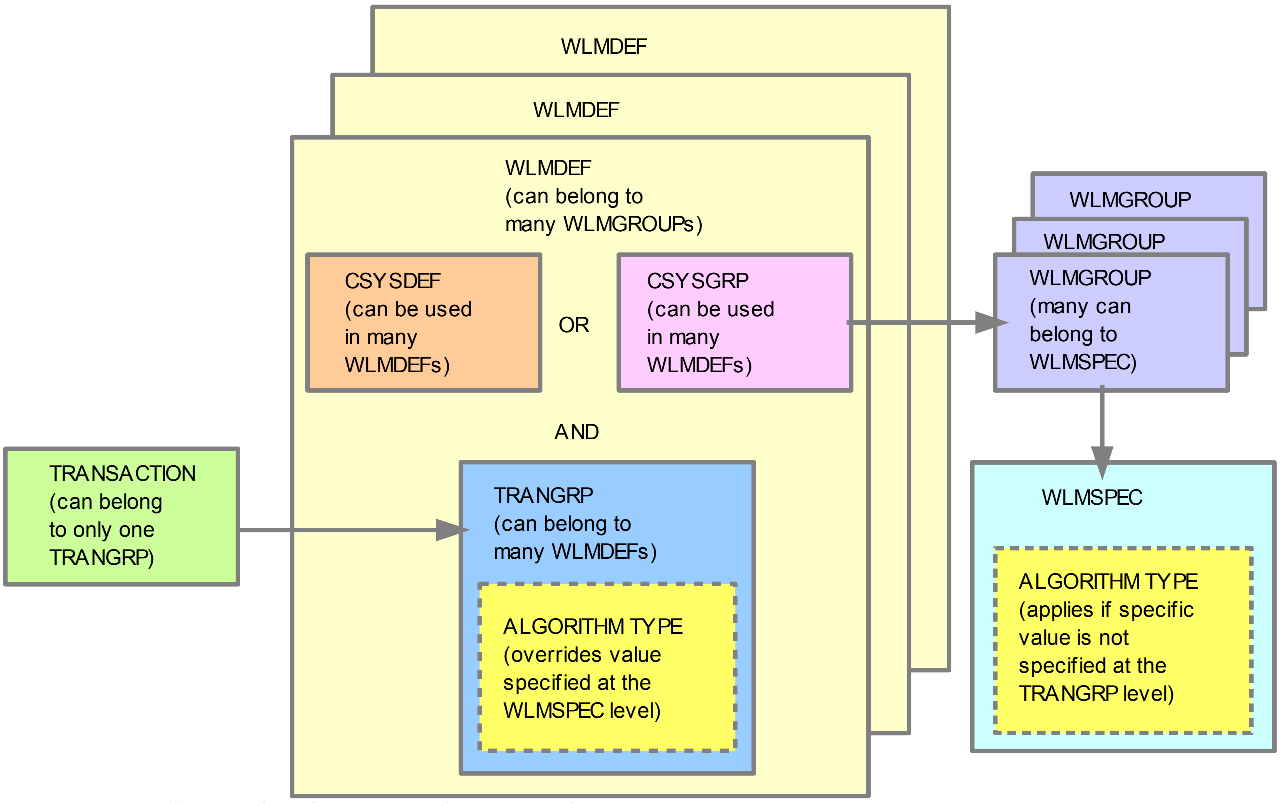
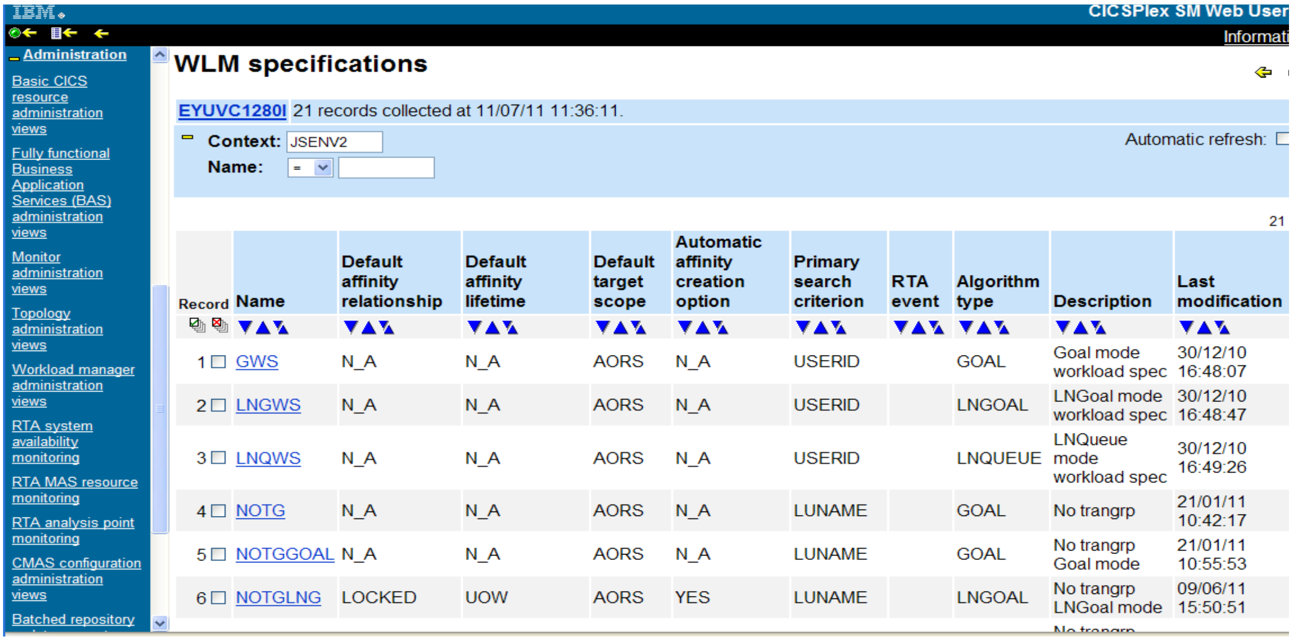

WLMDEF
WLMDEF
WLMDEF (can belong to many WLMGROUPs)
CSYSDEF (can be used in many WLMDEFs)
OR
CSYSGRP (can be used in many WLMDEFs)
AND
TRANSACTION (can belong to only one TRANGRP)
TRANGRP (can belong to many WLMDEFs)
ALGORITHM TYPE (overrides value specified at the WLMSPEC level)
WLMGROUP
WLMGROUP
WLMGROUP (many can belong to WLMSPEC)
WLMSPEC
ALGORITHM TYPE (applies if specific value is not specified at the TRANGRP level)

Figure 3. Relationship between the CICSPlex SM WLM resources

The following Web User Interface (WUI) view shows algorithm types specified at the WLM specification level:


IBM.
CICSPlex SM Web User
Informati
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Topology administration views
Workload manager administration views
RTA system availability monitoring
RTA MAS resource monitoring
RTA analysis point monitoring
CMAS configuration administration views
Batched repository

WLM specifications

EYUVC1280I 21 records collected at 11/07/11 11:36:11.

Context: JSENV2

Name: =

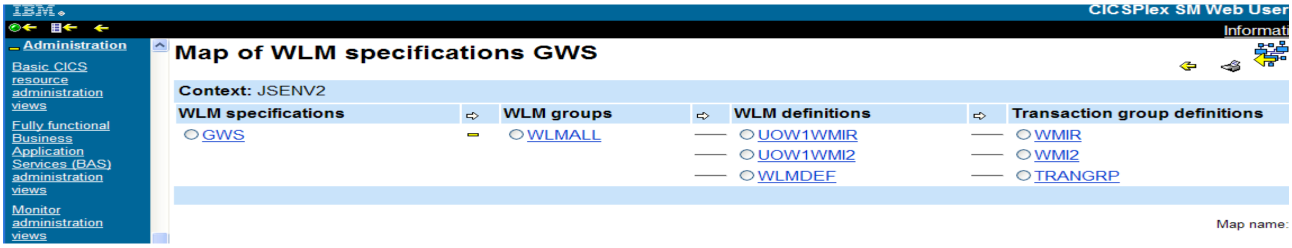
Automatic refresh: □

21

Record	Name	Default affinity relationship	Default affinity lifetime	Default target scope	Automatic affinity creation option	Primary search criterion	RTA event	Algorithm type	Description	Last modification
1 □	GWS	N_A	N_A	AORS	N_A	USERID		GOAL	Goal mode workload spec	30/12/10 16:48:07
2 □	LNGWS	N_A	N_A	AORS	N_A	USERID		LNGOAL	LNGoal mode workload spec	30/12/10 16:48:47
3 □	LNQWS	N_A	N_A	AORS	N_A	USERID		LNQUEUE	LNQueue mode workload spec	30/12/10 16:49:26
4 □	NOTG	N_A	N_A	AORS	N_A	LUNAME		GOAL	No trangrp	21/01/11 10:42:17
5 □	NOTGGOAL	N_A	N_A	AORS	N_A	LUNAME		GOAL	No trangrp Goal mode	21/01/11 10:55:53
6 □	NOTGLNG	LOCKED	UOW	AORS	YES	LUNAME		LNGOAL	No trangrp LNGoal mode	09/06/11 15:50:51

Figure 4. Algorithm types specified at the WLM specification level

Figure 4 shows that WLM specification GWS has an algorithm type of GOAL. If WLM specification GWS is selected and mapped, the WLM groups, WLM definitions, and transaction groups associated with GWS can be seen:


IBM.
CICSPlex SM Web User
Informati
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Map name:

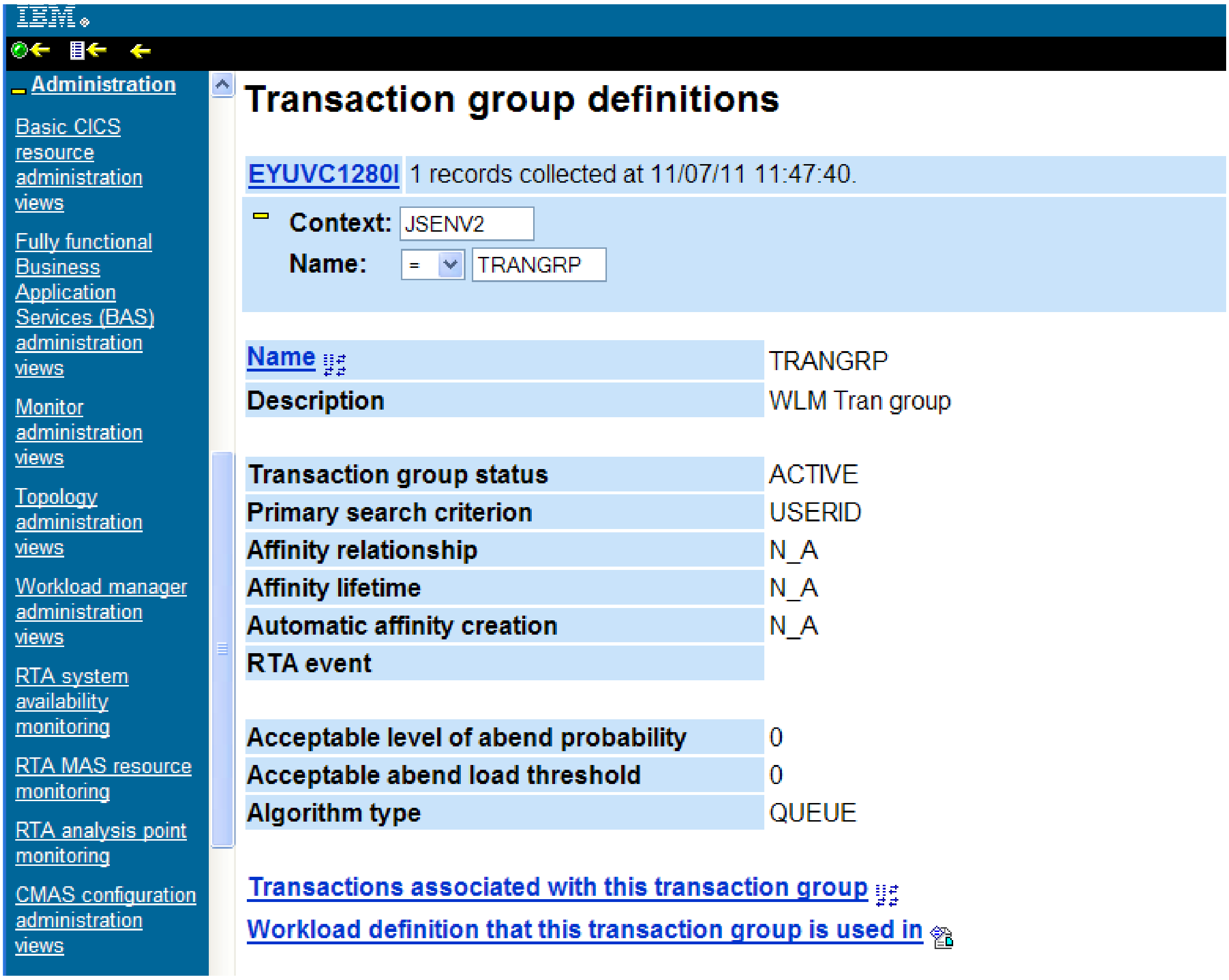
Map of WLM specifications GWS

Context: JSENV2

WLM specifications	WLM groups	WLM definitions	Transaction group definitions
○ GWS	○ WLMALL	○ UOW1WMIR	○ WMIR
		○ UOW1WMI2	○ WMI2
		○ WLMDEF	○ TRANGRP

Figure 5. Map of WLM specification GWS showing transaction groups

If transaction group TRANGRP is selected in the Transaction group definitions column, it can be seen that the algorithm type specified at the transaction group level is actually QUEUE:


IBM.
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Topology administration views
Workload manager administration views
RTA system availability monitoring
RTA MAS resource monitoring
RTA analysis point monitoring
CMAS configuration administration views

Transaction group definitions

EYUVC1280I 1 records collected at 11/07/11 11:47:40.

Context: JSENV2
Name: = TRANGRP

Name	TRANGRP
Description	WLM Tran group
Transaction group status	ACTIVE
Primary search criterion	USERID
Affinity relationship	N_A
Affinity lifetime	N_A
Automatic affinity creation	N_A
RTA event	
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

Transactions associated with this transaction group
Workload definition that this transaction group is used in

Figure 6. Transaction group TRANGRP defined with algorithm type QUEUE

This means that WLM algorithm type QUEUE will override the algorithm type GOAL, specified at the WLMSPEC level, for those transactions that are associated with transaction group TRANGRP.

The order of precedence of link types

CICSPlex SM workload management optimises processor capacity by making decisions to dynamically route transactions and programs to the most appropriate target region.

When executing its dynamic routing algorithm, CICSPlex SM WLM assigns a predefined arithmetic value based on the type of link between a routing region and a candidate target region. This value is used as a multiplier against the target region's task load as part of the routing weight calculation of a target region. The region with the lightest weight is normally selected as the target region.

Prior to CICS TS 4.2, IP interconnectivity (IPIC) was slower than LU6.2/APPC. So IPIC was allocated a higher arithmetic value so as to make it less preferable compared to other link types. As IPIC is now faster than LU6.2/APPC, it is now allocated a lower arithmetic value than LU6.2/APPC to make it more preferable. So, on occasions of significant workload, more dynamic route requests would be routed to the target regions over IPIC than over LU6.2/APPC.

The link-type order of precedence that a router now employs is:

- Local (faster than MRO/XM)
- MRO/XM (faster than MRO/XCF)
- MRO/XCF (faster than IPIC)
- IPIC (faster than LU6.2/APPC)
- APPC (faster than an indirect connection)
- Indirect connection

Note: This behavior is recognized only for queue mode and goal mode dynamic routing. The link neutral algorithms (LNQUEUE and LNGOAL) specifically omit the link type factor from the algorithm execution, causing all targets to be regarded as having the same link speed.

Unit of work affinities with distributed program link

CICS distributed program link (DPL) enables CICS application programs to run programs that are in other CICS regions by shipping program control LINK requests to target regions. This offers the advantage that one can write an application without knowledge of the location of the requested programs. The CICS program resource definition specifies that the program is not in the local region but in a remote region. The following diagram illustrates this:

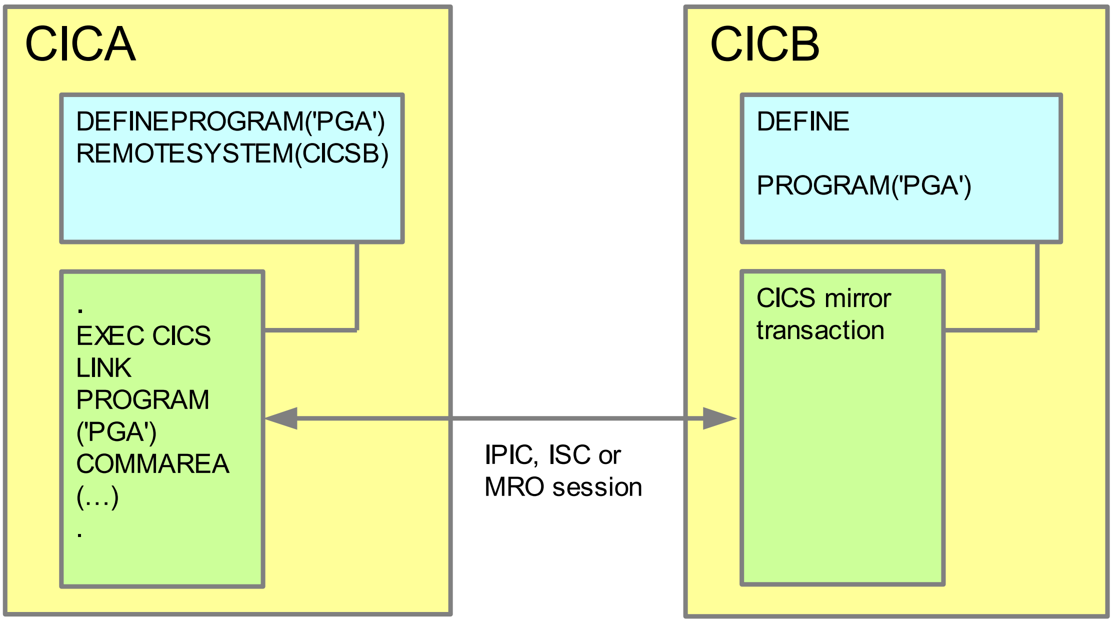


Figure 7. Distributed Program Link (DPL)

The program running on region CICA issues a program control LINK command for program PGA. From the installed program definitions, CICS discovers that program PGA is owned by region CICB. CICS changes the LINK request into a suitable transmission format and ships it to CICB. In CICB, a mirror transaction is attached. The mirror program DFHMIRS associated with the mirror transaction re-creates the original request and issues the request on CICB to link to program PGA. Hence, CICS has performed a DPL request.

CICSPlex SM WLM optimizes processor capacity by dynamically routing transactions and programs to the region that is the most appropriate to execute them. However, when using dynamic WLM, problems can occur during the use of multiple DPL requests within a single unit of work (UOW).

For example, if multiple invocations of the same dynamically routed program access a common resource within the same unit of work, one DPL request could be routed to one region where a resource may be locked, while a subsequent DPL request may be routed to a different region where the state associated with the outstanding UOW is not available. So, it would not be possible to run the second DPL request within the same UOW. The following diagram shows this:

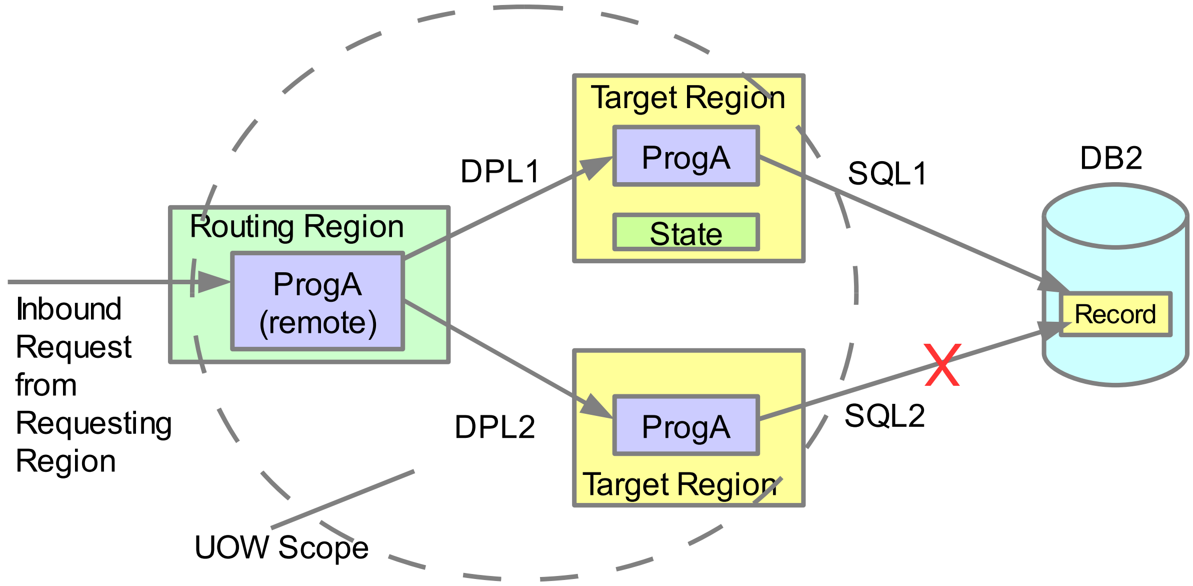


Figure 8. Problems with multiple Distributed Program Links (DPLs) within the same unit of work (UOW)

Dynamic WLM now resolves problems associated with the use of multiple DPL requests in a single unit of work. A new type of CICS affinity, associated with a UOW and restricted to programs that are dynamically linked, has been introduced. CICSPlex SM WLM has been extended to manage these UOW affinities for DPL requests. The affinity is defined with an affinity relation of LOCKED, meaning that a called program retains state data that is to be preserved after it returns to its caller, and an affinity lifetime of UOW so that programs with this type of affinity are routed to the same target region for the duration of the unit of work. The following diagram shows this:

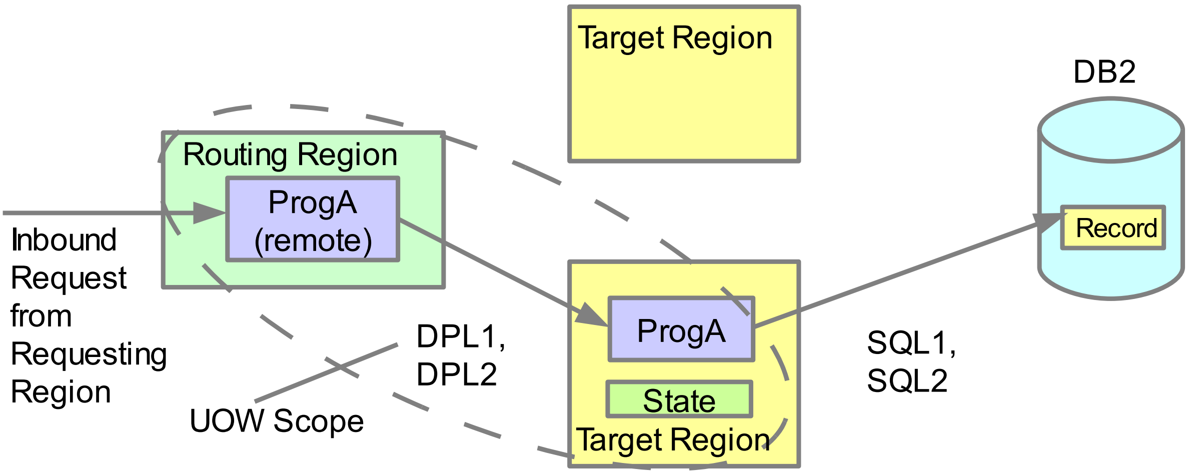
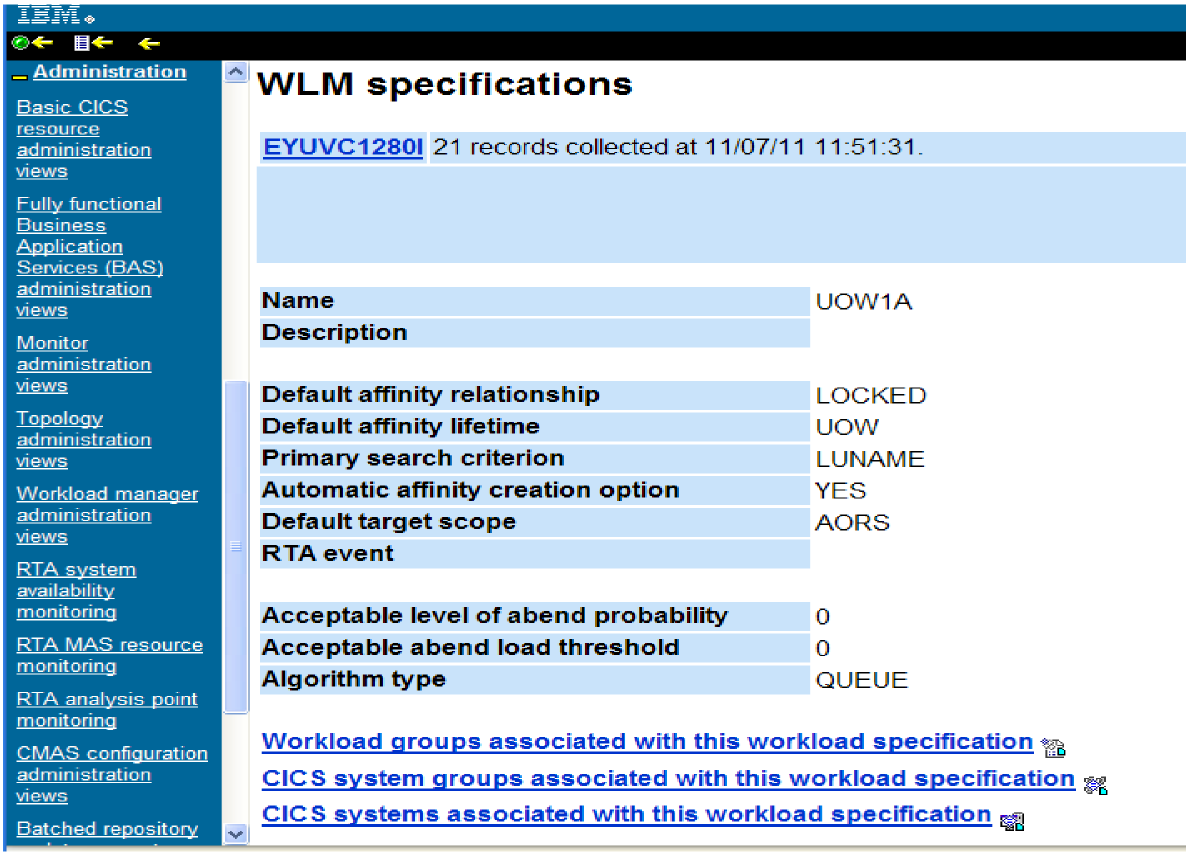


Figure 9. Routing Distributed Program Links (DPLs) to the same region for the duration of the unit of work (UOW)

CICSPlex SM workload management administration views have been updated with new fields and field values to configure UOW affinities. Using the TRANGRP and WLMSPEC resource tables, you can now create transaction groups and WLM specifications that incorporate this new type of affinity. The Active workloads view has been updated to display the number of active transaction group affinities. The following view shows an example of the affinity relationship and the affinity lifetime specified on a WLM specification:


IBM
Administration
Basic CICS resource administration views
Fully functional Business Application Services (BAS) administration views
Monitor administration views
Topology administration views
Workload manager administration views
RTA system availability monitoring
RTA MAS resource monitoring
RTA analysis point monitoring
CMAS configuration administration views
Batched repository

WLM specifications

EYUVC1280I 21 records collected at 11/07/11 11:51:31.

Name	UOW1A
Description	
Default affinity relationship	LOCKED
Default affinity lifetime	UOW
Primary search criterion	LUNAME
Automatic affinity creation option	YES
Default target scope	AORS
RTA event	
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

Workload groups associated with this workload specification

CICS system groups associated with this workload specification

CICS systems associated with this workload specification

Figure 10. Affinity relationship and lifetime defined in a WLM specification

To use the new UOW affinity with existing workloads you must restart the workloads with CICS TS 4.2.

Discovering and viewing system initialization parameters

System initialization parameters are used to modify CICS system attributes during the startup of a CICS region. The primary method of specifying system initialization parameters is in a system initialization table (SIT). System initialization parameters supply the system initialization program with the initial set of parameters necessary to initialize the system to suit specific requirements. However, system initialization parameter values can also be specified in other ways to override the values originally coded in the SIT. During startup these overrides are applied in sequence from the following sources:

1. The PARM parameter of the EXEC PGM=DFHSIP statement.
2. The SYSIN data set defined in the startup job stream.
3. The system operator's console.

The CICSPlex SM API can now be used to discover information about CICS system initialization parameters and CICS system initialization parameter overrides. System initialization parameter retrieval is supported by the CICSPlex SM command-level interface, the CICS management client interface (CMCI), and the CICSPlex SM WUI.

It is possible to retrieve:

- The current current values of the parameters in the SIT including any override values.
- The original SIT values as specified at system startup.
- The values from a single override source.

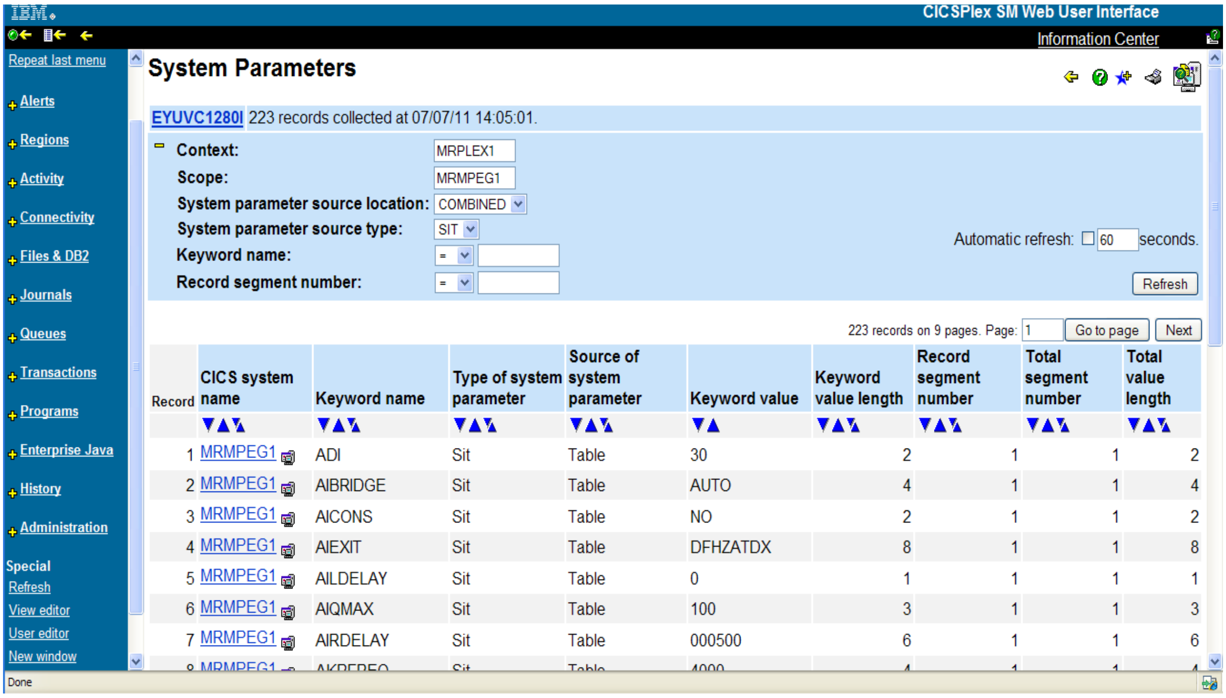
In common with many other CICSPlex SM operations, the CICS regions for which parameters are to be retrieved can be controlled by specifying context and scope.

System parameter retrieval is implemented using the CICSPlex SM resource SYSPARM. The SYSPARM resource has two mandatory parameters that are associated with the GET operation:

- PARMSRCE: identifies the source from which to retrieve the system initialization parameter
- PARMTYPE: identifies the type of parameters to retrieve. Currently SIT, to retrieve system initialization parameters, is the only valid value.

System initialization parameter discovery can be achieved in the following ways:

1. In an API program using the EXEC CPSM GET command operating on the SYSPARM object.
2. Using the CMCI GET method operating on the CICSSystemParameter external resource.
3. Using the CICS Explorer. For details, see the paper "IBM CICS System Management: Enhancements to CICS Explorer".
4. Using the WUI operations view based on the SYSPARM resource table linked from the CICS region view set:



System Parameters

EYUVC1280I 223 records collected at 07/07/11 14:05:01.

Context: MRPLEX1
Scope: MRMPEG1
System parameter source location: COMBINED
System parameter source type: SIT
Keyword name: =
Record segment number: =

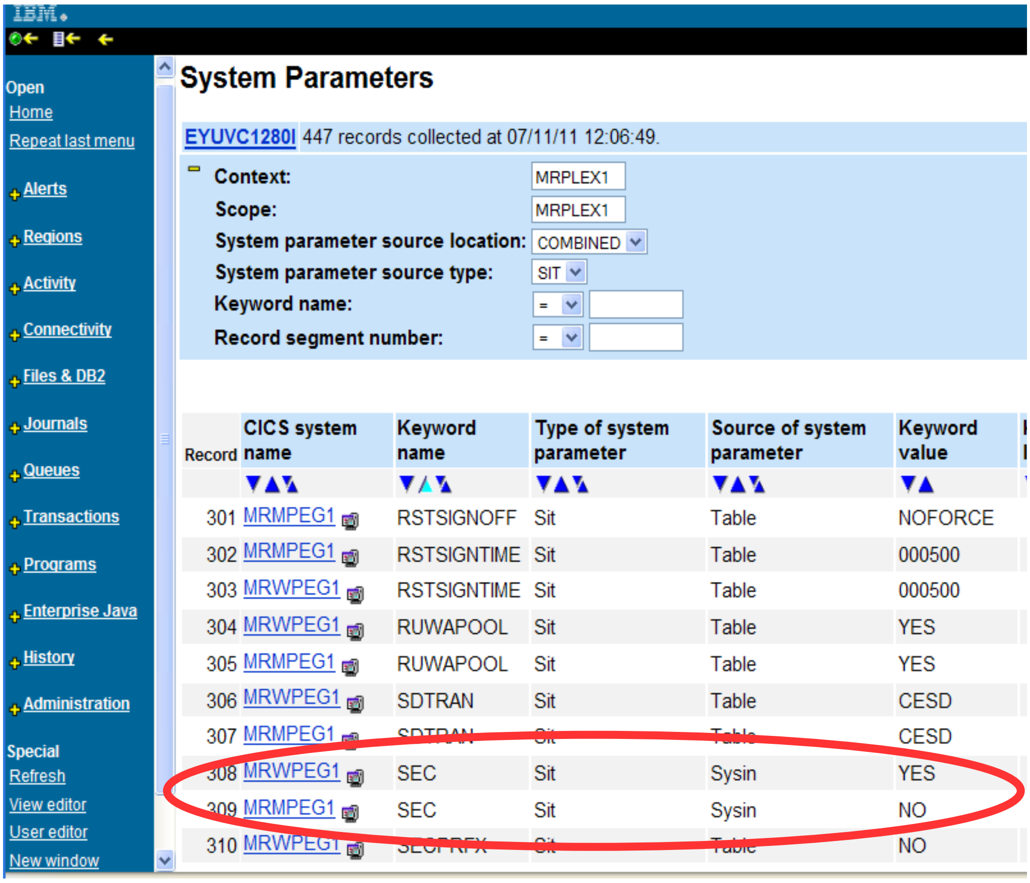
Automatic refresh: □ 60 seconds. Refresh

223 records on 9 pages. Page: 1 Go to page Next

Record	CICS system name	Keyword name	Type of system parameter	Source of system parameter	Keyword value	Keyword value length	Record segment number	Total segment number	Total value length
1	MRMPEG1	ADI	Sit	Table	30	2	1	1	2
2	MRMPEG1	AIBRIDGE	Sit	Table	AUTO	4	1	1	4
3	MRMPEG1	AICONS	Sit	Table	NO	2	1	1	2
4	MRMPEG1	AIEXIT	Sit	Table	DFHZATDX	8	1	1	8
5	MRMPEG1	AILDELAY	Sit	Table	0	1	1	1	1
6	MRMPEG1	AIQMAX	Sit	Table	100	3	1	1	3
7	MRMPEG1	AIRDELAY	Sit	Table	000500	6	1	1	6
8	MRMPEG1	AKPFREQ	Sit	Table	4000	4	1	1	4

Figure 11. Viewing the system initialization parameters of a single CICS region

Viewing the system initialization parameters of all regions in a CICSplex can be useful in tracking down discrepancies in settings across different CICS regions in a CICSplex. For example, in the following WUI view, the SEC parameter is set to YES in region MRWPEG1 and to NO in region MRMPEG1:



System Parameters

EYUVC1280I 447 records collected at 07/11/11 12:06:49.

Context: MRPLEX1
Scope: MRPLEX1
System parameter source location: COMBINED
System parameter source type: SIT
Keyword name: =
Record segment number: =

Record	CICS system name	Keyword name	Type of system parameter	Source of system parameter	Keyword value
301	MRMPEG1	RSTSIGNOFF	Sit	Table	NOFORCE
302	MRMPEG1	RSTSIGNTIME	Sit	Table	000500
303	MRWPEG1	RSTSIGNTIME	Sit	Table	000500
304	MRWPEG1	RUWAPOOL	Sit	Table	YES
305	MRMPEG1	RUWAPOOL	Sit	Table	YES
306	MRWPEG1	SDTRAN	Sit	Table	CESD
307	MRMPEG1	SDTRAN	Sit	Table	CESD
308	MRWPEG1	SEC	Sit	Sysin	YES
309	MRMPEG1	SEC	Sit	Sysin	NO
310	MRWPEG1	SECPRFX	Sit	Table	NO

Figure 12. Viewing system initialization parameters in a CICSplex

When using the EXEC CPSM GET command or the CMCI, PARMSRCE and PARMTYPE can be used to define a parameter expression to specify the parameters to be retrieved. When using the WUI, PARMSRCE and PARMTYPE can be used as filters to control the records displayed. PARMTYPE must be set to SIT, while PARMSRCE can be one of the following values:

- COMBINED: a combination of the original system initialization parameter definitions and any applied parameter overrides.
- CONSOLE: override parameters as specified at startup on the system console.
- JCL: override parameters provided through a JCL EXEC PGM statement.
- SYSIN: override parameters from the startup job stream defined in the SYSIN data set.
- TABLE: the original system initialization table values extracted from the DFHSITxx load module.

Enhanced Security with Password Phrase Support

In z/OS V1.8, Resource Access Control Facility (RACF®) implemented support for password phrases. RACF password phrases offer the following advantages:

- Provide extremely strong password security since password phrases are less likely to be guessed and require more processing power to sustain an attack.
- Allow users to choose their own memorable phrases.
- Allow for an exponentially greater number of possible combinations of characters.
- Meet the enterprise password requirements imposed by many companies, governments, and institutions.
- Can consist of mixed-case letters, spaces, numbers, and certain special characters.
- Provide better cross-platform consistency.

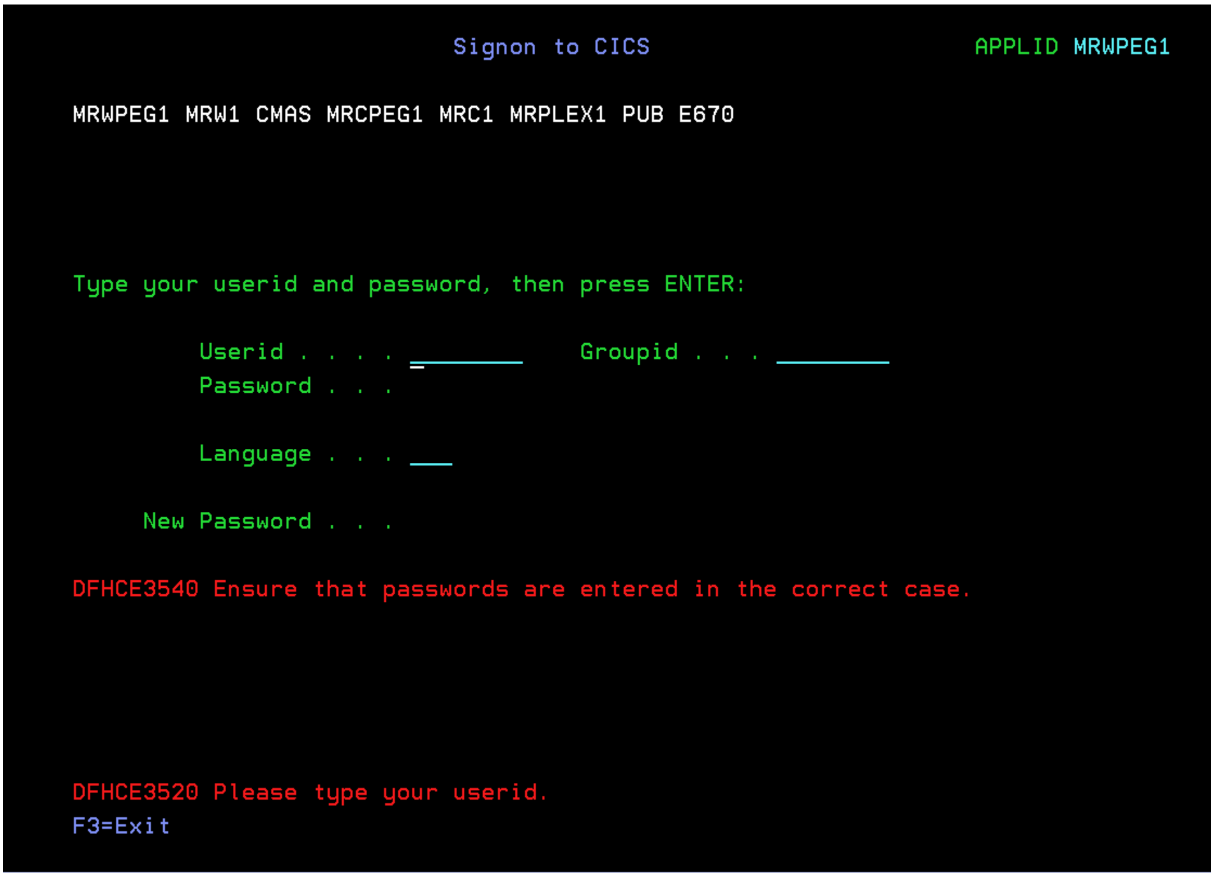
In z/OS V1.8, RACF exploits password phrases as strings of characters from 14 to 100 bytes in length. In z/OS V1.9, RACF introduced a new password phrase exit called ICHPWX11. The exit can be used to define password phrase quality rules and to control password phrase length checks. For example, the exit can allow password phrases from 9 to 100 characters in length.

A user ID can have both a password and a password phrase but a new password phrase cannot be set using a password for authorization. Likewise a new password cannot be set using a password phrase for authorization. The same user ID can be used for existing applications that accept an 8-character password, and for those applications that take advantage of the new password phrase support.

For more information about password phrases, see the *Security Server RACF Security Administrator’s Guide*.

To improve system security and usability, CICS TS 4.2 introduces support for password phrases:

- A new transaction called CESL (sign-on long) is introduced to allow sign-on with either the longer password phrases or with traditional 8-character passwords. The panel displayed is essentially the same as that displayed for CESN but the password field is spread over two lines to allow a longer password phrase to be entered:



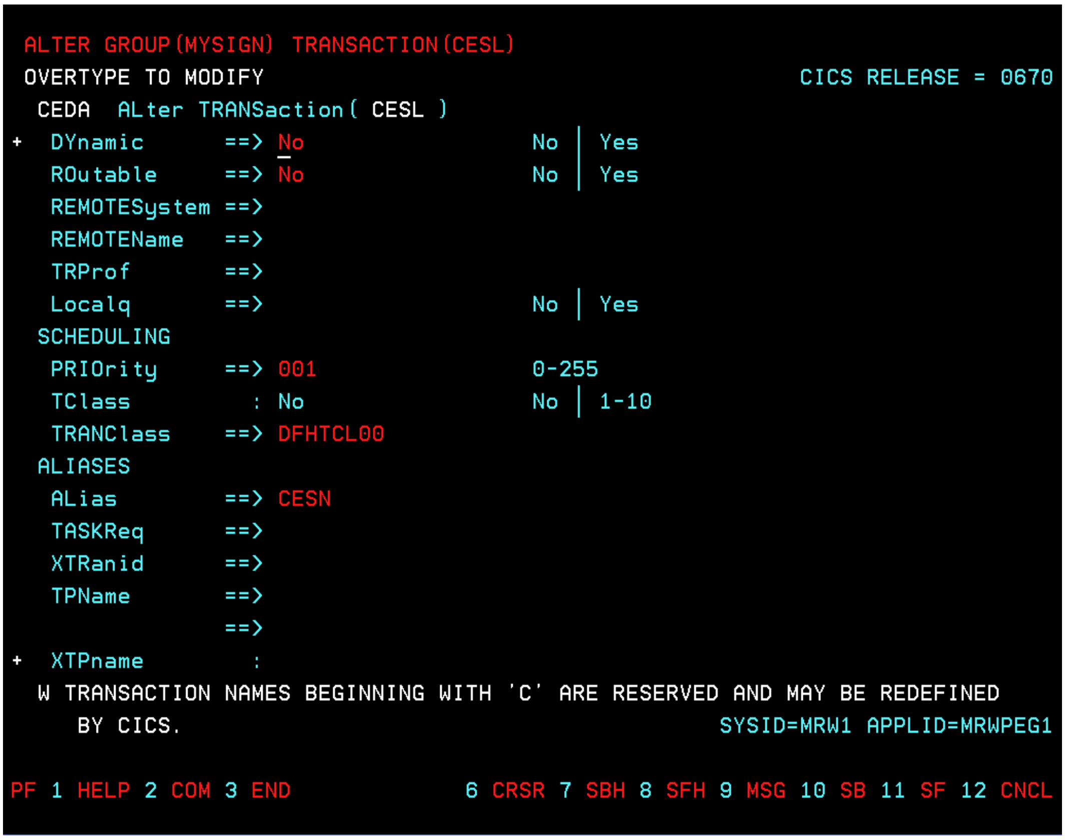
```
                        Signon to CICS                        APPLID MRWPEG1

 MRWPEG1 MRW1 CMAS MRCPEG1 MRC1 MRPLEX1 PUB E670



 Type your userid and password, then press ENTER:

          Userid . . . . ________    Groupid . . . ________
          Password . . . _

          Language . . . ___

      New Password . . .

 DFHCE3540 Ensure that passwords are entered in the correct case.




 DFHCE3520 Please type your userid.
 F3=Exit
```

Figure 13. Panel displayed for transaction CESL

A new message pertaining to the case of passwords is displayed. If the exact position of this message on the panel becomes an issue, CICS TS 4.2 allows users to edit the map for this panel to reposition the message.

The CESN transaction remains unchanged and users can continue to use it to sign on with traditional 8-character passwords. However, if required, the following steps can be used to define transaction CESN as an alias of transaction CESL:

1. Use the CEDA transaction to:
   a) Append the current group list in use by CICS (say DFHLIST) to a new group list MYLIST.
   b) Copy group DFHSIGN to group MYSIGN.
   c) Delete transaction CESN from group MYSIGN.
   d) Alter transaction CESL to set the alias name to CESN:



```
 ALTER GROUP(MYSIGN) TRANSACTION(CESL)
 OVERTYPE TO MODIFY                                               CICS RELEASE = 0670
  CEDA  ALter TRANSaction( CESL )
+  DYnamic      ==> No                 No | Yes
   ROutable     ==> No                 No | Yes
   REMOTESystem ==>
   REMOTEName   ==>
   TRProf       ==>
   Localq       ==>                    No | Yes
  SCHEDULING
   PRIOrity     ==> 001                0-255
   TClass         : No                 No | 1-10
   TRANClass    ==> DFHTCL00
  ALIASES
   ALias        ==> CESN
   TASKReq      ==>
   XTRanid      ==>
   TPName       ==>
                ==>
+  XTPname        :
  W TRANSACTION NAMES BEGINNING WITH 'C' ARE RESERVED AND MAY BE REDEFINED
     BY CICS.                                          SYSID=MRW1 APPLID=MRWPEG1

PF 1 HELP 2 COM 3 END              6 CRSR 7 SBH 8 SFH 9 MSG 10 SB 11 SF 12 CNCL
```

Figure 14. Altering transaction CESL to define transaction CESN as an alias.

2. Stop the CICS region and cold start it with group list MYLIST.

   This ensures that the sign-on panel for transaction CESL is displayed when transaction CESL or CESN is entered.

- The EXEC CICS SIGNON (Sign on to a terminal) application programming interface (API) command is extended to include new parameters PHRASE, PHRASELEN, NEWPHRASE, and NEWPHRASELEN to allow password phrase values to be specified.

- Two new API commands EXEC CICS VERIFY PHRASE (Verify that a password or password phrase matches the password or password phrase recorded by an External Security Manager (ESM)) and EXEC CICS CHANGE PHRASE (Change the password or password phrase recorded by an ESM for a specified user ID) are also introduced. These commands can be issued from within the CECI transaction.

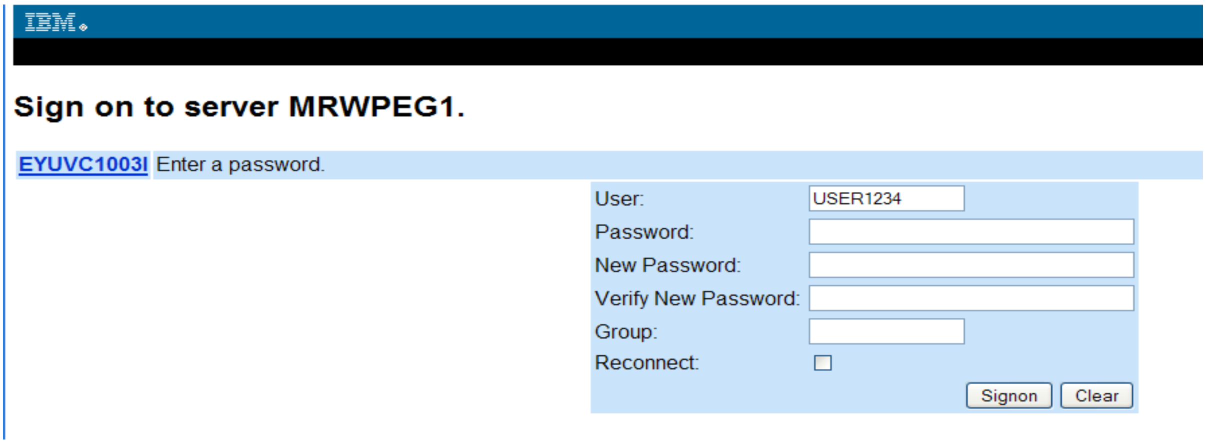
- If CICS is used as an HTTP server, with basic authentication, clients can specify a user ID and either a password or now a password phrase. If either the password or password phrase is expired, the user is prompted for a new password or password phrase.

- If CICS is used as an HTTP client, if the value for the password field on the EXEC CICS WEB SEND (send an HTTP request) or EXEC CICS WEB CONVERSE (send an HTTP request and receive a response from the server) commands is greater than 8 characters it is treated as a password phrase.

- The password or password phrase (and new password or new password phrase, if applicable) is blanked out when one of the following EXEC CICS commands is issued by a transaction running under CEDF:

  1. CHANGE PASSWORD
  2. CHANGE PHRASE
  3. SIGNON
  4. VERIFY PASSWORD
  5. VERIFY PHRASE

- The CICSPlex SM WUI sign-on panel now supports sign-on with either the traditional password or with a password phrase:



Sign on to server MRWPEG1.

EYUVC1003I Enter a password.

User: USER1234
Password:
New Password:
Verify New Password:
Group:
Reconnect: □

Figure 15.CICSPlex SM Web User Interface sign-on panel

Note: The only visible change is the slight increase in the width of the Password, New Password, and Verify Password fields. The associated help page for sign-on has also been updated to indicate that passwords or password phrases can now be entered in the password fields and new messages relating to password phrases can be issued for sign-on failures.

- The CICSPlex SM Web User Interface (WUI) client application data interface provides access from a client application to a WUI server. The Data Interface Data/Connect command of this interface allows a session to be established between the client and a CICSPlex SM WUI server. Password phrases can now be specified on the PASSWORD, NEWPASS1, and NEWPASS2 fields of this command.

- The CMCI makes use of the CICS Web domain to make a connection to CICS. If the SEC system initialization parameter is set to YES, the AUTHENTICATE attribute of the TCP/IP service used during connection is set to BASIC. This can take advantage of password phrase support.

- The CICS Explorer can now use password phrases to sign on when using the management interface or data interface connection.

Increased number of VSAM LSRPOOLs

The Local Shared Resources (LSR) pool is a reserve of data buffers, strings, and Hiperspace™ (a high performance storage area in an MVS image) buffers that Virtual Storage Access Method (VSAM) uses when processing access requests for certain files.

In CICS TS, the LSRPOOL resource defines the size and characteristics of the LSR pool. Prior to CICS TS 4.2, it was possible to define up to 8 LSR pools concurrently in the system. It is now possible to define up to 255 LSR pools concurrently in the system. Each pool is identified by its LSRPOOLNUM. The LSRPOOLNUM is used to associate a file with an LSR pool if that file is to use shared resources.

When the LSRPOOL definition is installed in the active system, its information is stored and used when the pool with the specified ID is next built. A pool is built when the first file that uses a particular LSR pool is opened, and is dynamically de-allocated only when no files are currently open against that pool.

If a given file is being accessed more frequently, to minimize paging and hence improve performance, it may be better to move it to its own dedicated LSR pool. The following diagram shows that in CICS TS 4.2 files A and B could be moved to map to their own dedicated LSR pools.

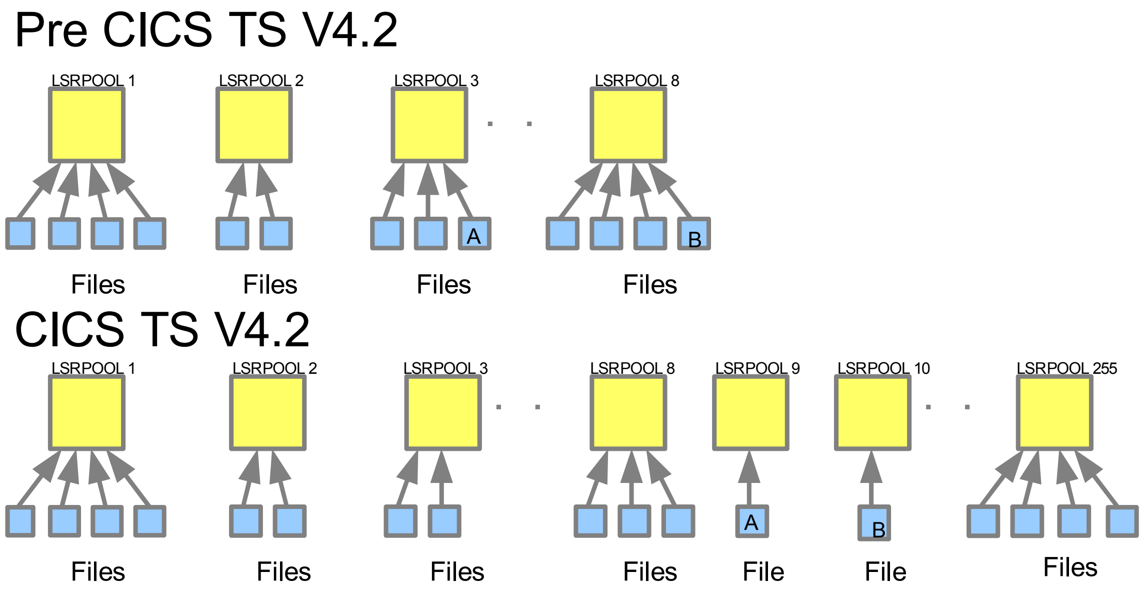


Figure 16. LSRPOOLs: Comparison of CICS Transaction Server for z/OS V4.2 with earlier releases

CICS TS sets default attributes if an LSRPOOL is not defined, but you are advised to define the LSRPOOL anyway, for reasons of performance. In a production system, for example, delay might be incurred while pool requirements are being calculated by CICS TS. Another possible problem is that if files are not allocated at the time the pool is built, the data set names are not known to CICS TS. In this case, the pool is built based on the information available, but the subsequent performance of the system can suffer or files might fail to open.

Conclusion

This paper has shown how:

- CICSPlex SM WLM algorithms can be used to isolate the connection factor from the routing weight calculation
- CICSPlex SM WLM dynamic routing algorithms can be specified at the WLMSPEC level and overridden at the TRANGRP levels
- Unit of work affinities are taken into account with DPL
- CICS system initialization parameters can be viewed using the CICSPlex SM Web User Interface
- Password phrases can be used to provide improved security
- The use of additional VSAM LSR pools can aid performance.

It is hoped that CICS systems administrators realise the value of the new features of CICS Transaction Server for z/OS Version 4.2, and consider exploiting them to gain advantage.

Further reading

1. System management enhancements in CICS TS 4.2:
   http://publib.boulder.ibm.com/infocenter/cicsts/v4r2/topic/com.ibm.cics.ts.whatsnew.doc/themes/theme4.html

2. “IBM CICS System Management: Enhancements to CICS Explorer”, IBM, August 2011:
   http://www.ibm.com/software/htp/cics/tserver/v42/library/index5.html

3. Security Server RACF Security Administrator’s Guide publication:
   http://publib.boulder.ibm.com/infocenter/zos/v1r11/index.jsp?topic=/com.ibm.zos.r11.icha700/ichza7a0.htm

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