CICS Transaction Server for z/OS
Version 4 Release 1

CICSPlex SM Managing Workloads

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Contents

Preface

This book provides administration information for the CICSPlex® SM component of CICS® Transaction Server for z/OS®. It describes how to establish and maintain the CICSPlex SM definitions necessary to perform workload management.

This manual documents intended Programming Interfaces that allow the customer to write programs to obtain the services of Version 4 Release 1.

Who this book is for

This book is for the individual responsible for administering the CICS systems in your enterprise.

What you need to know

It is assumed that you have read:

CICSPlex System Manager User Interface Guide
> For information about using the ISPF user interface to CICSPlex SM.

CICSPlex System Manager Concepts and Planning
> For an introduction to CICSPlex SM.

Note: Many of the views in this book are based on the Starter Set. For useful examples of the definitions and programs described in this book, explore the Starter Set itself, which is described in *CICSPlex System Manager Concepts and Planning*.

Notes on terminology

In the text of this book, the term **CICSPlex SM** (spelled with an uppercase letter 'P') means the IBM® CICSPlex System Manager element of CICS Transaction Server for z/OS, Version 3 Release 2.

The term **CICSplex** (spelled with a lowercase letter 'p') means the largest set of CICS systems to be managed by CICSPlex SM as a single entity.

Other terms used in this book are:

BTS-set
> A set of CICS regions within a CICSplex across which related CICS business transaction services (BTS) processes and activities may execute.

CICS　The CICS element of CICS TS for z/OS

CICSPlex SM
> The CICSPlex SM element of CICS TS for z/OS

MVS™　The operating system which is a base element of z/OS.

Requesting region
> A CICS region that initiates a dynamic routing function.

Routing region
> A CICS region that routes the request for a dynamic routing function.

Target region
    A CICS region that receives and executes a dynamic routing function.

WUI   The Web User Interface component of CICSPlex SM.

Syntax notation and conventions used in this book

The syntax descriptions of the CICSPlex SM commands use the following symbols:
- Braces { } enclose two or more alternatives from which one must be chosen.
- Square brackets [ ] enclose one or more optional alternatives.
- The OR symbol | separates alternatives.

The following conventions also apply to CICSPlex SM syntax descriptions:
- Commands and keyword parameters are shown in uppercase characters. If a command or parameter may be abbreviated, the minimum permitted abbreviation is in uppercase characters; the remainder is shown in lowercase characters and may be omitted.
- Variable parameters are shown in lowercase characters. You must replace them with your own information.
- Parameters that are not enclosed by braces { } or brackets [ ] are required.
- A default parameter value is shown like this: KEYWORD. It is the value that is assumed if you do not select one of the optional values.
- Punctuation symbols, uppercase characters, and special characters must be coded exactly as shown.

    Note: A semicolon ; is shown as the command delimiter in examples using multiple commands. For information about using and changing the command delimiter, see the *CICSPlex System Manager User Interface Guide*.
- The ellipsis ... means that the immediately preceding parameter can be included one or more times.

CICS system connectivity

This release of CICSPlex SM can be used to control CICS systems that are directly connected to it.

For this release of CICSPlex SM, the connectable CICS systems are:
- CICS Transaction Server for z/OS 3.1
- CICS Transaction Server for z/OS 2.3
- CICS Transaction Server for z/OS 2.2
- CICS Transaction Server for OS/390® 1.3

You can use this release of CICSPlex SM to control systems running supported releases of CICS that are connected to, and managed by, your previous release of CICSPlex SM. However, if you have any directly-connectable release levels of CICS, as listed above, that are connected to a previous release of CICSPlex SM, you are strongly recommended to migrate them to the current release of CICSPlex SM, to take full advantage of the enhanced management services. See the *CICS Transaction Server for z/OS Migration from CICS TS Version 2.3* for information on how to do this.

Table 1 on page vii shows which supported CICS systems can be directly connected to which releases of CICSPlex SM.

Table 1. Directly-connectable CICS systems by CICSPlex SM release

CICS system	CICSPlex SM component of CICS TS 3.1	CICSPlex SM component of CICS TS 2.3	CICSPlex SM component of CICS TS 2.2	CICSPlex SM component of CICS TS 1.3
CICS TS 3.1	Yes	No	No	No
CICS TS 2.3	Yes	Yes	No	No
CICS TS 2.2	Yes	Yes	Yes	No
CICS TS 1.3	Yes	Yes	Yes	Yes
TXSeries 4.3.0.4	No	Yes	Yes	No
TXSeries 5.0	No	Yes	Yes	No

Changes in CICS Transaction Server for z/OS, Version 4 Release 1

For information about changes that have been made in this release, please refer to *What's New* in the information center, or the following publications:

- *CICS Transaction Server for z/OS What's New*
- *CICS Transaction Server for z/OS Upgrading from CICS TS Version 3.2*
- *CICS Transaction Server for z/OS Upgrading from CICS TS Version 3.1*
- *CICS Transaction Server for z/OS Upgrading from CICS TS Version 2.3*

Any technical changes that are made to the text after release are indicated by a vertical bar (|) to the left of each new or changed line of information.

Part 1. Implementing workload management

Implement workload management by using a combination of CICS system initialization parameters and CPSM definitions.

Chapter 1. Introduction to workload management

This chapter introduces the concepts involved with workload management and the dynamic routing of transactions and programs.

Workload management and dynamic routing

CICSPlex SM workload management optimizes processor capacity in your enterprise.

Workload management achieves this by dynamically routing transactions and programs to whichever CICS region is the most appropriate at the time, taking into account any transaction affinities that exist. Workload management can dynamically route:

- Transactions invoked at a terminal
- Eligible transactions invoked using EXEC CICS START commands that are associated with a terminal
- Eligible transactions invoked using EXEC CICS START commands that are not associated with a terminal
- Distributed program links, including:
  - The CICS Web support
  - The CICS Transaction Gateway
  - EXCI calls
  - CICS Client ECI calls
  - Distributed Computing Environment (DCE) remote procedure calls (RPCs)
  - Open Network Computing (ONC) remote procedure calls (RPCs)
  - Internet Inter Object Request Broker Protocol (IIOP)
  - Any function that issues an EXEC CICS LINK PROGRAM request
  - Link3270 requests
- Transactions associated with CICS business transaction services (BTS) activities.
- Enterprise beans executing in CICS-provided CorbaServers

Alternatively, if you want work to run always in a specifed region, you can use **static routing**.

The CICS systems involved in dynamic routing may act as one of the following:

Requesting region
> The CICS system where the request is initiated. For terminal-initiated transactions and for inbound client DPLs, the requesting region is typically a terminal-owning region (TOR); for terminal-related EXEC CICS START commands, for non-terminal-related EXEC CICS START commands, for peer-to-peer DPLs, for CICS BTS activities, and for Link3270 bridge requests, the requesting region is typically an application-owning region (AOR). For *enterprise bean invocations*, the requesting region is typically the external client code that invokes the enterprise bean.

Routing region
> The CICS region that decides where to route the transaction or program. For terminal-initiated transactions and terminal-associated EXEC CICS

START commands, the routing region is typically a TOR; for DPLs, for non-terminal-related EXEC CICS START commands, and CICS BTS activities, and for Link3270 bridge requests, the routing region is typically an AOR. For *enterprise bean invocations*, the routing region is a CICS listener region.

Target region
The CICS system in which the transaction or program will run. For all dynamically-routed transactions, programs, BTS activities and enterprise bean invocations, the target region is typically an AOR.

In order to manage enterprise bean workloads, you need to create a *logical EJB server*, which will typically consist of a number of cloned enterprise bean listener regions acting as routing regions and cloned target regions. A CICSplex involved in the workload management of enterprise beans may contain one or more logical EJB servers, and regions that are not involved with processing enterprise bean invocations. Each cloned target region may run a number of *CorbaServers*. A CorbaServer provides the execution environment for enterprise beans and stateless CORBA objects.

If the region is the listener, include the statement:
MASPLTWAIT(YES)

in its EYUPARM file, to ensure that the critical components of the local CICSPlex SM environment initialize before any enterprise bean routing requests are presented.

The routing can be based on:

- User, terminal, processtype, and affinity attributes associated with the work requests, which may be the transactions, programs, or BTS processes and activities
- The work requests themselves

When you establish a workload, you are associating the work itself and the CICS systems (acting as requesting, routing, and target regions), to form a single, dynamic entity. Within this entity, you can route the work:

- To a target region selected on the basis of its availability. This type of routing, known as *workload routing*, allows you to distribute work activity across all of the target regions associated with a workload. See "Managing the work in a workload" on page 7 for additional information.
- To a subset of the target regions based on specific criteria. This type of routing, known as *workload separation*, allows you to separate transaction and program occurrences and direct them to different target region subsets, where activity is distributed across the target regions within the subset.

  The criteria you use to separate transactions or programs can be based on:
  - The terminal id and user id associated with a transaction or program occurrence.
  - The process type associated with the CICS BTS activity.
  - The transaction.

  See "Separating the work in a workload" on page 10 for additional information.
- To a selected target region based on its affinity relationship and lifetime. This type of routing, based on the *transaction affinity* of the target region, allows you

to route specific transaction occurrences to the same target region for a designated period of time. For additional information, see "Taking affinity relations into consideration" on page 16.

Workload routing and workload separation can be active concurrently within the same or different workloads associated with a CICSplex.

Note:

1. You can use the CICSPlex SM real-time analysis functions to produce data that will help in the selection of a target region during workload management. See "Using real-time analysis to select a target region for workload routing" on page 145 for details.
2. For additional information about how CICSPlex SM handles dynamic routing and how you can customize this facility, see Chapter 4, "Dynamic routing with CICSPlex SM," on page 27.

Workload requirements

Any CICS system can act as a requesting region, a routing region, or a target region, under certain conditions.

- All the CICS systems associated with a workload are either part of the same CICSplex, or, for BTS processes and activities, part of the same BTS-set. They do not have to reside in the same MVS image.
- For dynamic routing of both terminal-related and non-terminal-related **EXEC CICS START** commands, requesting, routing, and target regions must be a supported release of CICS Transaction Server.
- For dynamic routing of DPLs, routing regions must be a supported release of CICS Transaction Server; target regions can be any level of CICS.
- For enterprise beans, the routing and target regions must be part of the same IIOP server; that is, the same logical EJB server.
- For CICS BTS activities, the routing region (which is also the requesting region) and the target region must be a supported release of CICS Transaction Server. They must also be in the same sysplex.
- For dynamic routing of transactions and static routing, the CICS system acting as the routing region must be running CICS Transaction Server. The CICS systems acting as target regions can be running any version of any CICS platform supported by CICSPlex SM.
- For dynamic routing of enterprise bean-related transactions, the CICS system acting as the routing region and the target region must be running a supported release of CICS Transaction Server.
- The routing region must be defined as local to a CMAS involved in managing the CICSplex. It must use CICSPlex SM facilities to communicate with that CMAS.
- For Link3270 bridge requests, the target regions must be a supported release of CICS Transaction Server.

For more information about these conditions, see the *CICS Intercommunication Guide*.

A CICS system can act as a target region in one or more workloads; however, it can act as a routing region in only one workload.

Note: A CICS system can act as a routing region and a target region in the same workload.

When a CICS system acting as a target region is combined with other target regions to form a CICS system group, each of the target regions must have access to all the resources required by any transactions that might be routed to that CICS system group. In the case of a CICS BTS workload, they must all be in the same sysplex.

Chapter 2. Establishing a workload

The criteria used to identify a workload are based on the information provided by a workload specification, one or more workload definitions and their optional transaction groups, and one or more workload groups.

- A *workload specification* identifies the CICS systems or CICS system groups within a CICSplex that are to be treated as routing regions and the default target regions. You can also use a workload specification to identify a default affinity relationship and lifetime.

  A CICS region can be associated with none, or one workload specification (WLMSPEC). For the CICS region to be a CICSPlex SM routing region, it must be associated with a workload. For the CICS region to be a CICSPlex SM target region, it depends on the type of routing being used:

  - For Dynamic routing, the target region is not associated with a workload (WLMSPEC), This means that the target region could be a target for one or more workloads.
  - For Distributed routing. then the target region must be associated with a workload (WLMSPEC). This means that the target region can be a target for one workload

  If you are only using dynamic routing today, we suggest that target regions are targets in only one workload, to make things easier if you decide to implement distributed routing at a later time.

  The name of a workload specification becomes the name of the workload itself.

- A *workload definition* includes specific or generic terminal and user names, or a specific or generic process type, that are used when attempting to match a transaction occurrence to a workload definition. It also identifies the target region to which transaction occurrences matching the criteria are to be routed.

- A *transaction group* identifies one or more related transaction identifiers and indicates whether the terminal id or the user id specified in the workload definition is to be used as the primary selection criterion in determining which transactions are to be routed to the set of target regions identified in the workload definition. A transaction group is also used to define affinities.

- A *workload group* is a collection of workload definitions that are to be treated as a single entity.

Note: When no workload definitions are installed in a workload, all transactions and programs are routed to a target region in the default target scope identified by the workload specification. However, when a workload definition is installed in a workload, all transactions and programs that match the criteria in that workload definition are routed to a target region in the target scope identified by the definition itself. A dynamic routing request that is not associated with any workload definition is routed to a target region in the workload specification's default target scope.

Managing the work in a workload

You can have all dynamic transactions and programs initiated from a set of requesting regions routed by a routing region to a specific set of target regions in the same CICSplex.

The specific target region to which each request is routed is determined by the activity and availability of all target regions in that set.

To establish workload routing, you need to define only a workload specification; see *CICSPlex System Manager Administration*.

The dynamic routing processes are explained using Figure 1, which illustrates the Starter Set configuration. For dynamic transaction routing, any transaction initiated from a terminal associated with the requesting region EYUMAS1A (a TOR) is routed to the most appropriate target region (an AOR) in the CICS system group EYUCSG01.
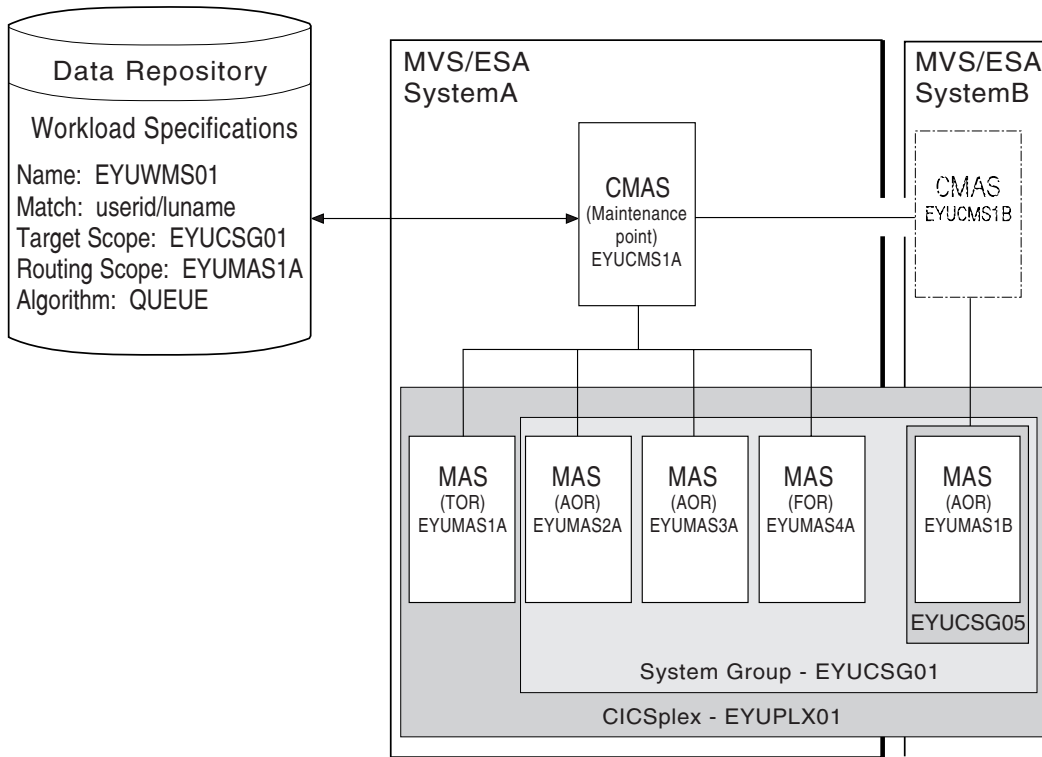
Figure 1. Sample workload definition for dynamic routing

For dynamic routing of EXEC CICS START TRANSID TERMID commands, any transaction initiated in the requesting region EYUMAS2A (an AOR) is sent to EYUMAS1A (a TOR), the routing region associated with the terminal identified in the TERMID option of the START command. The routing region sends the transaction to the most appropriate target region (an AOR) in the CICS system group EYUCSG01.

For dynamic program linking, there are two possible scenarios. For an inbound client request, the request is received in TOR EYUMAS1A, which acts as the requesting region and the routing region. The target region is any AOR in the CICS system group EYUCSG01. For a peer-to-peer request, the request is initiated by a transaction running in EYUMAS2A (an AOR). EYUMAS2A acts as the routing region, and the target region may be any AOR in the CICS system group EYUCSG01.

The routing processes for enterprise beans are explained using Figure 2 on page 9. The inbound IIOP work request is received by a routing region (listener) in system

group EYUSGEJ1 and is matched to an existing request model definition. The routing region routes the transaction identified in the request model to a target region in the CICS system group. The transaction runs in the CorbaServer identified in the request model definition.
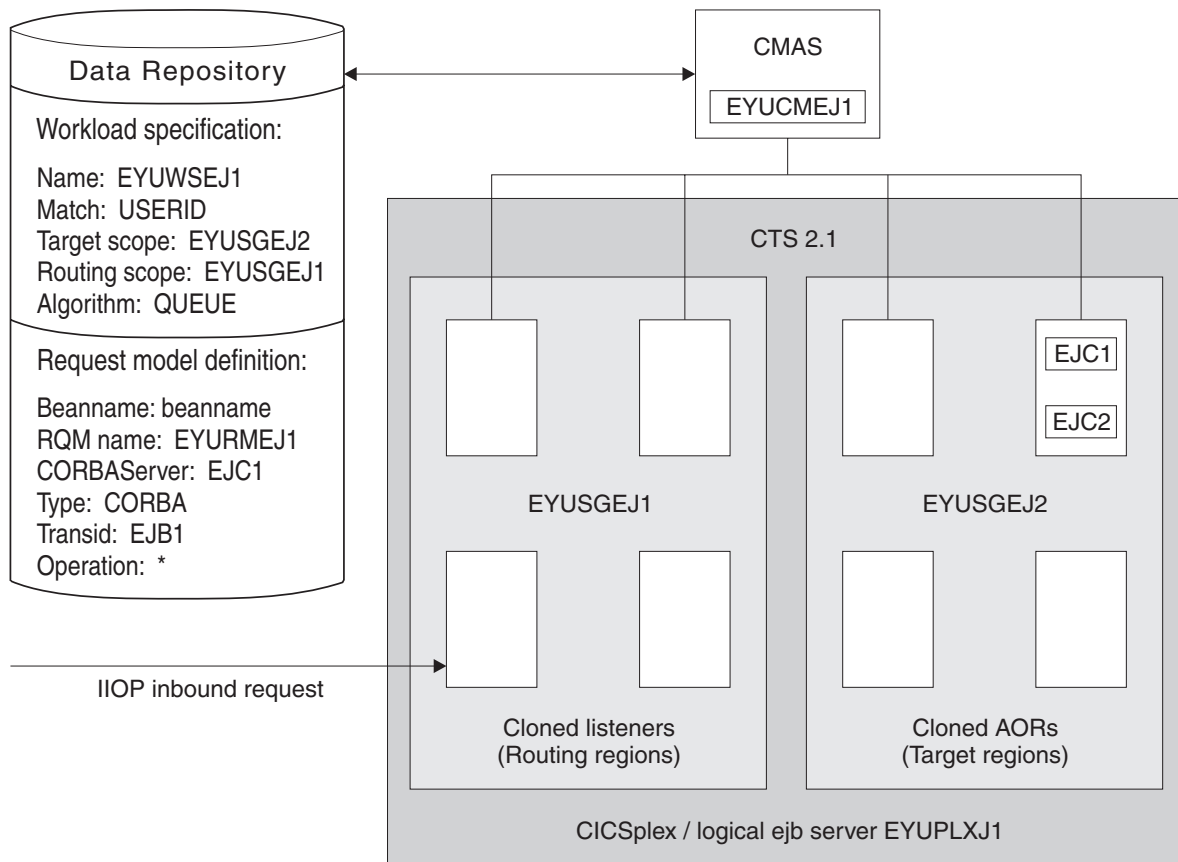
Figure 2. Sample workload definition for dynamic routing of enterprise beans

> **Note:** For additional information about the goal algorithm, see *MVS/ESA SP Version 5 Planning: Workload Management*.

Using the queue algorithm

During workload processing using the queue algorithm, CICSPlex SM routes all transactions and programs initiated in the requesting region to the most appropriate target region in the designated set of target regions.

Using the goal algorithm

CICSPlex SM supports the z/OS goal algorithm. The aim of the goal algorithm is to select the target region that is best able to meet the defined, average, or percentile response-time goals for all work in a workload.

The goal is defined by associating transactions, using the z/OS Workload Manager, to a service class. Service classes are assigned on a transaction, LU name, and user ID basis. Service classes can define several types of response-time goals. However, CICSPlex SM recognizes average and percentile response-time goals only. If transactions are given velocity or discretionary goals, they are assumed to be meeting their goals. CICSPlex SM manages at the service-class level; that is, it has

no internal knowledge of the transaction characteristics. By consistently allocating service classes to sets of target regions, it minimizes the amount of resource reallocation by the z/OS Workload Manager.

You can use goal mode to provide efficient routing decisions, where routers and targets are managed by the same CMAS, in the following scenarios:

- Dynamic routing using DTRPGM for dynamic transactions
- Dynamic routing using DTRPGM for EXEC CICS START TERMID over APPC or MRO connections
- Distributed routing using DSRTPGM for business transaction service routing

It is important for the Service Level Administrator to define goals that are realistic for the underlying capacity of the target systems. Transactions of like attributes (for example, transactions that have similar resource consumption, or pseudoconversational transactions) must be assigned to distinct service classes. The response-time goals can be the same for several service classes. Use CICS statistics to help you define these transaction sets. See the CICS Transaction Server for z/OS Performance Guide for information about CICS statistics.

Separating the work in a workload

You can separate the work in a workload using the name of the user, the terminal, or both that are associated with a transaction or program, the transaction itself, or the BTS process-type associated with the transaction.

Note: You can separate a workload using either LU name and user ID, or process type. You cannot separate a workload using, for example, a generic process type and a user ID. Separation of enterprise bean workloads may be implemented only through the user ID.

Separating by terminal or user name

You can create a workload that routes requests from a set of requesting regions to different subsets of target regions based on the name of the terminal, user, or both associated with each occurrence of a transaction.

For example, you might want to route all requests initiated by certain individuals from specific terminals to a special subset of target regions.

Figure 3 on page 11 illustrates what such a workload might look like. In this case, if the user and terminal names associated with a transaction begin with SM and NET, respectively, the transaction is routed to the set of target regions identified as EYUCSG05. If either the user or terminal name begins with any other characters, the transaction is routed to the default set of target regions identified as EYUCSG01 on the workload specification.
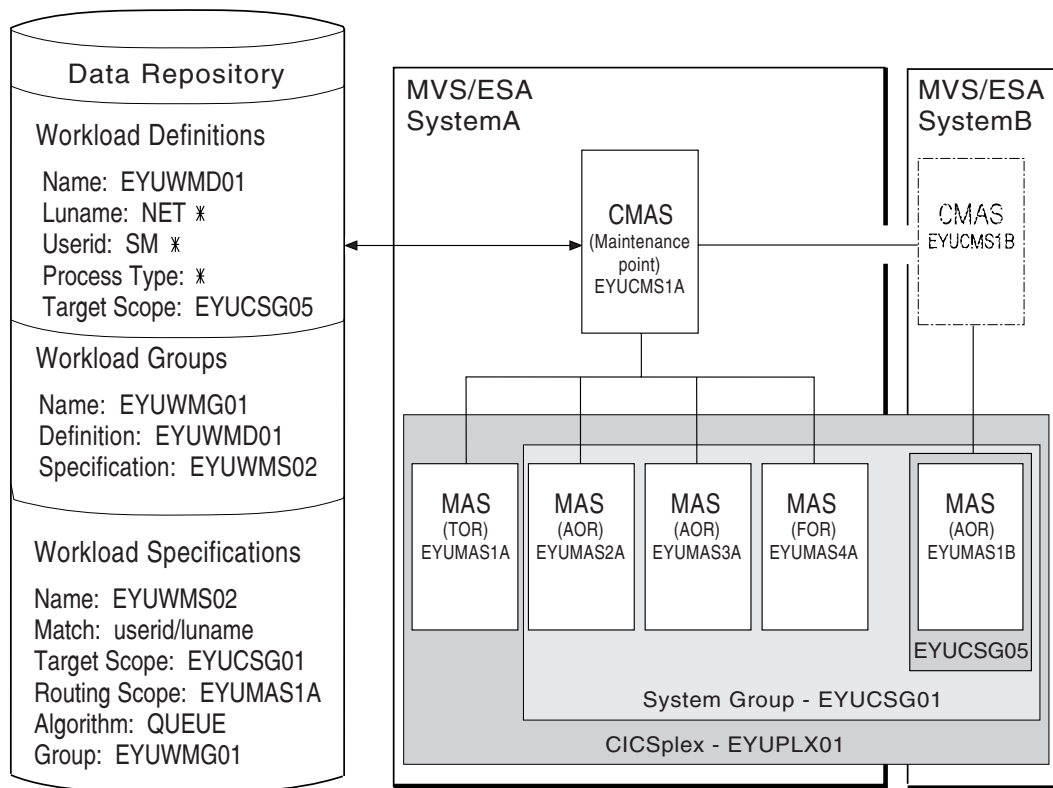
Figure 3. Sample definition separating a workload by terminal and user name

During workload processing, CICSPlex SM evaluates the terminal and user names associated with each occurrence of a request to determine where the request should be routed.

- If the terminal and user names associated with the transaction match the selection criteria specified in an installed workload definition, the request is routed to the target regions identified in that definition.
- If either the terminal or user name does not match the selection criteria, the request is routed to the default set of target regions identified in the workload specification.

After determining the appropriate set of target regions, CICSPlex SM selects one based on the status of the active target regions in that set.

Separating by process type

You can create a CICS BTS workload that routes requests associated with a certain process type to a specific target region or set of target regions. For example, you may want to route all the requests associated with the STOCK process type to a special subset of target regions.

Figure 4 on page 12 illustrates what such a workload might look like, if the process type associated with a CICS BTS transaction is STOCK, the transaction is routed to a set of target regions identified as EYUCSG05. If the process type is anything other than STOCK, the transaction is routed to the default set of target regions identified as EYUCSG01 in the workload specification.

Data Repository

Workload Definitions

Name: EYUWMD04
Trangrp: STOCK1
Luname: *
Userid: *
Process Type: STOCK
Target Scope: EYUCSG05

Workload Groups

Name: EYUWMG04
Definition: EYUWMD04
Specification: EYUWMS05

Workload Specifications

Name: EYUWMS05
Match: userid/luname
Target Scope: EYUCSG01
Routing Scope: EYUMAS1A
Algorithm: QUEUE
Group: EYUWMG04

MVS/ESA SystemA

MVS/ESA SystemB

CMAS (Maintenance point) EYUCMS1A

CMAS EYUCMS1B

MAS (TOR) EYUMAS1A

MAS (AOR) EYUMAS2A

MAS (AOR) EYUMAS3A

MAS (FOR) EYUMAS4A

MAS (AOR) EYUMAS1B

EYUCSG05

System Group - EYUCSG01

CICSplex - EYUPLX01

Figure 4. Sample definition separating a workload by process type

If you choose to separate a workload by process type, you must set the Luname and Userid fields to *. If you separate a workload by LU name and user ID, you must set the Process Type field to *. If you want to separate an enterprise bean workload, the Luname and Process Type fields must be set to *. You can separate a workload only either by process type or by LU name and user ID.

You can specify either a specific or a generic process type. During workload separation processing, CICSPlex SM evaluates the process type supplied by CICS to determine to where the transaction should be routed.

- If the process type matches the selection criteria specified in an installed definition, the request is routed to the target regions identified in the definition.
- If the process type does not match the selection criteria, a match may be found based on the transaction's associated LU name and user ID. If a match is found based on these criteria, the request is routed to the target regions identified in the associated definition.
- If no match is found using the process type, LU name and user ID, the request is routed to the default set of target regions identified in the specification.

Note: Separation by process type takes precedence over separation by LU name and user ID. Thus, if a transaction's associated process type, LU name and user ID mean that it satisfies the selection criteria specified in two workload definitions, one specifying separation by process type and the other separation by LU name and user ID, the transaction is routed to a region in the target scope specified in the workload definition specifying separation by process type.

Separating by transaction

You can also separate the work in a workload based on the transactions themselves. For example, you might want all occurrences of payroll-related transactions initiated from terminals in an accounting department to be routed to a specific set of target regions for processing.

Figure 5 on page 14 illustrates how you might separate the work in a workload based on transaction identifiers. In this case, if the user and terminal names associated with any transaction identified in transaction group EYUWMT01 begin with SM and NET, respectively, the transaction is routed to the target regions identified as EYUCSG05. If the transaction identifier, user name, or terminal name does not match the criteria, the transaction is routed to the default target regions identified as EYUCSG01.

During workload processing, CICSPlex SM evaluates the transaction identifier supplied by CICS to determine which transaction group to use.

- If the transaction is defined to a transaction group, CICSPlex SM notes whether the match key for that group is USERID or LUNAME.
- If the transaction is not part of a transaction group, CICSPlex SM uses the match key from the default transaction group for the specification. The match key is the value specified with the associated specification. For additional information, see *CICSPlex System Manager Administration*.

CICSPlex SM uses the match key value to establish the order in which the terminal and user names associated with the transaction are to be evaluated. The evaluation is used to determine where the transaction should be directed:

- If the terminal and user names associated with the transaction match the selection criteria specified in an installed workload definition, the request is routed to the target regions identified in that definition.
- If the terminal and user names do not match the selection criteria, the request is routed to the default set of target regions identified in the workload specification.

After determining the appropriate set of target regions, one is selected based on the status of the active target regions in that set.

Data Repository

Transaction Groups

Name: EYUWMT01
Match: luname/userid
Tranid: PAY1, PAY2,
INV1, INV2

Workload Definitions

Name: EYUWMD02
Trangrp: EYUWMT01
Luname: NET✱
Userid: SM✱
Process Type:✱
Target Scope: EYUCSG05

Workload Groups

Name: EYUWMG02
Definition: EYUWMD02
Specification: EYUWMS03

Workload Specifications

Name: EYUWMS03
Match: userid/luname
Target Scope: EYUCSG01
Routing Scope: EYUMAS1A
Algorithm: QUEUE
Group: EYUWMG02

MVS/ESA SystemA

CMAS
(Maintenance point)
EYUCMS1A

MVS/ESA SystemB

CMAS
EYUCMS1B

MAS (TOR) EYUMAS1A
MAS (AOR) EYUMAS2A
MAS (AOR) EYUMAS3A
MAS (FOR) EYUMAS4A
MAS (AOR) EYUMAS1B

EYUCSG05

System Group - EYUCSG01

CICSplex - EYUPLX01

Figure 5. Sample definition separating a workload by transaction

Separating enterprise beans by transaction

The method for workload separation of enterprise beans is the same as separating enterprise beans by transaction. For example, you might want all enterprise bean-related transactions to be routed to a specific set of target regions for processing.

An incoming IIOP enterprise bean request to CICS includes the bean name, which is matched to a predefined request model definition that is installed in the routing regions (cloned listener regions). The request model identifies, among other things:

- The bean name
- The CICS transaction to be run
- The name of the CorbaServer in the target region in which the transaction is to run.

Figure 6 on page 15 illustrates how you might separate enterprise bean-related transactions. The request definition relates enterprise bean beanname with CICS transaction EJB1, which belongs to transaction group EYUTGEJ1. The workload definition identifies the target scope as EYUSGEJ2. The match key is USERID and you can use a specific or generic user id in the transaction group definition. If the

user id in the transaction group definition does not match that in the incoming IIOP request, the enterprise bean-related transaction is routed to the default target region EYUSGEJ2.
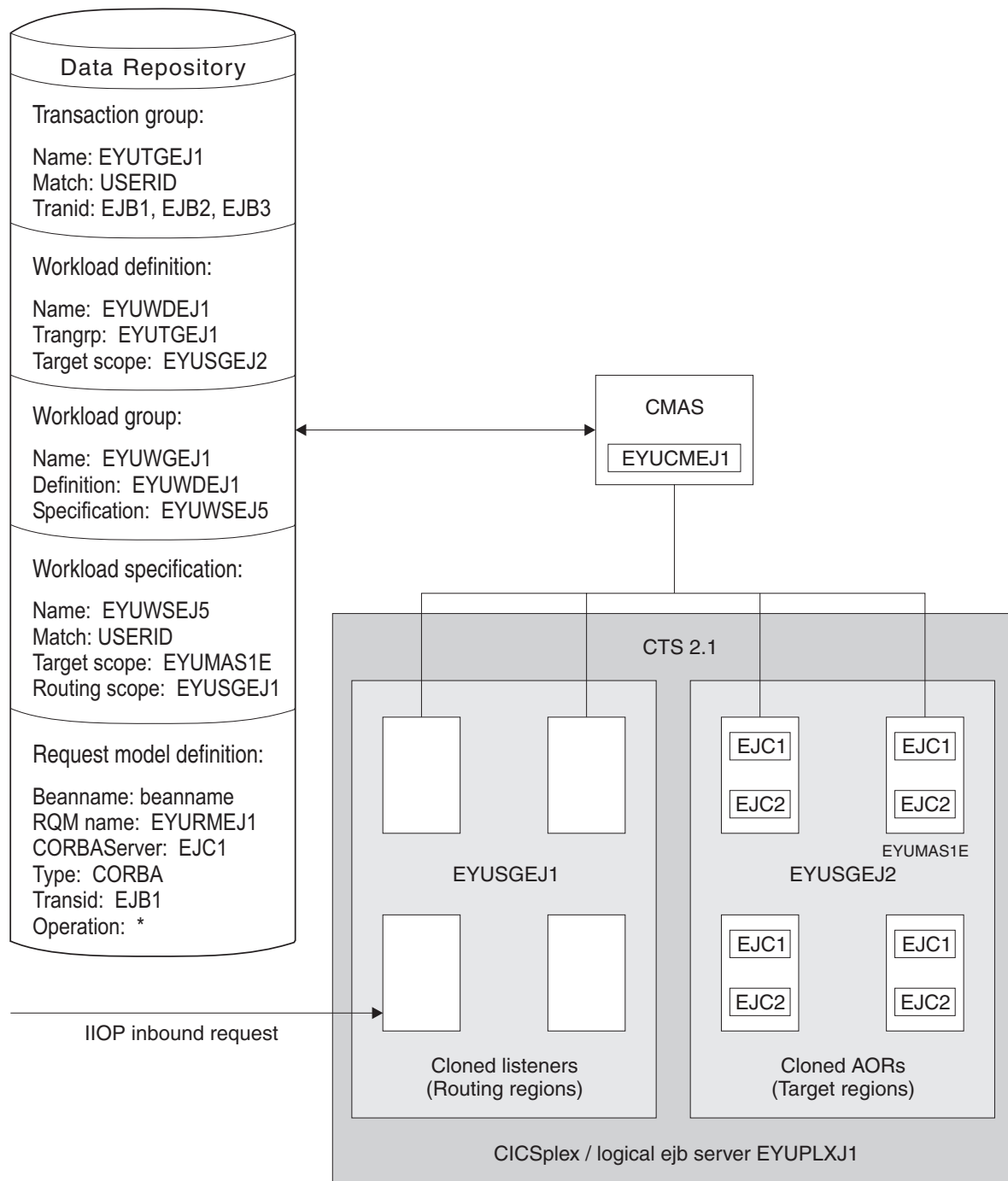
Figure 6. Sample workload separation definition for dynamic routing of enterprise beans

Separating Link3270 bridge workloads

Link3270 bridge workloads can be separated by user ID, LU name, and transaction group.

For Link3270 bridge workloads the LU name can be produced in three different ways:

1. It can be supplied by the user in the BRIH-NETNAME parameter on the Link3270 call.
2. It can be generated randomly by the Link3270 bridge facility.
3. The CICS autoinstall user replaceable program can be used in conjunction with either of the other two methods to accept, reject or modify the supplied or generated NETNAME.

You can separate Link3270 bridge workloads by LU name only if you are using methods 1 or 3 of those listed, so that the LU name is known in advance. If you are using the method 2, the LU name is not known in advance and cannot be used for workload separation.

To separate by the bridge facility NETNAME and not the name associated with the client program that started the Link3270 bridge you must modify the EYU9WRAM module. You can use the CICS API commands:

- EXEC CICS ASSIGN USERID()
- EXEC CICS ASSIGN BRFACILITY NETNAME()

to assign the user ID and LU name. You can use the NETNAME returned from the INQUIRE BRFACILITY() command rather than the NETNAME passed via the DFHDYPDS commarea parameter DYRNETNM to separate the workload.

For more information about Link3270 bridge facility definitions see *CICS External Interfaces Guide*.

Taking affinity relations into consideration

An *affinity* is a relationship that you define between two or more transactions for the duration (or *lifetime*) of that relationship.

When an affinity relationship exists between transactions, those transactions must be processed by the same target region. You can use affinities to route transactions from one or more requesting regions to a specific target region based on the rules applying to a particular combination of an affinity relation and lifetime. For a list of affinity relation and lifetime values, see Relations and lifetimes.

When multiple CMASs in the CICSplex manage affinities for the workload, and one of these CMASs is brought down and the local MASs stay up, the workload becomes frozen. When the workload is frozen, it cannot be changed, however the current workload remains active.

When a CMAS is down, and you have any of the following affinity life times and affinity relationships, a new affinity instance cannot be created, and the transaction cannot be routed to the target MAS associated with the affinity, because the local TORs cannot be informed of the workload changes while the workload is frozen.

Affinity relation	Affinity lifetime
User ID	- SYSTEM - PERMANENT
LUNAME	- SYSTEM - PERMANENT

Affinity relation	Affinity lifetime
GLOBAL	• SYSTEM • PERMANENT
BAPPL	• SYSTEM • PERMANENT • ACTIVITY • PROCESS

When the CMAS is brought back up and reconnects to the MASs, the workload is unfrozen and is able to be changed.

You can use the IBM CICS Interdependency Analyzer for z/OS to detect existing affinities between transactions and between BTS processes and activities. The output from the Reporter component of that utility can be used as input to the CICSPlex SM batched repository-update facility. For more information, see the *CICS Interdependency Analyzer for z/OS User's Guide and Reference*.

Note: You cannot use the IBM CICS Interdependency Analyzer for z/OS to detect affinities between non-terminal-related EXEC CICS START commands, and between DPLs that are not associated with either a user ID or a terminal ID. For these request types, try to remove or avoid all affinities, and ensure that your applications can honor any remaining affinities.

CICS BTS considerations

Although BTS itself does not introduce any affinities, and discourages programming techniques that do, it does support existing code that may introduce affinities.

You must define such affinities to workload management. It is particularly important to specify each affinity's lifetime. Failure to do this may restrict unnecessarily the workload management routing options.

It is important to note that a given activity can be run both synchronously and asynchronously. Workload management is only able to honor invocations that are made asynchronously. Furthermore, you are strongly encouraged not to create these affinities, particularly activity and process affinities, because these affinities are synchronized across the BTS-set. This could have serious performance impacts on your systems.

You should also note that, with CICSPlex SM, the longest time that an affinity can be maintained is while a CMAS involved in the workload is active; that is, an affinity of PERMANENT. If there is a total system failure, or a planned shutdown, affinities will be lost, but activities in CICS will be recovered from the BTS RLS data set.

Enterprise bean considerations

The CICSPlex SM affinity services have no facilities for the management of affinities between enterprise beans. Transaction affinity relation and lifetime fields in the workload management views should be left blank.

Link3270 bridge considerations

For Link3270 bridge transactions, affinities are managed by CICS and not by CICSPlex SM. Transaction affinity relation and lifetime fields in the workload management views should be left blank.

Adding affinities into a workload

For non-Link3270 bridge transactions, affinities are managed by CICSPlex SM `Transaction affinity relation` and `lifetime` fields in the workload management views. You specify these fields to isolate transactions to particular systems and to define affinity types and lifetimes.

Figure 7 on page 19 illustrates how you might separate the work in a workload based on transaction identifiers and then associate an affinity relation and lifetime with those transactions. With this example, the first occurrence of a transaction named PAY1, where the associated terminal and user names are NET1 and SMITH, respectively, is directed to the appropriate target region within the set of target regions identified as EYUCSG05. The specific target region receiving the transaction and the affinity relation and lifetime associated with the transaction group to which PAY1 belongs are noted. All subsequent occurrences of any transaction in the transaction group that meet the terminal and user name criteria are directed to the same target region for the designated period of time.

Note: If you do not specify a default affinity relation and lifetime, then you may use the same workload specification for workload routing and separation.
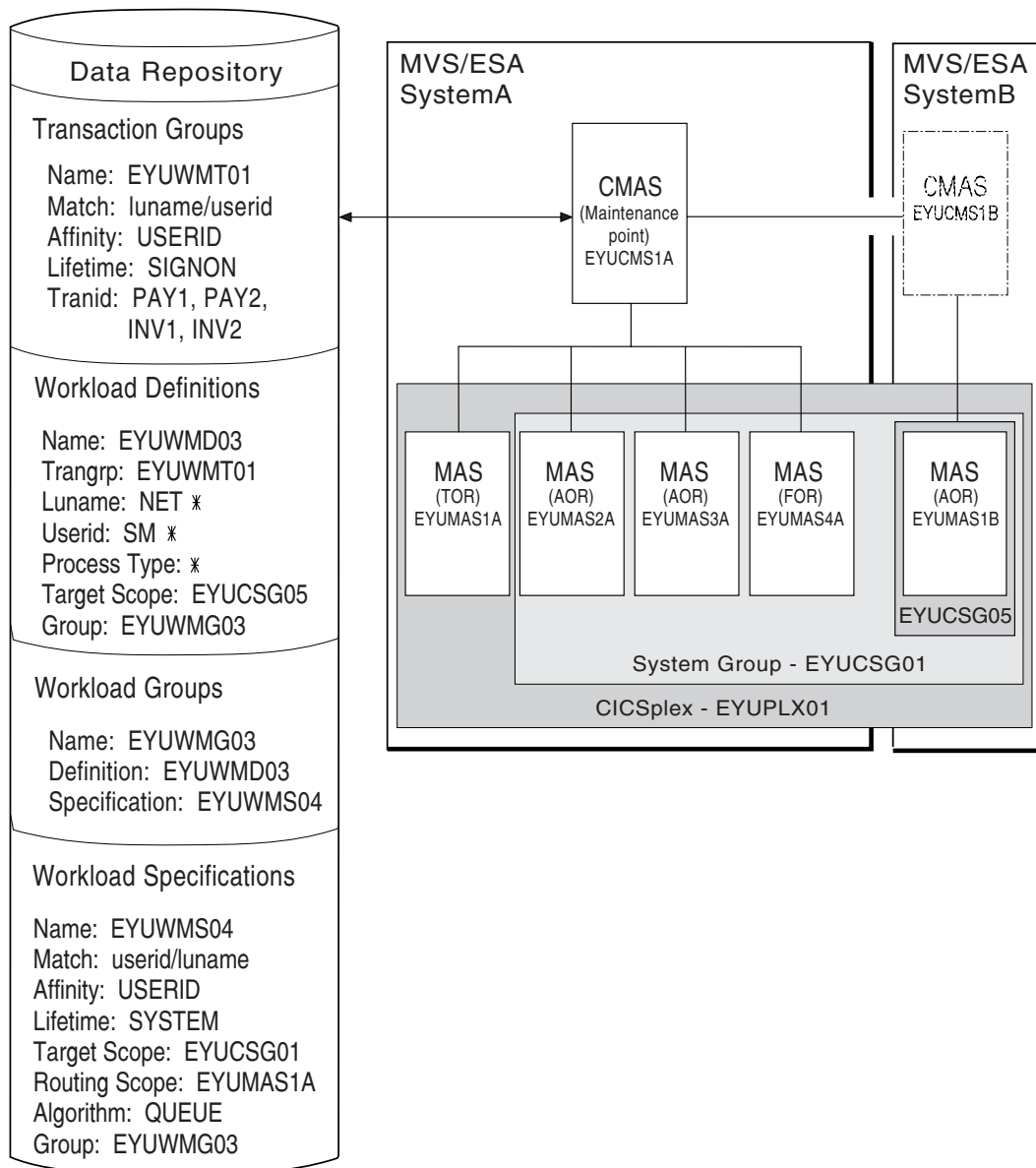
Figure 7. Sample definition adding transaction affinity to a workload

Note: During workload processing, CICSPlex SM evaluates the transaction identifier supplied by CICS to determine which transaction group to use.

- If the transaction is defined to a transaction group, CICSPlex SM notes the match key for that group.

- If the transaction is not part of a transaction group, CICSPlex SM uses the match key from the default transaction group for the workload specification.

CICSPlex SM uses this value to establish the order in which the terminal and user names associated with the transaction are to be evaluated. The evaluation is to determine where the transaction should be directed:

- If the terminal and user names associated with the transaction match the selection criteria specified in an installed workload definition, CICSPlex SM checks to see if an affinity relation and lifetime are associated with the transaction group.

- When an affinity relation and lifetime are associated with the transaction group:
  - If it is the first occurrence, CICSPlex SM notes the affinity relation and lifetime. Based on target region availability, CICSPlex SM then selects a target region and directs the transaction to it.
  - If it is not the first occurrence, CICSPlex SM routes the transaction to the previously selected target region. As long as the affinity relation and lifetime are applicable, subsequent occurrences of any transaction in the transaction group are directed to the same target region.
- When no affinity relation and lifetime are associated with the transaction group, the transaction is routed to the most appropriate target region in the designated set of target regions.
- If the terminal and user names do not match the selection criteria, the transaction is routed to the default set of target regions identified in the workload specification. One is selected based on the status of the active target regions in that set.

Note: When transactions in a *series* of terminal-initiated transactions are associated with separate transaction groups, affinities for each transaction group follow the rules defined for that transaction group.

Taking abend probabilities into consideration

CICSPlex SM can evaluate both the health and activity (or load) of each target region identified by the target scope. This information, along with the abend probability values you provide when defining transaction groups to CICSPlex SM, is then used in determining to which target region a particular transaction should be routed.

Note: For any transactions that are not associated with a transaction group, the default abend probability values defined in the workload specification are used.

The probability that a transaction will abend if routed to a particular target region is calculated in one of the following ways:
- When the transaction is associated with a transaction group that either has no defined affinity type and lifetime or uses the default values defined in a workload specification, then the probability of an abend is calculated individually for that transaction.
- When the transaction is associated with a transaction group that has a defined affinity type and lifetime, then the probability of an abend for that transaction is calculated as the probability of an abend for the entire group of transactions.

The abend probability values that you provide cover both the health and load of a potential target region, where:
- If the probability that a given transaction within the set will abend in a specific target region is equal to or greater than the abend health value you specified with the transaction, then that target region is considered unhealthy. CICSPlex SM attempts to avoid routing the transaction to that target region. However, if there is no healthier target region, then the transaction may be routed to that target region.
- If the probability that a given transaction within the set will abend in a specific target region is greater than 0% but less than the abend load value you specified, CICSPlex SM gradually adjusts the perceived transaction load upward. Once the abend probability reaches the defined load value, the perceived load is doubled,

which means the target region is considered to have twice the load that it really has. The target region is still considered healthy, but its perceived load may make it less acceptable as a target for routing. The perceived load continues to increase until the abend probability reaches the defined health value, at which point the target region is considered unhealthy.

Note:

1. Abend probabilities are only taken into account if you are using the dynamic routing exit DTRPGM. They are not considered if you are using the distributed routing exit DSRTPGM.

2. Once an affinity is active, all subsequent transactions are routed to the same target region for as long as the affinity remains active, regardless of its abend probability.

3. If a transaction abends in a target region with EXEC CICS HANDLE ABEND in force, CICSPlex SM does not receive the information that the abend has occurred. Therefore, CICSPlex SM cannot take such abends into account when calculating the probability that a transaction will abend in that target region. In other words, the abend probability might stay low in this situation, even though abends had occurred.

Chapter 3. Activating workload management

This chapter contains the steps you need to perform to activate workload management.

For workload management to occur for a particular CICS system, you must:

1. Associate a workload specification with the CICS system, using the WLMSPEC view, as described "Associating a CICS system or system group with a workload specification" on page 65.

2. Identify the dynamic routing program EYU9XLOP to the CICS systems acting as requesting regions and target regions.

   If the CICS system is not active, you can make workload management processing available the next time the CICS system starts by setting the CICS system initialization table DTRPGM (SIT) parameter in the requesting region which initiates the request and in any target region which is also to act as a routing region:

   ```
   DTRPGM=EYU9XLOP
   ```

   For non-terminal-related EXEC CICS START commands and BTS activities, and also for all regions within a logical server, set the DSRTPGM SIT parameter in the region that initiates the request and in all potential target regions:

   ```
   DSRTPGM=EYU9XLOP
   ```

   If the CICS system is active, you can use the **CICS regions** detailed view, as described in CICS regions - CICSRGN , in the *CICSPlex System Manager Operations Views Reference*, to set the name of the dynamic routing program and the distributed routing program.

   Note: For additional information about this program and dynamic routing, see Chapter 4, "Dynamic routing with CICSPlex SM," on page 27.

3. Activate workload management for the CICS system. You can do this using the views:

   CICS system definitions
   > To change the CICS system definition in the data repository.

   MASs known to CICSplex
   > To activate temporarily workload management for an active CICS system.

When either the first routing region associated with a CICSplex is started, or you use the **MASs known to CICSplex** detailed view to activate workload management for the first routing region in a CICSplex, the appropriate workload specifications are installed automatically. (All CMASs involved in managing the CICSplex are also notified.) All workload definitions and transaction groups, associated with the specification by workload groups, are also installed automatically. As long as the CICS system remains active, additional workload definitions can be installed manually in the CICS system.

Note: When a requesting region associated with a CICSplex, and defined with either DTRPGM=EYU9XLOP or DSRTPGM=EYU9XLOP, is starting, it connects to its target CMAS and workload management is activated. However, if the target CMAS is not active when the routing region is starting, any transactions initiated from that routing region and processed by the EYU9XLOP program will wait

indefinitely until the CMAS becomes active and the requesting region fully connects to it. Note that once the requesting region connects to the CMAS and workload management is activated, the CMAS can become inactive and workload management remains active.

Once a workload is active, subsequent changes you make to workload definitions and transaction groups are noted in the data repository. To include these changes in an active workload, you must use action commands to install or discard them.

Installed workload definitions become active immediately and remain active as long as the workload is active or until you discard them. (To verify that the definition is installed in the workload and that all of the CMASs involved in managing the CICSplex using that workload know about the definition, you can use the **Active workload definitions** view, as described in "Active workload views" on page 75.)

How long a workload remains active depends on the affinity lifetime associated with the workload.
* When an affinity lifetime of PERMANENT is in effect, the workload remains active as long as any CMAS involved in managing the workload is active.
* When any other affinity lifetime, or no affinity lifetime, is associated with the workload, the workload remains active as long as any CICS system that is associated with that workload remains connected to a CMAS that manages the CICSplex to which that CICS system belongs.

Important

Once workload management is active, you should not attempt to deactivate it while any workloads are active. When CICSPlex SM is routing or separating the work in a workload, unpredictable results may occur if you attempt to deactivate workload management. Unacceptable results occur if you attempt this action when affinity relations are associated with active workloads. For details, see "Discarding an active transaction from a workload" on page 144.

Part 2. Implementing dynamic routing

You can define a transaction to CICS as either local or remote. Local transactions always run in the requesting region; remote transactions can be routed to any CICS system connected to the routing region. Routing of remote transactions can be dynamic, static, or ATI-controlled.

Chapter 4. Dynamic routing with CICSPlex SM

Use CICSPlex SM to select the most appropriate target region for the execution of a dynamic transaction using the workload management facility.

When a remote transaction is initiated, the CICS relay program is invoked. The CICS relay program links to the dynamic routing program EYU9XLOP. EYU9XLOP creates the environment necessary for CICSPlex SM-based dynamic routing and sets up the CICSPlex SM run-time environment. You must specify EYU9XLOP in the system initialization table (SIT) parameter.

- For static routing, ATI, and dynamic routing, set the DTRPGM SIT parameter associated with the requesting region initiating the transaction:

    ```
    DTRPGM=EYU9XLOP
    ```

    Any target region which is also to act as a routing region must also specify DTRPGM in the SIT and must be set up as a routing region as described in "Associating a CICS system or system group with a workload specification" on page 65.

- For non-terminal-related EXEC CICS START commands, BTS activities, or enterprise beans, set the DSRTPGM SIT parameter in the requesting region that initiates the request, and in all potential target regions that are also set up as a routing region:

    ```
    DSRTPGM=EYU9XLOP
    ```

Note: When the target region is not going to be set up as a routing region, then EYU9XLOP must not be specified in the DTRPGM and DSTRPGM SIT parameters. This causes an endless loop for routed transactions in EYU9XLOP waiting for the workload which never arrives.

CICS notifies EYU9XLOP of all routing requests. These requests are:
- Route selection, route selection error, and transaction termination.
- For BTS (All supported releases of CICS), transaction initiation, transaction abend, and routing attempt complete.
- For enterprise beans (All supported releases of CICS), transaction initiation, transaction abend, and routing attempt complete.

When CICS links to EYU9XLOP, it passes the CICS communication area named DFHDYPDS to it.

Control then passes to the CICSPlex SM workload management facilities. CICSPlex SM initializes the workload management MAS agent code and engages its routing action process. This process is called internally if any of the following conditions are true:
- The EYU9WRAM user-replaceable module is not defined to CICS
- EYU9WRAM is defined to CICS, but is not available
- EYU9WRAM is defined to CICS, is available, and the load module is the assembler version of the module as distributed with CICSPlex SM.

The internal routing action process produces the same results as executing the assembler version of EYU9WRAM as it is distributed with CICSPlex SM. If no additional dynamic routing control is required at your enterprise, the internal process provides better performance.

The EYU9WRAM module, or its equivalent internal process, receives the CICSPlex SM-based communication area EYURWCOM. An entry for EYU9WRAM is added to the CICS system definition file, DFHCSD, for each CICS system during installation. As distributed with CICSPlex SM, EYU9WRAM drives CICSPlex SM workload management processing. EYU9WRAM does this by first obtaining the appropriate list of target region candidates based on the transaction group, and the terminal ID, LU name, user ID, or process type. Then EYU9WRAM selects a target region from the list of candidates.

CICS release requirements for dynamic routing

Here are CICS release requirements for regions involved in dynamic routing.

Table 2. Release requirements for regions involved in dynamic routing.

Release requirement for:	Routing regions	Target regions	Requesting regions
Dynamic transaction routing	Any supported release of CICS (see CICS region connectivity)	Any supported release of CICS (see CICS region connectivity)	-
EXEC CICS START commands	Any supported release of CICS	Any supported release of CICS	Any supported release of CICS
CICS Business Transaction Services (BTS)	Any supported release of CICS	Any supported release of CICS	Any supported release of CICS
Distributed program link (DPL)	Any supported release of CICS	Any supported release of CICS (see CICS region connectivity)	-
Enterprise beans	Any supported release of CICS	Any supported release of CICS	-
Link3270 bridge	CICS Transaction Server for z/OS, Version 2 Release 3 or later	Any supported release of CICS	-

Sample source programs and copy books

Following installation, the module EYU9WRAM is loaded into CICSPlex SM.

It is an assembler-language, command-level program; its corresponding copy books are:

EYURWCOM
> Defines the communication area

EYURWCOD
> Defines literals for EYURWCOM

EYURWSVE
> Defines each element of a target region scope list

EYURWSVD
> Defines literals for EYURWSVE

To assist you in your customization effort, sample source programs and copy books for assembler, C, COBOL, and PL/I are distributed with CICSPlex SM. Copy books are located in language-specific libraries. All samples programs are located in the SEYUSAMP library. The names of the sample programs and copy books, and the CICSPlex SM libraries in which they can be found are listed in Table 3.

Table 3. Sample programs and copy books

Language	Member name	Alias	Library
Assembler:			
Program	EYUAWRAM	EYU9WRAM	SEYUSAMP
Copybook 1	EYUAWCOM	EYURWCOM	SEYUMAC
Copybook 2	EYUAWCOD	EYURWCOD	SEYUMAC
Copybook 3	EYUAWSVE	EYURWSVE	SEYUMAC
Copybook 4	EYUAWSVD	EYURWSVD	SEYUMAC
COBOL:			
Program	EYULWRAM	EYU9WRAM	SEYUSAMP
Copybook 1	EYULWCOM	EYURWCOM	SEYUCOB
Copybook 2	EYULWCOD	EYURWCOD	SEYUCOB
Copybook 3	EYULWSVE	EYURWSVE	SEYUCOB
Copybook 4	EYULWSVD	EYURWSVD	SEYUCOB
PL/I:			
Program	EYUPWRAM	EYU9WRAM	SEYUSAMP
Copybook 1	EYUPWCOM	EYURWCOM	SEYUPL1
Copybook 2	EYUPWCOD	EYURWCOD	SEYUPL1
Copybook 3	EYUPWSVE	EYURWSVE	SEYUPL1
Copybook 4	EYUPWSVD	EYURWSVD	SEYUPL1
C:			
Program	EYUCWRAM	EYU9WRAM	SEYUSAMP
Copybook 1	EYUCWCOM	EYURWCOM	SEYUC370
Copybook 2	EYUCWCOD	EYURWCOD	SEYUC370
Copybook 3	EYUCWSVE	EYURWSVE	SEYUC370
Copybook 4	EYUCWSVD	EYURWSVD	SEYUC370

Optimized dynamic workload routing implementation

CICSPlex SM provides dynamic workload management for CICS. CICSPlex SM can augment its workload management decisions using current status information posted directly from CICS by using a region status (RS) server.

To optimize workload routing in a sysplex, you must configure and monitor a region status (RS) server, as part of a coupling facility data table. Full workload optimization takes place automatically when all workload regions are migrated to CICS TS for z/OS, Version 4.1 and when a region status (RS) server is started in the same z/OS image as each region in the workload in the CICSplex.

For further details, see Setting up and running a region status server in the *CICS System Definition Guide* and Security for coupling facility data tables in the *CICS RACF Security Guide*.

You can mix CICS TS for z/OS, Version 4.1 regions in a workload with regions using a previous version of CICS TS. However, workloads will run in a

nonoptimized state because full workload optimization is achieved only when all regions in the workload are migrated to CICS TS for z/OS, Version 4.1.

You define and modify CICSplexes using the EYUSTARTCPLEXDEF view set. Using the CPLEXDEF detail view, you can modify the coupling facility (CF) tuning parameters for the region status (RS) server, which provide sysplex optimized workload routing.

Note: You can also modify the default region status (RS) pool name that will be used by all regions in the CICSplex. When you do not to use the default name DFHRSTAT, you must change the name before starting any other regions in the CICSplex. CPSM will not prevent you from changing the pool name while the CICSplex is active. If you make a change while the CICSplex is active, all CMAS and MAS regions in the CICSplex must be restarted as soon as possible. Failure to do so can result in inconsistent data in the CPSM WLM views and WLM optimization is deactivated until all the regions in the CICSplex are restarted.

Sysplex optimized workload routing overview

In CICS TS for z/OS, Version 4.1, workload throughput is improved through a more efficient workload management optimization function. This function is most effective for distributed workloads, for which the routing and target regions are managed by different CMASs. With new CPSM WUI views, you can monitor the distribution of dynamic workloads through your CICSplex.

Sysplex optimized workload routing is enabled at the z/OS coupling facility level by a region status (RS) server.

When a target region is running in optimized mode, the target region maintains the task count using the CICS transaction manager. The count includes all tasks in the CICS region, not just those that are dynamically routed. The load value for the CICS region, with its basic health status, is periodically broadcast to the coupling facility, where it is available for interrogation by other CICS regions and CMASs and by other CICS address spaces. If region status data is available, CICSPlex SM uses the data when it makes its dynamic routing decision.

For sysplex optimized workloads, routing regions review the same status data in the coupling facility for a potential target region regardless of which CMAS manages it. As a result, the routing region is using status data that might be updated many times a second to evaluate a target region, rather than status data that might be up to 15 seconds old. The refresh interval can vary from 2 seconds down to 1 millisecond. As the scale of this value is reduced, the usage effect on the coupling facility increases. Choose a value that provides a balance between workload throughput and the effect on the coupling facility. The default refresh value is 200 milliseconds. In an environment in which all routing targets are in a similar health and connectivity state, the spread of work across the workload target scope is more evenly distributed than in nonoptimized mode.

If the coupling facility is not available, workload routing is managed by CICSPlex SM Workload Manager using z/OS data spaces owned by a CMAS to share cross-region load and status data.

Benefits of sysplex optimized workload routing

A sysplex optimized workload is a workload that is best suited to workloads contained in a single sysplex. For a workload that runs in a CICSplex that spans

more than one sysplex, the benefits of optimized routing are reduced because region status data stored in the z/OS coupling facility is not shared across sysplexes.

Sysplex optimized workload routing is beneficial in the following scenarios:

- When the topology of a CICSplex is such that regions in a workload can be managed by the same CMAS, and nondynamic throughput is a high proportion of the workload.
- When a workload consists of routers and targets managed by different CMASs and the bulk of the dynamic traffic flows through the DSRTPGM exit. For example, if you use MQ triggers to feed transactional data into CICSplexes, where the trigger regions tend to be managed by different CMASs to the processing regions. In these instances, the benefit of running workloads in optimized state is that no workload batching occurs, and the overall workload runs through faster. Fewer, if any, routed transactions are waiting in the queue of a CICS region already at its MAXTASKS limit.

Impact of sysplex optimized workload routing on the coupling facility

Caching mechanisms are built into the coupling facility (CF) to reduce the number of I/O operations. CICS region status data is broadcast to the CF by target regions, and the data is subsequently read back by the routing regions when a route decision is being made. If CICS status data is broadcast at every change instance, and read back on every occasion that a route decision is made, the impact to the coupling facility might be considerable.

To reduce the impact to the coupling facility, CICS provides two system management parameters:

- **READRS** controls how long region status data is cached by a routing region before requesting a refresh.
- **UPDATERS** controls how often the CF is updated with task throughput data.

Region status server, read interval parameter (READRS)

You use the region status server read interval parameter in the CPLEXDEF, CSYSDEF, and MAS views to control how long region status data is cached by a routing region before requesting a refresh for sysplex optimized workload routing.

READRS={200|number}

In a workload running in optimized mode, the **READRS** value specifies the minimum interval, in milliseconds, between refreshes of a target region status from a CICS region status (RS) server. These refresh requests are issued by a routing region that is evaluating a target region for a dynamic routing request.

Note: You should only change the **READRS** value after considering the impact that the change might have on your workload and coupling facility throughput.

The value range is from 0 - 2000:

- A value of 0 means that a routing region requests a status update of a target region on every occasion that it examines the status of the target region.
- Values from 1 - 2000 specify the minimum time interval that must expire before the status of a target region can be refreshed.

A low interval value means that the RS server is polled more often for a status update. For workloads in QUEUE mode, this low value results in a smoother task load spread across the CICS regions in the workload target scope, *assuming all other health and link factors are equal*. However, the utilization of the RS server is correspondingly increased, which might result in higher utilization of your z/OS coupling facility.

The default value of the **READRS** parameter is 200 milliseconds.

The value specified in the EYUSTARTCPLEXDEF view set sets the read interval at the CICSplex level. However, you can override the interval at the CICS definition level to allow fine tuning of the value on an individual CICS target region basis.

You specify both the UPDATERS and the READRS parameters at the CICSplex definition (CPLEXDEF) level to establish default values for all regions in the CICSplex. You can override these values at the CICS system definition (CSYSDEF) level or at the MAS agent runtime (MAS) level.

At the CICS definition level, the value for **UPDATERS** and **READRS** is INHERIT, so that the values are adopted from the CICS system definition. By changing these values to explicit numeric values, the CICS system adopts the values specified on each successive restart. To implement a change to a running CICS region, the values must be applied using the MAS base tables or view sets. When the target region is restarted, it reemploys the specification from its CSYSDEF.

Region status server, update frequency parameter (UPDATERS)

You use the region status server update frequency parameter in the CPLEXDEF, CSYSDEF, and MAS views to control how often the coupling facility is updated with task throughput data for sysplex optimized workload routing.

UPDATERS={15|number}

In a workload running in optimized mode, the **UPDATERS** value indicates the frequency that the CICS region status (RS) server is called to modify the value of the task load in a target CICS region. This value is the default frequency value for all target CICS regions in the current CICSplex definition.

Note: You should only change the **UPDATERS** value after considering the impact that the change might have on your workload and coupling facility throughput.

The value range is from 0 - 25:
* A value of 0 means that the RS server is not notified of any task load count changes, because the optimized workload function for target regions in this CICSplex is not enabled.

   Note: A value of 0 does not suppress optimization of the workload routing function; a value of 0 suppresses only the target region RS domain broadcasting process.
* Values from 1 - 25 are applied as an arithmetic percentage to the MAXTASKS setting for a target. The resulting task count value is used as a numeric threshold to drive an update call to the RS server.

Specifying a value of zero effectively disables the optimized routing function for the target regions. For an optimized routing decision to be made, both the router and target must be in optimized mode.

For example, with a MAXTASKS setting of 120, and the UPDATERS set to 20, the RS server is called to update the WLM load count when the task count for a target region changes between these numbers of tasks:

- 23 and 24 tasks (20% of 120)
- 47 and 48 tasks (40% of 120)
- 71 and 72 tasks (60% of 120)
- 95 and 96 tasks (80% of 120)
- 119 and 120 tasks (100% of 120)

The RS server is updated when the task load for a target region increments or decrements across these boundaries.

If you set the **UPDATERS** parameter to a low value, the frequency of updates to the RS server increases across the task load range. For workloads in QUEUE mode, this low value results in a smoother task load spread across the target CICS regions in the workload scope, *assuming all other health and link factors are equal*. However, the utilization of the RS server is correspondingly increased, which might result in higher utilization of your z/OS coupling facility.

The default value for the **UPDATERS** parameter is 15.

The value specified in the EYUSTARTCPLEXDEF view set sets the update interval at the CICSplex level. However, you can override the interval at the CICS definition level to allow fine tuning of the value on an individual CICS target region basis.

You specify both the **UPDATERS** and the **READRS** parameters at the CICSplex definition (CPLEXDEF) level to establish default values for all target regions in the CICSplex. You can override these values at the CICS system definition (CSYSDEF) level or at the MAS agent runtime (MAS) level.

At the CICS definition level, the value for **UPDATERS** and **READRS** is INHERIT, so that the values are adopted from the CICS system definition. By changing these values to explicit numeric values, the CICS system adopts the values specified on each successive restart. To implement a change to a running CICS region, the values must be applied using the MAS base tables or view sets. When the target region is restarted, it uses the specification from its CSYSDEF.

Region status server, bottom-tier parameter (BOTRSUPD)

You use the region status server bottom-tier tuning parameter in the CPLEXDEF, CSYSDEF, and MAS views to control the workload distribution updates to the coupling facility (CF) during periods of low throughput.

BOTRSUPD={1|number}

For sysplex optimized workloads, the **BOTRSUPD** value is converted from a task load percentage to a real task count. That count is used to define the bottom-tier task load range, from zero up to this value.

Note: You should only change the **BOTRSUPD** value after considering the impact that the change might have on your workload and coupling facility throughput.

The value range is from 1 - 25. When the task load for a region falls within this range, the task load is then broadcast to the coupling facility (CF) for every change in the task load. When the load reaches this value, the RS server update frequency task rules are activated.

The default value of the **BOTRSUPD** parameter is 1%.

Change this value only after considering the impact that the change might have on your workload and coupling facility throughput. The **BOTRSUPD** parameter provides a smoother distribution of the workload during periods of low throughput. When your CICSplex consists of many target regions and you increase this value too much, you risk overloading the CF with update requests, which can result in degraded WLM and general z/OS subsystem performance.

When you need to modify the **BOTRSUPD** value, ensure that you monitor the performance of your coupling facility and WLM throughput capabilities for at least several days after modification.

Region status server, top-tier parameter (TOPRSUPD)

You use the region status server top-tier tuning parameter in the CPLEXDEF, CSYSDEF, and MAS views. It controls the workload when the workload management (WLM) max task health indicator is switched off for a target region, to limit updates to the coupling facility (CF) when the region is close to the MAXTASK (MXT) setting during periods of high throughput.

TOPRSUPD={5|number}

For sysplex optimized workloads, the **TOPRSUPD** value is converted from a task load percentage to a real task count. That count is subtracted from the **MAXTASKS** value for the region to determine the top-tier task load range.

Note: You should only change the **TOPRSUPD** value after considering the impact that the change might have on your workload and coupling facility throughput.

The value range is from 1 - 25. The value is applied as an arithmetic percentage to the **MAXTASKS** setting for a region. The task count value is then subtracted from the **MAXTASKS** setting for the region to establish a task load top tier. When the task load in a region runs up to its **MAXTASKS** limit, the task load must then drop back below this value before the **MAXTASKS** state for the region is switched off and broadcast to the coupling facility.

The default value of the **TOPRSUPD** parameter is 5%.

Change the **TOPRSUPD** value only after considering the impact that the change might have on your workload and coupling facility throughput. When you increase this value too much, you see a workload batching effect in the upper load range of the workload. When you decrease the value too much, the upper-tier batching effect is reduced, but updates to the coupling facility can be significantly increased.

When you need to modify the **TOPRSUPD** value, ensure that you monitor the performance of your coupling facility and WLM throughput capabilities for at least several days after modification.

Optimization status

You can use the Active workloads list view in the CICSPlex SM Web User Interface (WUI) to view the status of workloads.

Optimization status of the workload

You can use the Active workloads list view in the CICSPlex SM Web User Interface (WUI) to view the status of each workload active in the CICSplex.

The **Optimization status** attribute reports the sysplex optimization status of the current workload. The value is a combination of all of the workload router optimization statuses and all of the workload target optimization statuses.

These values are possible:
- ACTIVE: All targets and routers in the workload are running in optimized workload state.
- PARTIAL: At least one target and one router are running in optimized workload mode. Use the **Active routing regions** and **Active target regions** hyperlinks to determine which regions are not running in optimized state.
- INACTIVE: The workload is not running in an optimized state, for one or more of the following reasons:
  - No routing regions in the workload are running in an optimized state.
  - No target regions in the workload are running in an optimized state.
  - No regions in the workload are running in an optimized state.
  - The workload is designated as being nonoptimized by specifying a value of 0 for the RS server update frequency on the CICSplex definition or on all target CICS system definitions for this workload.

Optimization status for a CICS region

You can use the Routing regions or Target regions views located in the Active workloads menu to view the optimization status for the region.

The **Optimization status** attribute reports the status of the current target region for the optimized workload routing function.

These values are possible:
- ACTIVE: This target region is running in an optimized workload state.
- INACTIVE: This region can run in an optimized workload state; however, it is not currently optimized for one or more of the following reasons:
  - The region has no connection to an RS server.
  - The region is connected to an RS server; however, the server cannot connect to the z/OS coupling facility.
  - The optimization enablement setting for the region is set to *Disabled*. The enablement setting for the region must be set to *Enabled* before any optimized routing functions can be activated.

    Note: You can reset the optimization enablement setting in the CICS system definition view to change the value in preparation for the next region startup. The enablement setting can also be changed in an active region using the MAS view, but will revert to the setting in the CICS system definition when the region is restarted.

– The RS server update frequency value for this region is 0, which means that the optimization capabilities for this region when acting as a routing target are not enabled.

  Note: You can set the *UPDATERS* value to 0 for regions that are used as dynamic routers only. Setting this value to 0 prevents the region from making unnecessary region status broadcasts to the Region Status (RS) server.
- N_A: The target region is not at a CICS release that supports region status recording. Only nonoptimized WLM routing decisions can be made.

Nonoptimized workload routing

In releases before CICS TS for z/OS, Version 4.1, for nonoptimized workload management, and when a coupling facility is not available, workload routing is managed by CICSPlex SM Workload Manager using a data space owned by a CMAS to share cross-region load and status data.

Every CMAS manages a single WLM data space that it shares with every user CICS region (MAS) that it directly manages. When the CMAS initializes, it verifies and formats the data space with the structures necessary for all workloads associated with the CICS regions that it manages. When the user CICS regions begin routing dynamic traffic, the state of those CICS regions is recorded in this data space. Every 15 seconds, the CICSPLex SM agent in the user CICS region determines the task count at that time and reports to its owning CMAS. The CMAS updates the load count in the target region descriptor of its WLM data space and broadcasts that value to other CMASs participating in workloads associated with the user CICS region.

In an environment in which all user CICS regions are managed by the same CMAS, all routing and target regions refer to the same physical structures in the WLM data space. Dynamic routing decisions are based on the most current load data for a potential routing target region. A routing decision is based on a combination of factors:
- The number of tasks in the region.
  - Factored as a percentile value, calculated by dividing the target region MAXTASKS setting with the current task count.
- The health status of the region.
  - Factored by assigning arithmetic weights, depending on whether the region is short-on-storage, taking a transaction dump, taking a system dump, running at its MAXTASKS limit, or in a CPSM stall.
- The speed of the link between the router and the target.
  - Factored by assigning arithmetic weights, depending on whether the target region is linked to the target by an MRO connection, an XCF connection, an LU6.2 connection, an IPIC connection, or if the target region is the router itself.
- If any outstanding CICSPlex SM Realtime Analysis (RTA) Events are associated with the workload.
  - Factored by assigning arithmetic weights depending on the severity of the events outstanding. These events are factored in only when Event name is specified in the WLM specification for the workload or any Transaction Group definitions associated with it.
- If any transaction affinities are outstanding to override the dynamic routing decision.

– Regardless of any other factors, if the routing request has an outstanding affinity associated with it, that affinity always overrides the route decision.

Workloads are spread across multiple z/OS images, so additional CMASs are configured to manage the user CICS regions on the disparate LPARs. Each WLM data space must maintain a complete set of structures to describe every CICS region in the workload, not just the CICS regions for which each CMAS is responsible. The WLM data space owned by each CMAS must be periodically synchronized with the WLM data spaces owned by other CMASs that are participating in the workload. This synchronization occurs every 15 seconds from the MASs to their CMASs, and then out to all other CMASs in the workload.

The behavior of CICSPlex SM is different for DTRPGM and DSRTPGM requests:
- For DTRPGM requests, the routing region calls, from CICS, to decide if the target regions are synchronized with the execution of the request at the selected target, which is then followed by a call back from CICS on completion of the dynamic request. This call allows the router to increment the task load count before informing CICS of the target region system ID, and also to decrement the count on completion of the request.
- For DSRTPGM requests, the routing region calls, from CICS, to decide if targets are not synchronized with the selected target. Typically, these dynamic requests are asynchronous CICS starts. The router has no notification of when the routed transaction starts or finishes. Because of a lack of notification, CICSPlex SM stipulates that a DSRTPGM target region must also have the workload associated with the region, which transforms the targets into logical routing regions. This call allows the CICSPlex SM routing processes to determine that they are being called at the DSRTPGM target and, therefore, allows the task load count to be adjusted at transaction start and finish.

CICSPlex SM routing regions count the dynamic transaction throughput in a CICSplex, introducing an additional problem in that transactions started locally on the target regions remain unaccountable by the routing regions until a heartbeat occurs. The router transaction counts are not accurately synchronized until two heartbeats have occurred, the first to increment the count, and the second to decrement it again. This discrepancy, however, is not considered as severe as when a router and target are managed by different CMASs.

For multiple CMASs, the router regions evaluate status data for a target region as described in its local WLM data space. If that target region is managed by a different CMAS to that owned by the router, status data describing that target region can be up to 15 seconds old. For DTRPGM requests, this latency does not have a severe effect. For DSRTPGM requests, however, the effect can be significant, particularly when the workload throughput increases. The effect is known as workload batching.

For more information, see *Workload batching* in CICSPlex SM Managing Workloads.

Workload batching

Workload batching occurs in heavily used workloads in multiple CMAS environments, where dynamic distributed (DSRTPGM) routing requests are being processed.

A target region and its routing regions can be managed by different CMASes. This is always the case when the router runs in a different LPAR to the targets. In this

scenario, the router is using a different descriptor structure to evaluate the target status from the real descriptor structure employed by the target itself.

The target descriptor reviewed by the router is synchronized with the real descriptor at 15-second intervals by the CICSPlex SM heartbeat. The task count for the target region, as seen by the router, is refreshed at the same time. During a 15-second heartbeat interval, the router regards the target as being relatively busy, or relatively quiet, when compared to other potential target regions in the workload. Therefore, for that 15-second duration, the router continues to divert work towards, or away from, the target, depending on how busy it seems to be, because the current task count in the target is not seen to change until the next heartbeat. This routing, based on the previous status, can make the target very busy or unused. The router reacts to this situation by more actively routing work towards, or away from, the target, so the batching cycle continues. This state continues until activity in the workload throughput declines, which settles down the batching cycle until the throughput activity increases.

If you are monitoring the task load across the CICSplex, you see some regions running at their MAXTASKS limit and being continually given dynamically routed traffic, and others remain unused. A snapshot taken 15 seconds later might show a reversal of utilization; the busy regions might be idle and the idle regions might now be at the MAXTASKS limit.

When you start your region status servers and optimize workloads, the effects of workload batching are removed.

Modifying dynamic routing

You can customize CICSPlex SM workload management processing by modifying the module EYU9WRAM.

EYU9WRAM uses the CICSPlex SM dynamic routing application programming interface (API), which is a special-purpose, call-level interface that provides the mechanism needed to request workload management actions. All calls are constructed using standard CALL statements. The CALL statement generates the linkage between the EYU9WRAM module and the CICSPlex SM Workload Manager component. The format of the CALL statement is shown here:

```
CALL WAPIENPT(DA_TOKEN,function)
```

where:

DA_TOKEN
Identifies the dynamic routing API token supplied via the EYURWCOM communication area. This token is used by EYU9WAPI and must not be altered.

function
Is the function to be performed, specified as:

SM_SCOPE
Returns a list of eligible target regions.

SM_BALANCE
Selects a target region from the list of eligible target regions.

SM_ROUTE
Routes a transaction to a specific target region.

SM_CREAFF
>Creates an affinity.

SM_DELAFF
>Deletes an active affinity.

You can use SM_SCOPE and SM_BALANCE together to obtain a list of target regions and then select the target region to which a transaction is to be routed.

If you know that a transaction is always to be directed to a specific target region, you can use just SM_ROUTE.

As distributed, EYU9WRAM issues SM_SCOPE and SM_BALANCE calls. It does not include any SM_ROUTE calls. It includes unexecuted calls to SM_CREAFF and SM_DELAFF. You can modify the program to issue these calls as desired.

Although all the examples use the assembler language form of the dynamic routing API verbs, you can also use these verbs in programs written in C, COBOL, and PL/I. Sample programs distributed with CICSPlex SM contain examples of the CALL statements for each of these languages.

Important: As distributed, EYU9WRAM handles the workload routing and separation established via the workload management definitions by using the API verbs. Any changes you make to EYU9WRAM, therefore, may adversely impact the CICSPlex SM workload management facilities. For example, if you do not use SM_SCOPE, SM_BALANCE, or SM_ROUTE, each transaction occurrence is routed to the default target region identified when the transaction was defined to CICS. Thus, all CICSPlex SM workload management definitions are bypassed.

Nondynamic transaction considerations

You do not have to include any calls through the API if a transaction is statically routed or is started by ATI. In these cases, the target region cannot be changed. The routing function is route notify. The route notify function is intended to notify the EYU9WRAM program that such a transaction is being routed.

If you do include any of these functions, the following occurs:
- An SM_SCOPE call returns a single entry in the SCOP_VECT. The entry is the target region associated with the statically defined transaction when it was defined, or with the destination specified on the EXEC CICS START command for ATI transactions.
- An SM_BALANCE call selects the target region associated with the transaction when it was defined to CICS. The CICSPlex SM Workload Manager will not create any affinity for the transaction.
- An SM_ROUTE call returns an exception response.

When EYU9WRAM is called for:
- Notification, any existing affinity relations are ignored and none are created.
- Route selection error, any existing affinity relations are ignored and none are created. In addition, the EYU9WRAM program as delivered will write a terminal message and terminate.
- Routing attempt complete, for CICS BTS transactions only. Any existing affinities are ignored. Any dynamic routing API function call results in a bad response. See "Non-terminal-related STARTs and CICS BTS considerations" on page 40.

- Transaction initiation, for CICS BTS transactions only. Any existing affinities are ignored. Any dynamic routing API function call results in a bad response. See "Non-terminal-related STARTs and CICS BTS considerations."
- Transaction termination, any existing affinities are ignored. Any dynamic routing API function call results in an error response.
- Transaction abend, any existing affinities are ignored. Any dynamic routing API function call results in an error response.

Non-terminal-related STARTs and CICS BTS considerations

When routing a transaction associated with either a CICS BTS activity or a non-terminal-related EXEC CICS START comand, the routing program, identified in the DSRTPGM SIT parameter, is invoked for both static and dynamic routing.

In the case of statically routed transactions, the EYU9WRAM program cannot alter the target region; see "Nondynamic transaction considerations" on page 39. In the case of dynamically routed transactions, the EYU9WRAM program may alter the target region; see "Selecting a target region from a set of target regions" on page 41. However, in both cases, the EYU9WRAM program is invoked only for:

- In the requesting region:
  - Notification
  - Route selection
  - Route selection error
  - Route attempt complete
- In the target region:
  - Transaction initiation
  - Transaction termination
  - Transaction abend

For details of the function of route initiation, see *CICS Intercommunication Guide*.

Enterprise bean considerations

When routing a transaction associated with an enterprise bean invocation, the routing program, identified in the DSRTPGM SIT parameter, is invoked for both static and dynamic routing.

In the case of statically routed transactions, the EYU9WRAM program cannot alter the target region; see "Nondynamic transaction considerations" on page 39. In the case of dynamically routed transactions, the EYU9WRAM program may alter the target region; see "Selecting a target region from a set of target regions" on page 41. However, in both cases, the EYU9WRAM program is invoked only for:

- In the routing region:
  - Notification
  - Route selection
  - Route selection error
  - Route attempt complete
  In the target region:
  - Transaction initiation
  - Transaction termination
  - Transaction abend

For details of the function of route initiation, see *CICS Intercommunication Guide*.

Selecting a target region from a set of target regions

As distributed, EYU9WRAM uses SM_SCOPE and SM_BALANCE to select a target region from the list of target regions defined for a transaction. The options that you set affect the way that the target region is chosen.

Specifically, issuing:
- SM_SCOPE causes a list of target regions to be returned for the current transaction occurrence. The target regions are those that are explicitly or implicitly associated with the requesting region by a workload specification.
- SM_BALANCE causes a target region to be selected from the list of candidate target regions returned by SM_SCOPE.

After an SM_SCOPE or SM_BALANCE call, the result of the operation is indicated in the response and reason fields of the EYURWCOM communication area.

Actions during route selection

A dynamic route selection occurs when a transaction or program is scheduled for routing.
- Issuing SM_SCOPE results in the EYURWCOM communication area Scope Vector pointer being updated with the address of the target region scope list description area, SCOP_VECT. Also, the element count field is updated to contain the count of elements in the scope vector. Each element in the scope vector, as described in EYURWSVE, identifies a candidate target region and indicates its current status.

   During SM_BALANCE processing, the target region appearing first in the ordered list is selected for routing, unless the scope vector element EYURWSVE is marked ignore.
- When no affinity is associated with the current transaction occurrence, an SM_SCOPE call causes the SCOP_VECT elements to be sorted so that the target region that is the best candidate is placed first in the list.

   During SM_BALANCE processing, the APPLID and SYSID of the most suitable target region are placed in the fields WCOM_SEL_AOR and WCOM_SEL_SYSID, respectively. Typically, this will be the first target region represented in the scope vector. However, if the EYU9WRAM program has marked the WSVE-IGNORE field on some of the SCOP_VECT elements to denote that the target region is to be ignored, the first target region in the scope vector which is not marked to be ignored will be selected.

   Note:
   1. If the transaction identifier and the ids of the terminal and user associated with that transaction match a transaction group to which an affinity is defined, the affinity is made active during SM_BALANCE processing.
   2. Note that, with DPL, you can update the transaction id before the SM_SCOPE call.
- When an affinity is associated with the current transaction occurrence, an SM_SCOPE call normally causes only the target region with which the affinity exists to be identified in SCOP_VECT. An SM_BALANCE call then selects that target region. If the target region is not available for routing, the SM_BALANCE function will set a warning indicator. It will not attempt to select another target region.

- If the transaction is defined as a DTRTRAN, the EYURWCOM communication area will contain indicators denoting that the transaction is a DTRTRAN and that it will not be rejected by the Workload Manager. Processing is generally identical to the normal, non-DTRTRAN, case. Issuing SM_SCOPE returns a SCOP_VECT. Issuing SM_BALANCE selects a target region.

  The EYU9WRAM module might opt to reject the transaction before issuing the SM_SCOPE call. In this case, the Workload Manager returns to CICS with the reject indicator set to Y in the DFHDYPDS communication area. The sample EYU9WRAM program causes a DTRTRAN transaction to be rejected only if the transaction identifier is all blanks.

Actions during notification

Notification occurs when a static transaction or ATI transaction is being scheduled for routing.
- For statically routable transactions, ATI transactions, and BTS static routing requests, issuing SM_SCOPE causes the scope vector to contain a single target region. This is the target region associated with the transaction.

Actions during routing attempt complete

None, but you can tidy up and release any resources at this stage.

Actions during route selection error

A route selection error call occurs if the CICS link between the requesting region and target region is not available or is not defined.
- When no affinity is active: issue SM_SCOPE again. The candidate target regions identified by the SCOP_VECT it returns will not include the target region that caused the error. You can then use SM_BALANCE to select a new target region.
- When affinity became active as a result of the previous route selection:
  - If the lifetime associated with the affinity is PERMANENT, SYSTEM, ACTIVITY, or PROCESS, the target region causing the error will be included in scope list returned by SM_SCOPE. SM_BALANCE is required by affinity rules to select that target region. It also returns a warning to EYU9WRAM. EYU9WRAM should then notify the user that an error has occurred.
  - If the lifetime associated with the affinity is SIGNON, LOGON, DELIMIT, or PCONV, the active affinity status is removed before control returns to EYU9WRAM. When you reissue SM_SCOPE, the target region causing the error will not be included in the scope list. If the workload specification is defined with Create Affinity YES for the transaction group, EYU9WRAM is notified that an affinity is defined and will be activated when you issue SM_BALANCE.
- When affinity was activated by a previous transaction instance, and you issue SM_SCOPE again, the scope list returned contains the previously selected target region. Since SM_BALANCE is required by affinity rules to select that target region, a warning is returned to EYU9WRAM. EYU9WRAM should then notify the user that an error has occurred.

Actions during transaction termination

Transaction termination occurs when a transaction has terminated normally.
- EYU9WRAM should release any resources it may have acquired.

- Issuing SM_SCOPE or SM_BALANCE or SM_ROUTE causes an exception response to be returned.

Actions during transaction abend

Transaction abend occurs when a transaction has terminated abnormally.
- EYU9WRAM should release any resources it may have acquired.
- Issuing SM_SCOPE or SM_BALANCE or SM_ROUTE causes an exception response to be returned.

Actions during transaction initiation

Transaction initiation occurs when a CICS BTS-related transaction, or an enterprise bean-related transaction, has been routed to the target region. No specific action is taken. The call is issued for information purposes only.

Selecting a specific target region

SM_ROUTE requests that a specific target region is selected for routing. Use SM_ROUTE when you have application- or data-dependent requirements for explicit routing. For example, you might want to route a transaction associated with a specific user ID to a specific target region.

After an SM_ROUTE call, the result of the operation is stored in the response and reason fields of the EYURWCOM communication area.

A sample SM_ROUTE call is show here:

```
CALL WAPIENPT(DA_TOKEN,SM_ROUTE)
```

DA_TOKEN identifies the dynamic routing API token supplied via the EYURWCOM communication area. This token is used by EYU9WAPI and must not be altered.

Actions during route selection

The actions during route selection are:
- If there is only one connection between a requesting region and the target region, you can supply either the SYSID or the APPLID of the target region (CICSPlex SM will determine the appropriate, corresponding ID). Place the APPLID in the WCOM_SEL_AOR field of the EYURWCOM communication area. Place the SYSID in the WCOM_SEL_SYSID field.

  If there are multiple connections between a requesting region and the target region, supply both the SYSID and the APPLID, as described previously, to ensure that the correct target region is selected. Note that when both the SYSID and APPLID are supplied, they are not validated.

  The target region need not be defined to CICSPlex SM. The affinity status is not checked. Thus, no affinity is established as a result of this call and, if an affinity was in effect, it is ignored.
- Issuing SM_ROUTE during Route Notify processing causes an exception response to be returned.

Actions during routing attempt complete

None, but you can tidy up and release any resources at this stage.

Actions during route selection error

The EYU9WRAM program may issue a message and terminate. You may then issue SM_ROUTE again specifying a different target region, or issue SM_SCOPE and SM_BALANCE.

Actions during transaction termination
* EYU9WRAM should terminate any resources it may have acquired.
* Calling any API function causes an exception response to be returned.

Actions during transaction abend
* Calling any API function causes an exception response to be returned.

Actions during transaction initiation

At transaction initiation:
* EYU9WRAM should terminate any resources it may have acquired.
* Calling any API function causes an exception response to be returned.

Creating an affinity

You can use SM_CREAFF to create an affinity if one does not already exist in the transaction group established for the transaction.

The transaction group must be defined with an affinity type and lifetime. The affinity created will have the same affinity type and lifetime as defined in the transaction group.

You should review "Affinity considerations" on page 45 before using SM_CREAFF.

Before calling SM_CREAFF, you must first call SM_SCOPE to obtain a scope list. SM_CREAFF will not create an affinity to an target region that is not in the scope list. In addition, you should set the EYUWRCOM communication area fields WCOM_SEL_AOR and WCOM_SEL_SYSID to the APPLID and SYSID, respectively, of the target region for which you want the affinity created.

EYU9WRAM contains a fragment of unexecuted code that you can use as a template for implementing the SM_CREAFF function.

The SM_CREAFF function cannot be called during:
* Route termination
* Route abend
* Route notify
* Route initiate
* Route complete

Deleting an affinity

You can use SM_DELAFF to delete an active affinity.

You should review "Affinity considerations" on page 45 before using SM_DELAFF.

Before calling SM_DELAFF, you must first call SM_SCOPE to obtain a scope list. The WCOM_AFF_STAT field in the EYURWCOM communication area contains a

value indicating whether an affinity is active or committed. An active affinity can be deleted using SM_DELAFF. A committed affinity has a lifetime of SYSTEM or PERMANENT and cannot be deleted using SM_DELAFF.

EYU9WRAM contains a fragment of unexecuted code that you can use as a template for implementing the SM_DELAFF API function.

The SM_DELAFF function cannot be called during:
- Route notify
- Route initiate
- Route complete

Affinity considerations

An *affinity* is a relationship that you define between two or more transactions for the duration (or *lifetime*) of that relationship. An affinity exists for the lifetime that is appropriate to the affinity type.

The expiration for each lifetime is as follows:

Permanent
> When the workload of which the target region is a part terminates.

System
> When the target region terminates.

Logon When the terminal user logs off.

Signon
> When the terminal user signs off.

Pconv When a transaction uses EXEC CICS RETURN specifying no NEXTTRANSID or the PCONV mode of the transaction is END.
>
> CICS does not support pseudoconversations for APPC (LUTYPE6.2) devices.

Delimit
> When the PCONV mode of the transaction is END.

Activity
> When the CICS BTS activity ends.

Process
> When the CICS BTS process ends.

There are circumstances when SM_SCOPE generates a scope list containing a single affinity target region, but the target region is not available for routing. These circumstances happen when:
- The target region is down.
- The CICS link to the target region is down.
- The target region is currently active but it was shut down and restarted after the affinity was created.

In these cases, the EYU9WRAM default processing issues a terminal message indicating that the affinity target region is not available and causes the transaction to terminate. If the affinity lifetime is PCONV (pseudoconversation), CICSPlex SM automatically deletes the affinity because it has expired (there is no NEXTTRANSID). However, the default EYU9WRAM processing does not delete

any other affinities because the characteristics of the actual affinity to the target region are unknown. For example, a LOGON affinity might involve the use of the TCTUA to pass information to the target region. If the affinity is deleted when the target region is not available, the next transaction for the transaction group would cause a new target region to be selected. The transaction might fail upon using the TCTUA contents when routed to the new target region.

The sample EYU9WRAM program, which implements the default processing, contains a subroutine that checks on affinity status after a call to SM_SCOPE. When an affinity is active to a target region, but not committed, and the affinity target region status is not OK, the subroutine sends a message to the terminal user and then exits so that the EYU9WRAM program terminates. The subroutine contains an unexecuted code fragment that can be used to delete the affinity using the SM_DELAFF call. Before the unexecuted code fragment is a series of tests for the affinity lifetime of the active affinity. One or more of the branches can be changed to jump to the code fragment. The code fragment itself deletes the affinity, issues a message, and then returns so that the EYU9WRAM program exits, causing the transaction to terminate. This processing can be modified so that the affinity is deleted, no message is issued, and the subroutine exits causing the mainline process to reexecute the SM_SCOPE call. In that case, a new set of target regions is received for use by SM_BALANCE.

The same subroutine also contains an unexecuted code fragment that can be enabled to create an affinity. In this case, the subroutine has determined that an affinity is defined but not active. It then checks the WCOM_AFF_AUTO indicator to determine whether CICSPlex SM automatically creates affinities during SM_BALANCE. The subroutine exits normally no matter what the answer is. You can enable the SM_CREAFF fragment in order to cause an affinity to be created. The SM_CREAFF call can be used regardless of whether WCOM_AFF_AUTO does or does not indicate the automatic creation of affinities during SM_BALANCE. The SM_CREAFF call can therefore be used to:
- Create an affinity when CICSPlex SM will not.
- Create an affinity to a target region that CICSPlex SM would ordinarily not select.

The SM_CREAFF code fragment creates an affinity to the target region that appears first in the scope list returned by SM_SCOPE.

The following fields in the EYURWCOM communication area provide information regarding CICSPlex SM affinity processing.
- WCOM_AFF_STAT
- WCOM_AFFAOR_STAT
- WCOM_AFF_TYPE
- WCOM_AFF_LIFE
- WCOM_AFF_AUTO
- WCOM_WORK_NAME
- WCOM_TGRP_NAME

These fields are described in EYURWCOM.

CICSPlex SM data areas

The EYU9WRAM program uses two data areas, communication area EYURWCOM and scope vector element EYURWSVE.

Literals for EYURWCOM are defined in EYURWCOD and literals for EYURWSVE are defined in EYURWSVD.

The names of the copy books that you can use to map these data areas are identified in Sample programs and copy books.

The format of EYURWCOM is shown in RWCOM EYU9WRAM COMMAREA DSECT.

The scope vector element, EYURWSVE, contains information about the individual target regions associated with the list of candidate target regions returned by SM_SCOPE. The format of the SCOP_VECT element is shown in RWSVE Scope Vector Element DSECT.

Creating a user-replacement module for EYU9WRAM

You can use the sample procedures provided in CICSTS41.CPSM.SEYUPROC to create replacement modules for EYU9WRAM.

The procedure members are as follows:

Assembler	EYUEITAL
C	EYUEITDL
PL/I	EYUEITPL
COBOL	EYUEITVL

1. Copy these procedures to a cataloged system procedure library. You can use the samples in "Sample user-replacement modules" on page 173.
2. Use the JCL samples to run the procedure and create the replacement module for EYU9WRAM. Note that lower case values shown in the sample JCL should be replaced with the appropriate values for your site. Also, you cannot use the CICSPlex SM API in EYU9WRAM.

Chapter 5. Requesting additional dynamic routing support

This chapter contains Product-sensitive Programming Interface Information.

You can access the CICSPlex SM workload management facilities directly from an application program.

Note: If you are running CICS Transaction Server for OS/390 Version 1 Release 3 and later, it is recommended that you use the CICSPlex SM-supplied program EYU9XLOP for all your dynamic routing requirements. You need the information in this chapter only if you want to continue to use this function during migration to CICS Transaction Server for OS/390 Version 1 Release 3.

If your routing regions are CICS Transaction Server for OS/390 Version 1 Release 3 and later, or if you are using CICS BTS or enterprise beans, you do not need the information in this chapter . You should use the distributed routing facilities described in Chapter 4, "Dynamic routing with CICSPlex SM," on page 27.

To write such a program, you should be familiar with:
* The interface between the CICS relay program and the defined dynamic routing program.
* CICSPlex SM workload management processing, as described in Chapter 1, "Introduction to workload management," on page 3.
* The CICSPlex SM workload management routing action module, EYU9WRAM, as described in Chapter 4, "Dynamic routing with CICSPlex SM," on page 27.

The primary method of invoking CICSPlex SM workload management is by defining module EYU9XLOP to CICS as the dynamic routing program. This causes EYU9XLOP to be invoked by the CICS relay program, allowing CICSPlex SM workload management to make a routing decision about each work request that can be sent to another CICS system.

If necessary, CICSPlex SM workload management can be invoked directly from an application program, without going through the CICS relay program. For CICS releases prior to CICS Transaction Server for OS/390 Version 1 Release 3, you can use CICSPlex SM Workload Management to determine the best target region for a distributed program link (DPL) from a requesting region. The application program you write must follow certain guidelines:
* The program must run in a CICS system that is defined and running as a routing region. You cannot access CICSPlex SM workload management from a target region.
* The program must issue its INIT and TERM calls from the same task. CICSPlex SM expects the program to imitate the processing done by the CICS relay program, which always calls at route initiation and route termination.

Note: Accessing workload management through a program that issues an EXEC CICS START command is not recommended with an asynchronous transaction start. Furthermore, EXEC CICS START commands that are not related with either a terminal or a user should not be used for transactions that have affinity relationships, as those relationships cannot be correctly resolved using this interface.

Accessing workload management from a program using a dynamic program load is not supported. CICSPlex SM workload management uses the CICS application programming interface to gather information about the current environment in which it is running. Due to DPL restrictions some of that information is not available, and unpredictable results may occur.

In order to make a routing decision, CICSPlex SM workload management needs certain information that is normally supplied by the CICS relay program. The CICS relay program derives the information from data available to CICS for the instance of the transaction being relayed. When you invoke CICSPlex SM workload management directly, you need to provide this information, including terminal-oriented data and the equivalent of a transaction name to identify the work to be routed.

How to start CICSPlex SM workload management

To start the CICSPlex SM workload management facilities, use an EXEC CICS LINK command, specifying EYU9XLOP as the program and identifying EYURWTRA as the communication area.

The format of the command is:

```
EXEC CICS LINK
     PROGRAM(EYU9XLOP)
     COMMAREA(EYURWTRA)
     LENGTH(=AL2(WTRA_LENGTH))
```

Much of the data normally passed from the CICS relay program to the dynamic routing program in the DFHDYPDS communication area must be generated by your program and passed to CICSPlex SM workload management. Other data that is normally derived by CICSPlex SM workload management from a transaction- and terminal-oriented environment must also be provided by your program. The assembler copy book EYURWTRA provides a map of the communication area to be passed to CICSPlex SM workload management.

The corresponding copy books and the CICSPlex SM libraries in which they can be found are:

Language	Member name	Library
Assembler	EYUAWTRA	SEYUMAC
COBOL	EYULWTRA	SEYUCOB
PL/I	EYUPWTRA	SEYUPL1
C	EYUCWTRA	SEYUC370

Before invoking CICSPlex SM workload management, you must initialize the EYURWTRA communication area. The format of EYURWTRA is shown in RWTRA EYURWTRA WLM COMMAREA DSECT.

For a list of the possible response and reason code values that can be returned in WTRA_API_RESP and WTRA_API_REAS, refer to the assembler copy book member EYURWCOD.

Processing considerations

After CICSPlex SM workload management processing, the WTRA_RESPONSE field contains a return code of either zero (0) or 8.

If the return code is 0, WTRA_SYSID contains the SYSID of the selected target region, and WTRA_APPLID contains its APPLID. With that information, you can proceed to route the unit of work to the target region.

If the return code is 8, you should inspect the WTRA_API_RESP and WTRA_API_REAS fields for more information. These fields contain the last response and reason codes returned to the CICSPlex SM workload management routing action module (EYU9WRAM). In most cases, the response and reason codes describe what caused CICSPlex SM workload management to generate the return code of 8. Based on that information, you can decide how to proceed.

In some cases, however, the WTRA_RESPONSE field may contain a return code of 8, while the WTRA_API_RESP and WTRA_API_REAS fields have not been set by CICSPlex SM workload management. In those cases, an error was detected before invoking the routing action process. CICSPlex SM user trace records are written to the CICS trace data set for those types of errors. When this happens, your program should terminate processing.

When the return code is 8, you should also inspect the WTRA_OPTER field. If its value is WTRA_CALLYES:

1. Set the WTRA_FUNC field to WTRA_FUNCTRM for route termination.
2. Reinvoke CICSPlex SM workload management.
3. Terminate processing for the proposed unit of work.

If the WTRA_OPTER field contains a value of WTRA_CALLNO, terminate further processing for the proposed unit of work.

After the unit of work has completed in the target region, set the WTRA_FUNC field according to how the unit of work completed. If the unit of work completed successfully:

1. Set the WTRA_FUNC field to WTRA_FUNCTRM for route termination.
2. Optionally, set the WTRA_NEXTTRAN field to the ID of the next transaction to be used in the process. If there is no next transaction, set the field to all blanks.
3. Reinvoke CICSPlex SM workload management to request termination processing for the transaction.

If the unit of work abended or generated an error that you consider abnormal:

1. Set the WTRA_FUNC field to WTRA_FUNCABD to notify CICSPlex SM workload management that the routed transaction abended.
2. Reinvoke CICSPlex SM workload management to request abnormal termination processing for the transaction.

Route error considerations

After you receive the SYSID and APPLID of a target region, you can attempt to route the unit of work to the target region.

However, the routing attempt may result in an error condition if the system is unavailable. When this happens, you should:

1. Set the WTRA_FUNC field to WTRA_FUNCERR to indicate a routing error.
2. Specify the reason for the error in the WTRA_ERR field.
3. Reinvoke CICSPlex SM workload management.

CICSPlex SM workload management provides another target from the scope list, if possible. If no other systems are available, the WTRA_RESPONSE field is set to 8 and the WTRA_API_RESP and WTRA_API_REAS fields describe the reason for the failure. You may have to invoke CICSPlex SM workload management more than once for routing errors until you receive a valid target region.

Transaction affinity considerations

If the WTRA_TRANID, WTRA_USERID and WTRA_LUNAME fields cause CICSPlex SM workload management to select a transaction group that includes an affinity, the rules of transaction affinities are obeyed.

In this case, you should ensure that the WTRA_NEXTTRAN field is initialized with the ID of the next transaction before calling the route termination function.

If your units of work, or any subset of them, have an affinity relation defined, be careful in how you define that affinity. Since your program cannot provide SIGNOFF or LOGOFF processing, an affinity lifetime of SIGNON or LOGON, though valid, may cause an affinity relation to be built that is not removed until either the requesting region or the target region terminates.

The WTRA_NEXTTRAN field is most useful for pseudoconversation affinities. For this affinity lifetime, CICSPlex SM workload management normally issues the EXEC CICS ASSIGN NEXTTRANSID command to retrieve the next transaction ID, if any, for the facility. Since that command is not available when CICSPlex SM workload management is invoked by your program, it is your responsibility to provide the ID of the next transaction.

For a description of CICSPlex SM workload management affinity processing, see "Taking affinity relations into consideration" on page 16. For details on specifying affinity relation and lifetime values, see "Creating a transaction group" on page 68.

Abend compensation considerations

If the target region is running CICS TS, transactions initiated by your program can participate in abend compensation processing, provided that the active CICSPlex SM workload specifies it.

You should note that, if the work requests are either non-terminal-related EXEC CICS START commands, or BTS activities, the routing and target regions must be within the same MVS image for the routing region to detect that an abend has occurred.

Your program should notify CICSPlex SM workload management that a particular unit of work abended by specifying WTRA_FUNCABD in the WTRA_FUNC field. Then, if possible, CICSPlex SM workload management will tend to avoid selecting the same target region for the transaction (or set of transactions, if an affinity is defined) on subsequent route select functions.

For a description of CICSPlex SM workload management abend compensation processing, see "Taking abend probabilities into consideration" on page 20. For details on requesting abend compensation, see "Creating a workload specification" on page 65.

CMAS availability considerations

If your program issues an EXEC CICS LINK for the EYU9XLOP program, but the requesting region in which your program is running has not yet fully connected to its target CMAS, you see message EYUXL0020I, indicating that an ESSS connection is in progress.

Your program waits indefinitely until the CMAS becomes available and the requesting region is joined to a workload. If you have connected successfully to the CMAS and the MAS, but the CMAS has not installed any workload definitions to the MAS, you see a message indicating that the requesting region is waiting for a workload. You may need to set up and install workloads to rectify this situation.

Note: Once the requesting region has successfully connected to the CMAS, the CMAS can become inactive and workload management remains active.

Sample calling sequence

This code example illustrates a sample calling sequence for a program that accesses CICSPlex SM workload management facilities. It is not intended to be used as a sample program and is, therefore, not complete in every detail.

```
*----------------------------------------------------------------------*
         DFHEISTG  ,                       Define Workarea
WRK_WTRA        DS   CL(WTRA_LENGTH)
                DS   0D
WRK_UOWCOMM     DS   0C
WRK_UOW_RESP    DS   F
WRK_UOWCOMM_L   EQU  *-WRK_UOWCOMM
         COPY EYURWTRA               Include DSECT to map WTRA
SRVPGM   DFHEIENT EIBREG=R11,DATAREG=R13,CODEREG=R12


*----------------------------------------------------------------------*
* Initialize the WTRA COMMAREA.                                        *
*----------------------------------------------------------------------*
         LA   R8,WRK_WTRA            --> WTRA
         USING EYURWTRA,R8           *** USING WTRA ***
         MVC   WTRA_SLENGTH,=AL2(WTRA_LENGTH)
                                     Set length of block.
         MVI   WTRA_ARROW,C'>'       Set arrow.
         MVC   WTRA_NAME,=C'EYURWTRA'  Set the name.
         MVI   WTRA_BLANK,C' '       Set blank delimit.
         MVC   WTRA_PGMNAME,=CL8'SRVPGM  '
                                     Set program name.
         MVC   WTRA_TERMID,=CL4'TRM1'  Set TermID.
         MVC   WTRA_USERID,=CL8'USR1'  Set USERID.
         MVC   WTRA_LUNAME(8),=CL8'.NET1'
                                     Set LUNAME.
         MVC   WTRA_TRANID,=CL8'TRN1'  Set TRANID.
         MVC   WTRA_SYSID,=C'SYS1'     Set SYSID.
         MVC   WTRA_APPLID,=C'APPLID1' Set Applid.
         MVI   WTRA_FUNC,WTRA_FUNCSEL  Set the Route Select Function.
         MVI   WTRA_DYRTYPE,WTRA_DYRTYPE_DYN
*----------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Select.                           *
*----------------------------------------------------------------------*
ROUTE_SELECT  DS   0H
         BAS   R5,LINK_WLM           Go do it.
         CLC   WTRA_RESPONSE,=F'0'   Call go OK?
         BNE   CHECK_OPTER           ..no.
         BAS   R5,START_UOW          Go Start the UOW.
         LTR   R15,R15               Work Completed?
         BZ    ROUTE_TERM            ..yes.
```

```
        BP    ROUTE_ABND               UOW gave non zero return code.
        C     R15,=F'-4'               SYSID error?
        BNE   ROUTE_ABND               ..no.
*----------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Error.                            *
*----------------------------------------------------------------------*
ROUTE_ERROR  DS  0H
        MVI   WTRA_FUNC,WTRA_FUNCERR   Set the Termination Function.
        MVI   WTRA_ERR,WTRA_ERROUT     Say out of service.
        B     ROUTE_SELECT             Go Get another system.


*----------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Abend.                            *
*----------------------------------------------------------------------*
ROUTE_ABND   DS  0H
        MVI   WTRA_FUNC,WTRA_FUNCABD   Set the Abend function.
        BAS   R5,LINK_WLM              Go terminate.
        CLC   WTRA_RESPONSE,=F'0'      OK?
        BE    EXIT_ABD                 ..yes.
CHECK_OPTER  DS  0H
        CLI   WTRA_OPTER,WTRA_CALLYES  Call WLM for Term?
        BNE   WLM_CALLERR              ..no.


*----------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Termination                       *
*----------------------------------------------------------------------*
ROUTE_TERM   DS  0H
        MVI   WTRA_FUNC,WTRA_FUNCTRM   Set the Termination Function.
        MVC   WTRA_NEXTTRAN,=CL8'TRN2'                              X
                                       Set the next TRANID.
        BAS   R5,LINK_WLM              Go terminate.
        CLC   WTRA_RESPONSE,=F'0'      OK?
        BE    EXIT_TERMOK              ..yes. .


*----------------------------------------------------------------------*
* The WLM MAS AGENT returned an 8 in WTRA_RESPONSE                      *
*----------------------------------------------------------------------*
WLM_CALLERR  DS  0H


*----------------------------------------------------------------------*
* Process completed successfully                                       *
*----------------------------------------------------------------------*
EXIT_TERMOK  DS  0H


*----------------------------------------------------------------------*
* Route Abend Call returned a 0                                        *
*----------------------------------------------------------------------*
EXIT_ABD     DS  0H
EXIT         DS  0H
        EXEC  CICS RETURN
*----------------------------------------------------------------------*
* LINK_WLM     : Link to the WLM MAS AGENT                             *
*----------------------------------------------------------------------*
LINK_WLM     DS  0H
        EXEC  CICS LINK PROGRAM(EYU9XLOP)                           X
              COMMAREA(EYURWTRA) LENGTH(=AL2(WTRA_LENGTH))          X
        BR    R5                       Exit routine.
*----------------------------------------------------------------------*
* START_UOW    : Start the Unit Work.                                  *
*----------------------------------------------------------------------*
START_UOW    DS  0H
        EXEC  CICS LINK PROGRAM(UOWPGM)                             X
              COMMAREA(WRK_UOWCOMM) LENGTH(=AL2(WRK_UOWCOMM_L))     X
              SYSID(WTRA_SYSID)                                     X
              RESP(WRK_EIBRESP)
        CLC   WRK_EIBRESP,DFHRESP(NORMAL)                           X
                                       Did call go ok?
```

```
              BE      START_UOWL                 ..yes.
              L       R15,=F'-4'                 Assume SYSIDERR
              CLC     WRK_EIBRESP,DFHRESP(SYSIDERR)                        X
                                                 Is there one?
              BE      START_UOWX                 ..yes.
              L       R15,=F'-8'                 Load Failure code.
              B       START_UOWX                 Go exit.
START_UOWL    DS   0H
              L       R15,WORK_UOW_RESP          Load Response Code.
START_UOWX    DS   0H
              BR      R5                         Exit routine.
```

Part 3. Managing workloads

CICSPlex SM workload management optimizes processor capacity in your enterprise. Workload management dynamically routes transactions and programs to whichever CICS region is the most appropriate at the time, taking into account any transaction affinities that exist.

Chapter 6. Workload management definitions and their related views

You use the Web User Interface (WUI) workload management administration views to define a variety of workload management attributes.

Figure 8 on page 60 provides an overview of the workload management views from the perspective of the CICSPlex SM object model. In addition to these views, you can use the views described in "Active workload views" on page 75 to display information about and manage active workloads. You can also display a visual map of your workload management definitions by using the MAP button.

Figure 9 on page 61 illustrates the relationship between the components of a workload in a CICSplex and the views used to establish the workload.
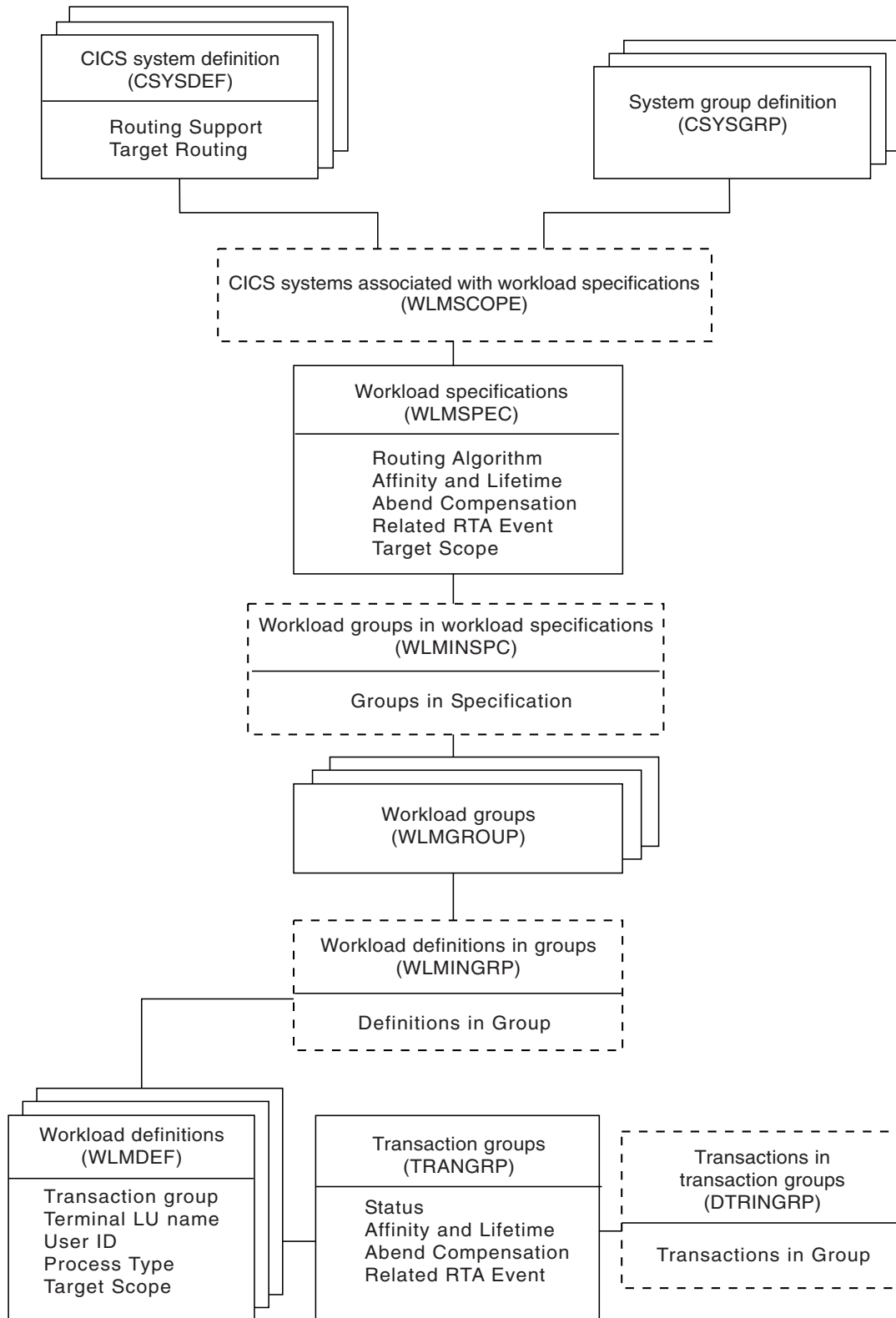
Figure 8. Views for creating workload management objects and associations
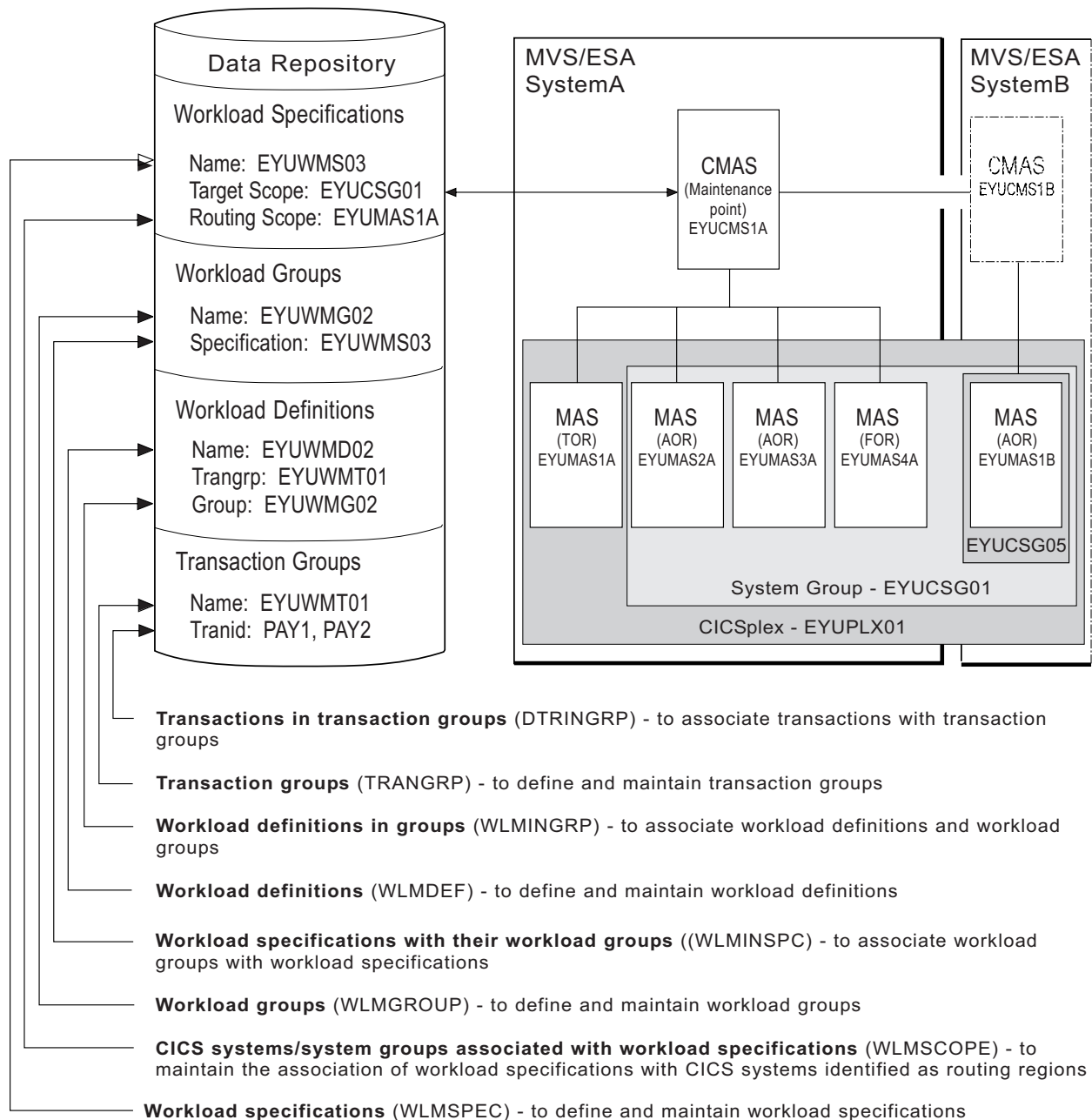
Figure 9. The relationship between a workload and the workload management views

Table 4 on page 62 shows the views you can use to create workload management definitions. It also indicates the information you can display and the actions you can perform using these views. To access these views in the Web User Interface, from the main menu, click **Administration views > Workload manager administration views**. For details of these views, see *CICSPlex System Manager Administration*.

Table 4. Views to create and maintain workload management definitions

WUI view	Object name	Tasks Supported
Transactions in transaction groups	DTRINGRP	• Display all transaction groups within the current context. • Remove a transaction from a transaction group. • Display a map of workload definitions using the designated transaction group as a starting point.
CICS system groups associated with workload specifications	LNKSWSCG	• Display, create or remove the association between a workload specification and a CICS system group.
CICS systems associated with workload specifications	LNKSWSCS	• Display, create, update or remove a link between a workload specification and a CICS system. • Display a map of workload definitions using the designated definition as a starting point.
Transaction groups	TRANGRP	• Display, create, display, update, remove, or update a transaction group. • Add a transaction to a transaction group. • Install • Display a map of workload definitions using the designated transaction group as a starting point.
Workload definitions	WLMDEF	• Create, change, or remove a workload definition. • Add an association between a workload definition and a workload group. • Install a workload definition into a workload.
Workload groups	WLMGROUP	• Display, create, update, or remove a workload group. • Add an association between a workload group and a workload specification. • Install workload definitions associated with a workload group into a workload. • Display a map of workload definitions using the designated workload group as the starting point.
Workload definitions in groups	WLMINGRP	• Add or remove the association between a workload definition and a workload group.

WUI view	Object name	Tasks Supported
Workload specifications	WLMSPEC	• Display, create, update, or remove a workload specification. • Add an association between a workload specification and a CICS system. • Add an association between a workload specification and a CICS system group. • Display a map of workload definitions using the designated workload specification as a starting point.
Workload groups in workload specifications	WLMINSPC	• Remove the association between a workload group and a workload specification. • Display a map of workload definitions using the designated definition as a starting point.

Table 5 shows the views you can use to manage active workloads. It also indicates the information you can display and the actions you can perform using these views. To access these views in the Web User Interface, from the main menu, click **Active workload views**.

Table 5. Views to manage active workloads

WUI view	Object name	Tasks Supported	Page
Active workloads	WLMAWORK	• Display active workloads within the current context.	"Active workloads - WLMAWORK" on page 75
Routing regions in an active workload	WLMAWTOR	• Display active routing regions that are associated with a workload.	"Active routing regions - WLMAWTOR" on page 82
Target regions in an active workload	WLMAWAOR	• Display target regions that are associated with a workload. • Activate a target region associated with an active workload. • Quiesce a target region associated with an active workload.	"Active workload target distribution factors - WLMAWAOR" on page 84
Active workload definitions	WLMAWDEF	• Display active workload definitions associated with a workload. • Discard an active workload definition.	"Definitions - WLMAWDEF" on page 108

Table 5. Views to manage active workloads (continued)

WUI view	Object name	Tasks Supported	Page
Active workload transaction groups	WLMATGRP	• Display active transaction groups associated with a workload. • Change the status of a transaction group to active. • Change the status of an active transaction group to dormant.	"Transaction groups - WLMATGRP" on page 110
Active workload dynamic transactions	WLMATRAN	• Display active transactions associated with a workload. • Discard a transaction from a transaction group.	"Dynamic transactions - WLMATRAN" on page 113
Active workload transaction group affinities	WLMATAFF	• Display the active affinities for a transaction group associated with a workload. • Discard an affinity entity.	"Transaction group affinities - WLMATAFF" on page 114

Chapter 7. Creating workload management definitions using the WUI

Here are some examples of the tasks required to create and manage workload management definitions using the WUI. Unless noted otherwise, only the context is recognized when you are creating and maintaining workload management definitions.

Creating a workload specification

A WLM specification identifies a workload and one or more CICS systems acting as target regions.

It also defines the attributes of the default transaction group. An example of how to use this view can be found in "Routing a specific transaction to a specific target region" on page 138.

To create a workload specification and add it to the data repository:

- From the main menu, click **Administration views > Workload manager administration views > Specifications** to open the **WLM specifications** tabular view.

  This view displays a list of existing workload specifications. It has action buttons that allow you to create, update, and remove workload specifications, and to associate CICS systems and CICS system groups with a workload specification.

- Click the **Create...** button. To use some of the information from an existing definition in the creation of your new definition, select an existing definition by selecting an adjacent check box in the **Record** column.

- Click the **Create...** button.

- Complete the fields and click the **Yes** button to create the new specification. Otherwise, click **No** to abandon the process.

The **WLM specification** view is redisplayed and includes an entry for the new definition.

> **Related reference**
>
> Specifications - WLMSPEC
> A WLM specification identifies the default control attributes that are used for CICPlex SM workload management. When associated with a routing region, the specification name becomes the workload name for that region. The WLMSPEC also provides the anchor for all explicit workload definitions associated with the CICS system. Although a WLM specification may be associated with any number of routing regions, a CICS region may have only one WLMSPEC associated with it.

Associating a CICS system or system group with a workload specification

Each workload specification has a default target scope and one or more CICS systems or CICS system groups associated with it.

These associated CICS systems or groups are known as the routing scope. The default target scope is identified when you create the specification. Associated CICS systems and system groups are identified when you add the routing region to the specification.

Follow this procedure to associate a CICS system group to an existing workload specification:

1. Click **Administration views > Workload manager administration views—>Specifications** to open the **WLM specifications** view.

   This view displays a list of existing workload specifications.

2. Select a workload specification and click the **Associate CICS group...** button. This opens the **Associate CICS group...** view.

3. In the **CICS system group field**, enter the specific or generic name of an existing CICS system group that represents one or more routing regions.

   Note: A CICS system or CICS system group acting as a routing region can be associated with only one workload specification at a time. A specification, however, can be associated with any number of CICS systems and CICS system groups.

4. Select one of the following options to indicate how the CICS systems that make up the CICS system group are to use the workload specification associated with the CICS system group:

   FORCE

   All CICS systems currently associated with the CICS system group are to use the workload specification. (The workload specification attribute for each CICS system changes to INHERIT, indicating that the specification was acquired from the CICS system group). If you add a new CICS system to the CICS system group, it does not automatically inherit the FORCE option. You must specify NULL or FORCE when adding a CICS system to a CICS system group.

   NULL Those CICS systems in the CICS system group that are not associated with a workload specification are to use this workload specification. (The workload specification attribute for those CICS systems changes to INHERIT, indicating that the specification was acquired from the CICS system group.)

   NONE

   Only the CICS system group is to be associated with the workload specification. The CICS systems in the CICS system group are not affected. That is, if there is no association between a CICS system and a workload specification, none is established; if there is an association, either explicitly established or inherited from another CICS system group, it is unchanged.

   Note:

   a. If the CICS system group includes other CICS system groups, all of the CICS systems, including those in subordinate CICS system groups, are affected by the value specified in this field.

   b. The CICS systems designated as the default target scope when you created the workload specification must be accessible to the CICS systems identified as the routing scope. Therefore, you should verify that the appropriate CICS connections exist between each routing region and all of the CICS systems in the target scope identified here.

5. Click **Yes** to update the workload specification in the data repository. Otherwise, click **No** to abandon the process.

Once you associate a CICS system or system group to a workload specification, the specification is automatically installed whenever an associated CICS system is started. Any workload definitions associated with the specification through workload groups are also automatically installed.

However, if you associate the workload specification with a CICS system that is already active, the new specification is not immediately available. To turn workload management on:

1. Click **Administration views > Topology administration views > System definitions** to display a list of active CICS systems.
2. Select the CICS system and click the **Update...** button
3. In the **Workload manager status** field, specify **YES**, and click the **Yes** button to turn on workload management. Otherwise, click **No** to abandon the process.

Updating a link between a WLM specification and a CICS system

Procedure

1. From the main menu, click **Administration views** > **Workload manager administration views**.
2. From the Workload manager administration views menu, click **Specifications to system links**. The WLM specifications to CICS system links view (LNKSWSCS object) is displayed.
3. Check the box for the WLM specification to be updated. You can check more than one box.
4. Click the **Change Spec Association** button to display the Change Spec Association (EYUSTARTLNKSWSCS.CHGSPEC) view.
5. Type the new name in the **New WLM specification name** field and select an appropriate inherit option.
   - Click **Yes** to update the link between a monitor specification and a CICS system group.
   - Click **No** to abandon the process.

Updating a link between a WLM specification and a CICS system group

Procedure

1. From the main menu, click **Administration views** > **Workload manager administration views**.
2. From the Workload manager administration views menu, click **Specifications to system group links**. The WLM specifications to CICS system links view (LNKSWSCG object) is displayed.
3. Check the box for the WLM specification to be updated. You can check more than one box.
4. Click the **Change Spec Association** button to display the Change Spec Association (EYUSTARTLNKSWSCG.CHGSPEC) view.
5. Type the new name in the **New WLM specification name** field and select an appropriate inherit option.
   - Click **Yes** to update the link between a monitor specification and a CICS system group.
   - Click **No** to abandon the process.

Creating a transaction group

A transaction group is an association of logically similar transactions. The similarity may be based on affinity requirements, common shared processing requirements, or any other user-determined characteristic. This section describes how to create a transaction group definition and add it to the data repository.

1. Click **Administration views > Workload manager administration views > Transaction group definitions** to open the **Transaction group definitions** view.

   This view displays a list of existing transaction group definitions. It has action buttons that allow you to create, update, and remove transaction group definitions, and to add a transaction to a transaction group.

2. If you want to use information from an existing definition in the creation of your new definition, select the check box adjacent to an existing definition before continuing.

3. Click the **Create...** action button.

4. Provide the following information, as appropriate:

   Transaction group name
   > Specify a 1- to 8-character name for the transaction group. The name can contain alphabetic, numeric, or national characters. However, the first character must be alphabetic.

   Description
   > (Optional.) Specify a 1- to 30-character description of the transaction group.

   Affinity relation and lifetime checking status
   > Specify whether the affinity relation and lifetime values are to be used when processing a transaction associated with this transaction group:
   > **ACTIVE**
   > > Recognize the affinity relation and lifetime settings.
   > **DORMANT**
   > > Recognize the affinity settings only when the lifetime is pseudoconversation (PCONV). Otherwise, do not recognize the affinity relation and lifetime settings.

   Primary search criterion
   > Designate whether a user name (USERID) or logical unit name (LUNAME) is to be used as the search criteria for the transaction group. This field is ignored if the associated workload definition specifies separation by process type rather than by luname and user ID.
   >
   > **Note:** The specific or generic user and terminal names that are to be used as the search criteria are defined as part of the workload definition to which this transaction group is associated.

   Affinity relationship
   > (Optional.) Indicate the affinity relation that is to be used when processing the transactions associated with this transaction group. Specify:
   > **N_a** Not defined.
   > **USERID**
   > > Base transaction affinity on the user ID.
   > **LUNAME**
   > > Base transaction affinity on the terminal logical unit name.
   > **GLOBAL**
   > > Base transaction affinity on all users at all terminals.

BAPPL

Base transaction affinity on the CICS BTS application.

If you do not specify a value, no affinity relation is recognized for transactions associated with this transaction group. All dynamic transactions in the group that are initiated from any routing region by any user can be routed to any CICS system associated with the target scope.

Affinity lifetime

(Required when you specify a value in the **Affinity relationship** field.) Indicate the affinity lifetime to be used when processing transactions associated with this transaction group. Specify:

N_a Not defined.

DELIMIT

Maintain transaction affinity until a transaction with a pseudoconversation mode of END is encountered.

LOGON

Maintain transaction affinity for the duration of the terminal session.

PCONV

Maintain transaction affinity for the duration of the pseudoconversation. That is, as long as each transaction ends with an EXEC CICS RETURN TRANSID command to invoke the next transaction in the sequence and no pseudoconversation mode of END is encountered.

CICS does not support pseudoconversations for APPC (LUTYPE 6.2) devices.

PERMANENT

Maintain transaction affinity as long as the workload containing this transaction group is active.

SIGNON

Maintain transaction affinity as long as the user's session is active.

SYSTEM

Maintain transaction affinity as long as the target region to which transactions are directed remains active.

ACTIVITY

Maintain transaction affinity until the associated BTS activity ends.

PROCESS

Maintain transaction affinity until the associated BTS process ends.

Note: The **Affinity relationship** and **Affinity lifetime** fields are related. If you specify a value in the **Affinity relationship** field, you must specify a value in the **Affinity lifetime** field. See Relations and lifetimes for valid affinity and lifetime combinations.

Automatic affinity creation option

(Required when you specify a value in the Affinity relationship and Affinity lifetime fields.) Indicate whether CICSPlex SM should automatically create an affinity relationship for transactions associated with this transaction group.

YES (or blank)
CICSPlex SM creates an affinity using the values specified in the **Affinity relationship** and **Affinity lifetime** fields.

NO
CICSPlex SM does not automatically create an affinity. However, you can create one by using the SM_CREAFF function in the dynamic routing program (EYU9WRAM). The SM_CREAFF function provides greater control over the creation of affinities. For example, you can create an affinity to a target region that CICSPlex SM might not ordinarily select for dynamic routing. Refer to Chapter 4, "Dynamic routing with CICSPlex SM," on page 27 for details on EYU9WRAM and SM_CREAFF.

N/A
Affinity not defined (**Affinity relationship** and **Affinity lifetime** fields are blank).

RTA event name
(Optional.) Enter the specific or generic name of an analysis definition (RTADEF) or status definition (STATDEF) that may affect transactions associated with this transaction group. If you enter a generic value, a list of valid definitions is displayed.

If a real-time analysis event is generated by this definition during the target region selection process, the severity level, if any, associated with the definition is used as part of the criteria in selecting a target region.

Acceptable level of abend probability
Specify the abend probability for a transaction associated with this group that should cause a target region to be considered unhealthy:

0
Ignore target region abend probability calculations.

value
Specify a value between 2 and 99 (inclusive) that indicates an unacceptable abend probability. For example, if you specify 25, a target region with a 25% or greater probability of abending for a transaction associated with this group is considered unhealthy and is avoided, if possible.

Acceptable target region load level
Specify the abend probability for a transaction associated with this group that should cause a target region's load level to be doubled:

0
Required when the Abend Health field is set to 0.

value
Specify a value that is greater than 0 and less than the Abend Health value.

For example, if you specified 25 as the Abend Health value, you must specify a value, x, between 1 and 24 (inclusive) as the Abend Load value. Then, if the probability of abend for a transaction being routed to a given target region is between 0% and x%, the perceived load on that target region is adjusted upward. Once the abend probability reaches x%, the perceived load is doubled, which means the target region is considered to have twice the load that it really has. This loading factor makes the region less desirable as a target for routing.

Note:

a. Once an affinity is active, all subsequent transactions are routed to the same target region for as long as the affinity remains active, regardless of its abend probability.

b. For additional information about specifying abend health and abend load values, see "Taking abend probabilities into consideration" on page 20.

5. Click **Yes** to create the new definition.

The Transaction group definition view is redisplayed with an entry for the new definition.

Creating a workload definition

You can use workload definitions to route work requests to a specific set of target regions based on the terminal and user names, or the process types, associated with those work requests. This section describes how to create a workload definition and add it to the data repository.

The terminal and user names may be either specific or generic. For example, you can create a workload definition that causes all transactions initiated by any user from terminals with logical unit names starting with NET to be routed to the target scope identified as EYUCSG01.

The transaction match criteria that CICSPlex SM uses to determine if a transaction should be routed are as follows:

- Is the transaction identifier part of a transaction group associated with the workload definition?
- Is there a definition specifying separation by process type? Is there a match? If so, use this definition. If not, is there a definition specifying separation by terminal logical unit name and user ID?
- In what order should the terminal and user names associated with the transaction be evaluated; that is, which name is to be used as the primary filter?
- Do the user and terminal names associated with the transaction match the name patterns specified with the workload definition?

The rules for establishing terminal and user name patterns are:

- When there are multiple workload definitions, the field containing the name identified as the primary filter can contain the same specific or generic pattern; the contents of the field used as the secondary filter must always be unique. For example, the following definitions are valid when USERID is the primary filter and LUNAME is the secondary filter. They are not valid, however, when LUNAME is the primary filter because the user identifiers are not unique.

```
Entry Name      :  EYUWMD01  EYUWMD02  EYUWMD03
Trangroup Name :  EYUTNG01  EYUTNG01  EYUTNG01
Terminal Luname:  LUR*      LUL*      LUT*
User ID         :  PIE*      PIE*      PIE*
```

- When a generic name is specified, the pattern with the most matching leading characters has precedence. For example, with the following patterns:

```
A37AR*
A37+R*
```

Pattern A37AR* is selected when the input is A37AR123. Pattern A37+R* is selected when the input is A37RTAP.

- Terminal LU name patterns are matched on the concatenated values of network name and logical unit name. The following are valid terminal LU name patterns:

```
NETWORK1.LU12345678   - A specific luname
NETWORK1.LU1*         - Generic lunames in the network
NETWORK1.*            - All lunames in the network
```

```
NET*                  - All lunames in a generic network
.LU12345678           - A specific luname within all networks
.* or *               - All lunames within all networks
```

To create a workload definition and add it to the data repository:

1. Click **Administration views—>Workload manager administration views—>Workload definitions** to open the **Workload management definition** view.

   This view displays a list of existing workload management definitions. It has action buttons that allow you to create, update, remove and install workload definitions, and to add a workload definition to a workload group.

2. If you want to use some of the information from an existing definition in the creation of your new definition, select an existing definition by selection by selecting an adjacent check box in the **Record** column.

3. Click the **Create** action button.

4. Provide the following information, as appropriate:

   Workload management definition name

   Specify a 1- to 8-character name for the workload definition. The name can contain alphabetic, numeric, or national characters. However, the first character must be alphabetic.

   Description

   (Optional) Specify a 1- to 30-character description of the definition.

   Trangroup group name

   (Optional) Enter the specific or generic name of a transaction group. If you enter a generic value, a list of valid transaction groups is displayed.

   If you do not identify a transaction group, the default transaction group for the specification is assumed. (For a description of this transaction group, see Transaction group definitions - TRANGRP.)

   Terminal LU name

   Enter a specific logical unit name or a pattern, using the format:

   ```
   [network_qualifier_name.]luname
   ```

   where both the `network_qualifier_name` and the `luname` are between 1 and 8 characters in length.

   A pattern can include the characters + (plus sign), * (asterisk), or both.

   User ID

   Enter a specific user ID or a pattern. A pattern can include the characters + (plus sign), * (asterisk), or both.

   Note: The Terminal Luname and User ID values are used when CICSPlex SM attempts to match a transaction with this definition. (See page Separating by transaction for additional information.)

   BTS process type

   Enter a specific process type or a pattern. A pattern may include + (plus sign), * (asterisk), or both.

   Note: If you specify anything other than an * in this field, the luname and user id fields must be set to an *. Similarly, if there is anything

other than an * in either luname and user id, this field must be set to *. You cannot separate a workload by process type, luname and user id.

Scope name of set of target systems

Enter the specific or generic name of a CICS system or CICS system group to be used as target regions for dynamic routing requests. If you enter a generic value, a list of valid CICS systems and CICS system groups is displayed.

Note: The specified CICS system or CICS system group must be accessible to the CICS systems identified as the routing scope with the workload specification to which this definition is associated. Therefore, you should verify that the appropriate CICS connections exist between each routing region and all of the CICS systems identified here as the target scope.

5. Click **Yes** to create the new definition.

The **Workload management definition** view is redisplayed and includes an entry for the new definition.

Creating a workload group

A workload group is used to associate one or more related workload definitions.

An example of how to use this view can be found in "Routing a specific transaction to a specific target region" on page 138. This section describes how to create a workload group definition and add it to the data repository.

- Click **Administration views—>Workload manager administration views—>Groups** to open the **WLM groups** view.

  This view displays a list of your existing workload management group definitions. It has action buttons that allow you to create, update, remove and install workload groups, and to add a group to a workload specification.

- If you want to use some of the information from an existing definition in the creation of your new definition, select an existing definition by selecting an adjacent check box in the **Record** column.

- Click the **Create** action button.

-

  Provide the following information, as appropriate:

  Workload management group name

  Specify a 1- to 8-character name for the workload group. The name can contain alphabetic, numeric, or national characters. However, the first character must be alphabetic.

  Description

  (Optional.) Specify a 1- to 30-character description of the workload group.

- Click **Yes** to create the new definition.

  The **Workload management group** view is redisplayed and includes an entry for the new definition.

Chapter 8. Active workloads view reference

This topic describes the WUI view sets used to obtain information about active workloads and the transactions and transaction groups comprising those workloads.

Note: Workload management is performed on a CICSplex-wide basis. These views ignore any scope that may be in effect.

Active workload views

The active workload views display information about active workloads and the transactions and transaction groups comprising those workloads. Workload management is performed on a CICSplex-wide basis. These views ignore any scope that may be in effect.

Active workloads - WLMAWORK

The **Active workloads** (WLMAWORK) views display information about an active workload within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Active workloads

Table 6. Views in the supplied **Active workloads** *(WLMAWORK) view set*

View	Notes
Active workloads EYUSTARTWLMAWORK.DETAILED	Detailed information about a selected active workload.
Active workloads EYUSTARTWLMAWORK.TABULAR	Tabular information about all active workloads within the current context.

Actions

None.

Fields

Table 7. Fields in WLMAWORK views

Field	Attribute name	Description
Acceptable level of abend probability	ABENDCRIT	The abend probability for a transaction associated with the default transaction group that should cause a target region to be considered unhealthy. A value of 0 means WLM is not calculating abend probabilities for the workload.

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Acceptable target region load level	ABENDTHRESH	The abend probability for a transaction associated with the default transaction group that should cause a target region's load level to be doubled. A value of 0 means WLM is not calculating abend loads for the workload.

Automatic affinity creation	AFFAUTO	Indicates whether CICSPlex SM is to automatically create an affinity relationship for transactions that are not associated with any installed transaction group.
		• YES
		  – An affinity is created using the values in the Affinity Relation and Affinity Lifetime fields.
		• NO
		  – An affinity is not automatically created (but can be created by a customized version of the dynamic routing program EYU9WRAM).
		• N/A
		  – There are no values in the **Affinity Relation** and **Affinity Lifetime** fields, therefore, no affinity is created.

Default affinity type	AFFINITY	The default affinity relation applied to transactions not associated with any installed transaction group. The affinity relation values are: • GLOBAL - All users at all terminals • LUNAME - Terminal logical unit name • NONE - No affinity relation was defined • USERID - User ID • BAPPL - Business Application

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Default affinity lifetime	AFFLIFE	The default affinity lifetime used with the default affinity relation. This value is applied to transactions that are not associated with any installed transaction group. After the first instance of a transaction, subsequent instances of the transaction are run on the same target region: • DELIMIT - Until the pseudoconversation mode is END • LOGON - For the duration of the terminal session • PCONV - For the duration of the pseudoconversation • PERMANENT - For as long as the workload is active • SIGNON - Until the terminal user signs off • SYSTEM - Until the target region terminates • ACTIVITY - For as long as the CICS BTS activity is active • PROCESS - For as long as the CICS BTS process is active • NONE - No affinity lifetime was defined
Algorithm type	ALGTYPE	The algorithm being used to select the best target region from those available: • QUEUE - Routes transactions to the target region that has the shortest queue of work, is least affected by conditions such as short-on-storage, and is the least likely to cause the transaction to abend • GOAL - Routes transactions to the target region which is best able to meet the transaction's average response time goal, as predefined using z/OS Workload Manager, and is the least likely to cause the transaction to abend
Active target regions	AORCNT	The number of active CICS systems, identified as target region for the workload.
Default target scope	AORSCOPE	The name of the CICS system or CICS system group that is to be the target for any dynamic transactions or programs not associated with a transaction or program group.

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Description	DESC	The description of the workload.
Event name	EVENTNAME	The name of a real-time analysis event that will affect the routing of transactions in this workload. If a real-time analysis event is generated, WLM uses the information as part of the target selection criteria. An event can optionally be associated with a workload when the workload specification is created. If this field is blank, no event is associated with the workload. The name of an event is the same as an installed real-time analysis definition (RTADEF) or status definition (STATDEF)

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Optimization status	OWSTATE	This field reports the sysplex optimization status of the current workload. The value is an amalgamation of all of the workload router optimization statuses, and all of the workload target optimization statuses.

The possible values are:
- ACTIVE
    - All targets and routers in the workload are executing in optimized workload state.
- PARTIAL
    - At least one target and one router are executing in optimized workload mode. Use the Active routing regions and Active target regions hyperlinks to determine which regions are not running in an optimized state.
- INACTIVE
    - The workload is not running in an optimized state, for one or more of the following reasons:
      - No routing regions in the workload are running in an optimized state
      - No target regions in the workload are running in an optimized state
      - No regions in the workload are running in an optimized state
      - The optimised workload routing function is DISABLED for the current target region
      - The workload was designated as being non optimized by specifying a value of 0 for the RS server update frequency on the CICSplex definition or CICS system definition for this workload. |
| Shared status | SHARED | Indicates whether the workload has been shared with a pre-CICS TS 1.3 CMAS. If it has installs of CICS BTS related definitions are inhibited. |

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Duplicate workload status	STATE	A value of YES indicates that a workload of the same name is active on two CMASs that are connected to each other. If this field is blank, no duplicate workload exists. Duplicate workloads are treated as unique workloads; their attributes cannot be synchronized. To synchronize the two workloads, do the following: 1. Shut down all of the AORs and TORs associated with one of the CMASs 2. Shut down the CMAS. 3. Restart the CMAS and wait for it to connect to the other CMAS. 4. Restart the AORs and TORs

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Workload status	STATUS	The status of the workload: • ACTIVE - All the target and routing region connections that this workload depends upon are available • FROZEN - A target or routing region connection that this workload depends upon has been lost As long as a workload remains frozen: • Transactions will continue to be routed according to any existing affinities • New affinities can be created as long as they do not involve other CMASs. Global or permanent affinities, which require other CMASs to be notified, cannot be created • Install and discard action commands are not allowed for any aspect of the workload The cause of a lost connection could be the target or routing region, one of the CMASs that manage the workload or a connection between the CMASs. To determine why a workload is frozen: • Check the contact status in the Target region in active workload (WLMAWAOR) and Active workload routing regions (WLMAWTOR) views to determine which target or routing region is affected • Check the MAS view to determine the status of the target or routing region • Check the status of all connections for the target or routing region Determine which connection(s) were lost and take appropriate action to re-establish the connections.
Active routing regions	TORCNT	The number of active CICS systems, identified as routing regions, that are associated with the workload.
Name	WORKLOAD	The name of the workload. This is also the name of the installed workload specification definition.

Table 7. Fields in WLMAWORK views (continued)

Field	Attribute name	Description
Owning system ID	WRKLOWNER	The CICS system ID of the CMAS that created the workload.

Active routing regions - WLMAWTOR

The **Routing regions in an active workload** (WLMAWTOR) views display information about all active routing regions that are associated with a workload that is within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Active routing regions

*Table 8. Views in the supplied **Active workload routing regions** (WLMAWTOR) view set*

View	Notes
Active workload routing regions EYUSTARTWLMAWTOR.DETAILED	Detailed information about a selected active routing region.
Active workload routing regions EYUSTARTWLMAWTOR.TABULAR	Tabular information about all active routing regions that are associated with a workload.

Actions

Table 9. Actions available for WLMAWTOR views

Action	Description
GET	The name of the workload specification. You can specify a workload name of '*', which returns details of all routing regions in all workloads. No other type of generic workload name may be specified.

Fields

Table 10. Fields in WLMAWTOR views

Field	Attribute name	Description
Routing region contact status	CON_STATUS	The status of the connection between the routing region and the CMAS. Values are: • LOSTCON - The connection between the routing region and the CMASs has been lost. • N_A - The connection between the routing region and the CMASes managing the workload is available.

Table 10. Fields in WLMAWTOR views (continued)

Field	Attribute name	Description

Optimization status	OWSTATE	This field reports the status of the current routing region for the optimized workload routing function.
		
		The possible values are:
		• ACTIVE
		  – This router region is executing in an optimized workload state.
		• INACTIVE
		  – This region is capable of executing in an optimized workload state, however, is not currently optimized for one or more of the following reasons:
		    - The region has no connection to an RS Server
		    - The region is connected to an RS Server, however, the server has not been able to connect to the coupling facility
		    - The optimised workload routing function is DISABLED for the current target region
		    - The RS server update frequency value for this region is 0, which means that the optimization capabilities for this region are not enabled
		• N_A
		  – The router region is not configured to provide optimized workload management. Only non optimized WLM routing decisions can be made.
		
		If the CMAS that your WUI is using is not connected to a Region Status (RS) server, the optimization status for remote regions will not be updated and defaults to INACTIVE. Where this situation occurs, either connect all reporting CMASs to the RS server or use the Active target regions view to check the optimization state.

Table 10. Fields in WLMAWTOR views (continued)

Field	Attribute name	Description
Routing region name	TOR	The name of an active CICS system, acting as a routing region, to which the workload is associated.
Name of controlling CMAS	TOROWNER	The name of the controlling CMAS.
Workload name	WORKLOAD	The name of the workload specification.
System ID of workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Active workload target distribution factors - WLMAWAOR

The **Target regions in an active workload** (WLMAWAOR) views display information about all target regions that are associated with a workload that is within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Active workload target distribution factors

Table 11. Views in the supplied **Target region in active workload** *(WLMAWAOR) view set*

View	Notes
Target region in active workload EYUSTARTWLMAWAOR.ACTIVATE	Cause the specified target region to be recognized so that it can participate in workload management.
Target region in active workload EYUSTARTWLMAWAOR.DETAILED	Detailed information about a selected target region.
Target region in active workload EYUSTARTWLMAWAOR.QUIESCE	Cause the specified target region to be removed from workload management. This means that no further transactions are routed to the target region unless they share an affinity with earlier transactions. For example, if you are engaged in a pseudoconversation when a target region begins quiescing, the transactions that constitute the pseudoconversation continue to be routed to the same target region until the end of the affinity lifetime. When the affinity is no longer active, the target region is fully quiesced and subsequent transactions are routed to a different target region in the target scope.
Target region in active workload EYUSTARTWLMAWAOR.TABULAR	Tabular information about target regions that are associated with a workload that is within the CICSplex identified as the context.

View	Notes
Target region in active workload EYUSTARTWLMAWAOR.TABULAR2	Tabular information about target regions that are associated with a workload that is within the CICSplex identified as the context.

Actions

Table 12. Actions available for WLMAWAOR views

Action	Description
ACTIVATE	Cause the specified target region to be recognized so that it can participate in workload management.
QUIESCE	Cause the specified target region to be removed from workload management. This means that no further transactions are routed to the target region unless they share an affinity with earlier transactions. For example, if you are engaged in a pseudoconversation when a target region begins quiescing, the transactions that constitute the pseudoconversation continue to be routed to the same target region until the end of the affinity lifetime. When the affinity is no longer active, the target region is fully quiesced and subsequent transactions are routed to a different target region in the target scope.

Fields

Table 13. Fields in WLMAWAOR views

Field	Attribute name	Description
Target region name	AOR	The name of an active CICS system, acting as a target region, to which the workload is associated.
Coupling Facility update count	CFUPDCNT	This is the number of update calls that the RS Server has made to the z/OS Coupling Facility for this target region. This value is reset to zero whenever the RS Server or the CICS region is started.
Target region contact status	CON_STATUS	The status of the connection between the routing region and the CMAS. Values are: • LOSTCON - The connection between the routing region and the CMASs has been lost. • N_A - The connection between the routing region and the CMASes managing the workload is available.
RTA event active	EVENTS	This is the indicator of an outstanding RTA event that is associated with the current workload for the current region. This value may vary for each workload that targets the current region, and will cause corresponding variations of the routing weight for that region.
Region is dumping	HLTHDUMP	This indicates whether the routing target is currently issuing a transaction or system dump.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
Region is at MAXTASKS	HLTHMAXT	This indicates whether the routing target is currently running at a task rate that has reached its maximum tasks threshold.
Short on storage	HLTHSOS	This field indicates the SOS status of this routing target at the current time. Note that a CICS region can change from being in and out of SOS status very rapidly.
Region has stalled	HLTHSTALL	This indicates whether the routing target is in a stall condition. If the region is stalled, use the Active task views to determine which tasks are suspended, and determine why. Note: Stall here means a task has been waiting for the same resource for a specific time.
Maximum task count for region	MAXTASKS	This is the defined maximum number of active tasks that may concurrently execute in this routing target.

Optimization status	OWSTATE	This field reports the status of the current target region for the optimized workload routing function.
		
		The possible values are:
		• ACTIVE
		  – This target region is executing in an optimized workload state.
		• INACTIVE
		  – This region is capable of executing in an optimized workload state, however, it is not currently optimized for one or more of the following reasons:
		    - The region has no connection to an RS server
		    - The region is connected to an RS server, however, the server has not been able to connect to the z/OS coupling facility
		    - The optimised workload routing function is DISABLED for the current target region
		    - The RS server update frequency value for this region is 0, which means that the optimization capabilities for this region are not enabled
		• N_A
		  – The target region is not configured to provide optimized workload management. Only non optimized WLM routing decisions can be made.
		
		If the CMAS that your WUI is using is not connected to a Region Status (RS) server, the optimization status for remote regions will not be updated and defaults to INACTIVE. Where this situation occurs, either connect all reporting CMASs to the RS server or use the Active target regions view to check the optimization state.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
RS server read interval	READRS	Within a workload running in optimized mode, this value specifies the minimum interval between refreshes of a target region status from a CICS CFDT Server. These refresh requests will be issued by a routing region that is evaluating this region as a possible target for a dynamic routing request. The value range is from 0 to 2000, and represents units of milliseconds: • When the Optimization status is not set to Active, then this value will be set to 0, and WLM will ignore it. When the Optimization status is set to Active, then a value of 0 means that a routing region will request a status update of a target region on every occasion that it examines this region's status. • Values between 1 and 2000 specify the minimum time interval that must expire before the status of this region can be refreshed. A low interval value means that the CFDT Server will be polled more often for a status update, than for a higher value. For workloads in QUEUE mode, this will result in a task load more evenly distributed across the CICS regions in the workload target scope **(assuming all other health and link factors are equal)**. However, the utilization of the RS server will be correspondingly increased, which may consequently result in a higher utilization of your z/OS Coupling Facility. A value of 1000 represents a one second interval. The default value is 200 milliseconds This value may be modified for this specific region using the MASs known to CICSplex views, or the CICS system definition views.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
WLM routing weight for region	ROUTEWGHT	This is the calculated routing weight for the current routing target according to a specified transaction name. This value will be combined with the link weight from a Router to determine an overall normalized routing weight for this CICS region. This value will be compared with the same value for other potential routing targets. Assuming no affinities are outstanding, then the target with the lowest routing weight will be chosen as the actual route target. If the workload associated with this target region specifies that RTA events should influence a route decision for certain transaction codes, then different transaction names will result in different routing weights because of the effects of outstanding RTA events. Note: 2147483647 is a special value indicating that the target is quiesced. Generally speaking, the Link weight is used to prefer faster connections over slower ones. weighting is as follows; • MRO is considered faster then VTAM. • VTAM is considered faster then IPIC. • IPIC is considered faster then indirect connections. • MRO, XM AND IRC connections are considered faster than XCF (cross coupling-facility) connections.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
Routing Load	ROUTINGLOAD	This is the routing load used by WLM route decision making for the target region. Note that this will not match the real CICS task count at the time of this query. For an ACTIVE System Optimized WLM routing region this will be the approximate task load in the target region, taking into account 'Task Count Increment Value', 'RS Server Bottom Tier' and 'RS Server Top Tier'. The accuracy of this value is also affected by the RS Read Interval and RS Update frequency settings. For target regions that are not connected to a RS Server, and are therefore in a non-optimized WLM state, this value will appear to be less accurate, when compared to the actual task count. This is because this is the normalized routing load for this region. It should be noted that when running in a non-optimized WLM state, this value can exceed the MAX TASK value, without the MAX TASK flag being set on, and is correct behaviour as the MAX TASK indicator is related to the target region's health status taken from actual task counts. It is possible that a region could be the target for multiple workloads and show different routing weight values. This is not abnormal behaviour - it is a symptom of the synchronization latencies within workload manager. Workload optimization will nullify this effect. The workload manager runtime processes will continue to execute normally in spite of this disparity in the load values. To suppress these observed load differences, try to ensure that all MASes and CMASes that participate in the workload have a connectable region status server available.
RS server pool name	RSPOOLID	For sysplex optimized workloads, region status data is maintained within a coupling facility data table. That table will be contained within a CFDT pool identified by this attribute. For an optimized workload to activate, there must be an active Region Status server which manages data for the pool name identified here. If your CICSplex identifiers are not unique within your sysplex, you must ensure that the RS server pool names are **unique.** If your Sysplex comprises unique CICSplex identifiers, then they may all share the same RS server pool. This attribute is defined in the parent CICSplex definition of the current target region. The default name is DFHRSTAT. You may choose to employ an existing CFDT pool for containing your CICSplex data tables. If you do, be aware that the throughput of your optimized workloads may be impeded by any user application activity to the specified pool name. Likewise, any application throughput to the pool may be impacted by sysplex optimized workloads. It is recommended that a discrete RS server and pool name is defined for the optimized workload function.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
Target region status	STATUS	The current status of the target region associated with the workload, as one of the following: • ACTIVE - The target is available to participate in workload management. • QUIESCEING - The target is being quiesced. No new transactions are routed to this target. Transactions currently being routed to this target are routed to another target, unless an affinity relation exists. If there is an affinity relation, transactions continue to be routed to this target until the affinity lifetime expires. Note that if a target has an affinity lifetime of PERMANENT, it will remain in a QUIESCING state indefinitely. • QUIESCED - The target is not available to participate in workload management. Input Values: ACTIVE | QUIESCE
Task count increment value	TASKINC	This is the translation of the RS Server update frequency value to an actual task count value for the current target region. Each time the current task count reaches a boundary that is a factor of this value, then an update is sent to the RS server.
Task load percentage	TASKLOAD	This is the normalized task load for this target region. It is calculated from dividing the current task routing count by the MAXTASKS value for the region, and multiplying by 100.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
RS Server update frequency	UPDATERS	Within a workload running in optimized mode, this value specifies the frequency with which the CICS CFDT (RS) server will be called to modify the value of the task load within this target region.
		The value range is from 0 to 25:
		• When the Optimization status is not set to Active, then this value will be set to 0, and WLM will ignore it. When the Optimization status is set to Active, then a value of 0 means that the RS Server is not notified of any task load count changes, which disables the optimized workload function for this target region.
		• Values between 1 and 25 are applied as an arithmetic percentage to a region's MAXTASKS setting. The resultant task count value is used as a numeric threshold to drive an update call to the RS Server.
		For example , with a MAXTASKS setting of 120, and with this attribute set to 20, the RS Server will be called to update the WLM load count when the regions task count changes between:
		• 23 and 24 tasks - (20%),
		• 47 and 48 tasks - (40%),
		• 71 and 72 tasks - (60%),
		• 95 and 96 tasks - (80%),
		• 119 and 120 tasks - (100%).
		The RS Server would be updated when the task load increments or decrements across these boundaries.
		If a value is specified that is at the lower end of the 1-25 scale, then that will cause an increase in the frequency of updates to the RS Server across the task load range. For workloads in QUEUE mode, this will result in a task load more evenly distributed across the CICS regions in the workload target scope **(assuming all other health and link factors are equal)** . However, the utilization of the RS server will be correspondingly increased, which may consequently result in a higher utilization of your z/OS Coupling Facility.
		This value may be modified for this specific region using the MASs known to CICSplex views, or the CICS system definition views.

Table 13. Fields in WLMAWAOR views (continued)

Field	Attribute name	Description
Task load queue mode	WLMQMODE	This attribute specifies how the queued task load of a target CICS region is to be evaluated: • **MAXTASK** - specifies that both active and MAXTASK queued tasks are to be included in the task load evaluation for the region. • **ALL** - specifies that the task load evaluation for the region will include active tasks, tasks queued for the MAXTASK limit **and** tasks that are queued because of a TRANCLASS limit. • **N_a** - specifies that the current region is not at a high enough level to support the use of this attribute. You will not be able to change it, and the WLM route decision process will ignore it. The default value is **ALL.** This value is specified within the CICSPlex SM CICS system definition object. If you want this value to be changed, you must modify the system definition for the current region and then restart it. You may change the value in an active CICS region by using the CICSPlex SM MAS object. When the region restarts it will revert to the value specified in the system definition.
Task load health threshold	WLMTHRSH	This specifies a percentage threshold of the current region's task load, which is calculated by dividing the current task count by the maximum task count. When the load for a target region reaches this threshold, then WLM considers the region to be relatively unhealthy. This will cause higher link weights to be applied to the WLM routing algorithm when evaluating this region. When a target scope covers local and remote regions relative to the router, then WLM will favour local targets over remote ones. The effect of this attribute is that when this load threshold in the local regions is achieved, then WLM will start to favour remote targets instead. When all targets in the scope achieve this load threshold, then WLM will revert to favouring local targets again. The value range is from 1 to 100, and the default value is 60. This value is specified within the CICSPlex SM CICS System Definition object. If you want this value to be changed, you must modify the system definition for the current region and then restart it. You may change the value in an active CICS region by using the CICSPlex SM MAS object. When the region restarts it will revert to the value specified in the system definition. If this value is set to 0, then the current region is not at a high enough level to support the use of this attribute. You will not be able to change it, and the WLM route decision process will ignore it.
Workload name	WORKLOAD	The name of the workload specification.
System ID of workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Active target regions - WLMATARG

The **Target regions in an active workload** (WLMATARG) views display information about all target regions that are associated with workloads within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Active target regions

Table 14. Views in the supplied **Active target region** (WLMATARG) view set

View	Notes
Active target region EYUSTARTWLMATARG.DETAILED	Detailed information about a selected target region.
Active target region EYUSTARTWLMATARG.RESET	Causes the Dynamic Routing statistics for the current target region to be reset to zero. After resetting the statistics, for performance and accuracy purposes, it is recommended that the refresh button on this viewset is used to reflect the changes to the statistics.
Active target region EYUSTARTWLMATARG.TABULAR	Tabular information about target regions that are associated with a workload that is within the CICSplex identified as the context.
Active target region EYUSTARTWLMATARG.TABULAR2	Tabular information about target regions that are associated with a workload that is within the CICSplex identified as the context. Routing statistics can only be collected in a region connected to a CICS TS V4.1 CMAS (or greater). For targets or routers that are connected to a pre-CICS TS V4.1 CMAS, some statistics may appear as zero.
Active target region EYUSTARTWLMATARG.TABULAR3	Tabular information about target regions that are associated with a workload that is within the CICSplex identified as the context. Routing statistics can only be collected in a region connected to a CICS TS V4.1 CMAS (or greater). For targets or routers that are connected to a pre-CICS TS V4.1 CMAS, some statistics may appear as zero.

Actions

Table 15. Actions available for WLMATARG views

Action	Description
RESET	Causes the Dynamic Routing statistics for the current target region to be reset to zero. After resetting the statistics, for performance and accuracy purposes, it is recommended that the refresh button on this viewset is used to reflect the changes to the statistics.

Fields

Table 16. Fields in WLMATARG views

Field	Attribute name	Description
Target region name	AOR	The name of an active CICS system, acting as a WLM target region.
RS server bottom tier	BOTRSUPD	This is the bottom tier task load range (from zero up to this value). The value range is from 1 to 25. When a region's task load falls within this range, then the task load will be broadcast to the coupling facility for every change in the task load. Once the load reaches this value, then the 'RS server update frequency' task rules will be activated. The value shown here at the CICSplex level may be overridden at the CICS definition level to allow fine tuning of the value on an individual CICS region basis.
Coupling Facility update count	CFUPDCNT	This is the number of update calls that the RS Server has made to the coupling facility for this target region. This value is reset to zero whenever the RS Server or the CICS region is started.
Target region contact status	CON_STATUS	The status of the connection between the routing region and the CMAS. Values are: • LOSTCON - The connection between the routing region and the CMASs has been lost. • N_A - The connection between the routing region and the CMASes managing the workload is available.
RTA event count for target region	EVENTS	This is the count of all outstanding RTA events that are associated with the current region. This value is set to zero (0) if the reporting CMAS is not the owning CMAS.
Region is dumping	HLTHDUMP	This indicates whether the routing target is currently issuing a transaction or system dump.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Region is at MAXTASKS	HLTHMAXT	This indicates whether the routing target is currently running at a task rate that has reached its maximum tasks threshold.
Short on storage	HLTHSOS	This field indicates the SOS status of this routing target at the current time. Note that a CICS region can change from being in and out of SOS status very rapidly.
Region has stalled	HLTHSTALL	This indicates whether the routing target is in a stall condition. If the region is stalled, use the Active task views to determine which tasks are suspended, and determine why. Note: Stall here means a task has been waiting for the same resource for a specific time.
Maximum task count for region	MAXTASKS	This is the defined maximum number of active tasks that may concurrently execute in this routing target.
Owning CMAS name	OWNINGCMAS	The name of a CMAS that participates in the management of the target region.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description

Optimization status	OWSTATE	This field reports the status of the current target region for the optimized workload routing function.
		
		The possible values are:
		• ACTIVE
		  – This target region is executing in an optimized workload state.
		• INACTIVE
		  – This region is capable of executing in an optimized workload state, however, it is not currently optimized for one or more of the following reasons:
		    - The region has no connection to an RS server
		    - The region is connected to an RS server, however, the server has not been able to connect to the z/OS coupling facility
		    - The optimised workload routing function is DISABLED for the current target region facility
		    - The RS server update frequency value for this region is 0, which means that the optimization capabilities for this region are not enabled
		• N_A
		  – The target region is not configured to provide optimized workload management. Only non optimized WLM routing decisions can be made.
		
		This value is set to INACTIVE if the reporting CMAS is not connected to a Region Status (RS) server.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
RS server read interval	READRS	Within a region running in optimized mode, this value specifies the minimum interval between refreshes of a target region status from a CICS CFDT Server. These refresh requests will be issued by a routing region that is evaluating this region as a possible target for a dynamic routing request. The value range is from 0 to 2000, and represents units of milliseconds: • When the Optimization status is not set to 'Active', then this value will be set to 0, and WLM will ignore it. When the Optimization status is set to 'Active', then a value of 0 means that a routing region will request a status update of a target region on every occasion that it examines this region's status. • Values between 1 and 2000 specify the minimum time interval that must expire before the status of this region can be refreshed. A low interval value means that the CFDT Server will be polled more often for a status update, than for a higher value. For workloads in QUEUE mode, this will result in a task load more evenly distributed across the CICS regions in the workload target scope **(assuming all other health and link factors are equal)** . However, the utilization of the RS server will be correspondingly increased, which may consequently result in a higher utilization of your z/OS Coupling Facility. A value of 1000 represents a one second interval. The default value is 200 milliseconds This value may be modified for this specific region using the 'MASs known to CICSplex' views, or the 'CICS system definition' views.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
WLM routing weight for region	ROUTEWGHT	This is the calculated routing weight for the current routing target without accounting for outstanding RTA events, router region link speeds and transaction abend probabilities. Only the transaction load and health state of the region are calculated into this value. No workload associated parameters are included in this weight value. To determine routine weights for specific workloads, then use the corresponding attribute returned in the WLMAWAOR 'Target region in active workload' views. Note: 2147483647 is a special value indicating that the target is quiesced.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Routing Load	ROUTINGLOAD	This is the routing load used by WLM route decision making for the target region. Note that this will not match the real CICS task count at the time of this query. For an ACTIVE System Optimized WLM routing region this will be the approximate task load in the target region, taking into account 'Task Count Increment Value', 'RS Server Bottom Tier' and 'RS Server Top Tier'. The accuracy of this value is also affected by the RS Read Interval and RS Update frequency settings. For target regions that are not connected to a RS Server, and are therefore in a non-optimized WLM state, this value will appear to be less accurate, when compared to the actual task count. This is because this is the normalized routing load for this region. It should be noted that when running in a non-optimized WLM state, this value can exceed the MAX TASK value, without the MAX TASK flag being set on, and is correct behaviour as the MAX TASK indicator is related to the target region's health status taken from actual task counts. It is possible that a region could be the target for multiple workloads and show different routing weight values. This is not abnormal behaviour - it is a symptom of the synchronization latencies within workload manager. Workload optimization will nullify this effect. The workload manager runtime processes will continue to execute normally in spite of this disparity in the load values. To suppress these observed load differences, try to ensure that all MASes and CMASes that participate in the workload have a connectable region status server available.
Reporting CMAS name	RPTINGCMAS	The name of a CMAS that provided this record.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
RS server pool name	RSPOOLID	For sysplex optimized workloads, region status data is maintained within a coupling facility data table. That table will be contained within a CFDT pool identified by this attribute. For an optimized workload to activate, there must be an active Region Status server which manages data for the pool name identified here. If your CICSplex identifiers are not unique within your sysplex, you must ensure that the RS server pool names are **unique.** If your Sysplex comprises unique CICSplex identifiers, then they may all share the same RS server pool. This attribute is defined in the parent CICSplex definition of the current target region. The default name is DFHRSTAT. You may choose to employ an existing CFDT pool for containing your CICSplex data tables. If you do, be aware that the throughput of your optimized workloads may be impeded by any user application activity to the specified pool name. Likewise, any application throughput to the pool may be impacted by sysplex optimized workloads. It is recommended that a discrete RS server and pool name is defined for the optimized workload function.
Route abends	RTABEND	The number of times that route abend has been returned after selecting this region. This value is the total for all requests processed by routing regions (dynamic routing) and all requests processed by the target region (distributed routing) while they were connected to the reporting CMAS.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Route completes	RTCOMPLETE	The number of times that route complete has been driven for this region. Route complete occurs after the transaction request is dispatched to the waiting queue of the target region. This value is the total for all requests processed by routing regions while they were connected to the reporting CMAS.
Route errors	RTERROR	The number of times that the selection of the current region has caused a route error to occur. Route errors occur when CICSPlex SM has selected a target region, and CICS has experienced an error in routing the work to it. For example, the connection is out of service, or no sessions are immediately available for an LU 6.2 connection. CICSPlex SM will attempt to select another target when this occurs. This value is the total for all requests processed by routing regions while they were connected to the reporting CMAS.
Route initiates	RTINITIATE	The number of times that routed transactions have been actually started on the target region. This value is the total for all requests processed by the target region while it was connected to the reporting CMAS.
Route notifies	RTNOTIFY	The number of times that route notify has been driven for this region. Route notify normally occurs when a static routing starts. This value is the total for all requests processed by routing regions while they were connected to the reporting CMAS.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Route selections	RTSELECT	The number of times that the current region has been chosen as a routing target by route selection processing. This value is the total for all requests processed by routing regions while they were connected to the reporting CMAS.
Route terminates	RTTERMINATE	The number of times that route terminate has been driven for this region. Route terminate occurs when a transaction finishes on a target region. This value is the total for all requests processed by routing regions (dynamic routing) and all requests processed by the target region (distributed routing) while they were connected to the reporting CMAS.
Target region status	STATUS	The current status of the target region associated with the workload, as one of the following: • ACTIVE - The target is available to participate in workload management. • QUIESCEING - The target is being quiesced. No new transactions are routed to this target. Transactions currently being routed to this target are routed to another target, unless an affinity relation exists. If there is an affinity relation, transactions continue to be routed to this target until the affinity lifetime expires. Note that if a target has an affinity lifetime of PERMANENT, it will remain in a QUIESCING state indefinitely. • QUIESCED - The target is not available to participate in workload management. Input Values: ACTIVE | QUIESCE

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Task count increment value	TASKINC	This is the translation of the RS Server update frequency value to an actual task count value for the current target region. Each time the current task count reaches a boundary that is a factor of this value, then an update is sent to the RS server.
Task load percentage	TASKLOAD	This is the normalized task load for this target region. It is calculated from dividing the current task routing count by the MAXTASKS value for the region, and multiplying by 100.
RS server top tier	TOPRSUPD	This is the arithmetic percentage to a region's MAXTASKS setting. The resultant task count value is subtracted from the region's MAXTASKS setting to establish a task load 'top tier'. If the task load in a region runs up to its MAXTASKS limit, then the task load must drop back below this value before the MAXTASKS state for the region is switched off and broadcast to the coupling facility. The value shown here at the CICSplex level may be overridden at the CICS definition level to allow fine tuning of the value on an individual CICS region basis.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
RS Server update frequency	UPDATERS	Within a region running in optimized mode, this value specifies the frequency with which the CICS CFDT (RS) server will be called to modify the value of the task load within this target region. The value range is from 0 to 25: • When the Optimization status is not set to 'Active', then this value will be set to 0, and WLM will ignore it. When the Optimization status is set to 'Active', then a value of 0 means that the RS Server is not notified of any task load count changes, which disables the optimized workload function for this target region. • Values between 1 and 25 are applied as an arithmetic percentage to a region's MAXTASKS setting. The resultant task count value is used as a numeric threshold to drive an update call to the RS Server. **For example** , with a MAXTASKS setting of 120, and with this attribute set to 20, the RS Server will be called to update the WLM load count when the regions task count changes between: • 23 and 24 tasks - (20%), • 47 and 48 tasks - (40%), • 71 and 72 tasks - (60%), • 95 and 96 tasks - (80%). • 119 and 120 tasks - (100%). The RS Server would be updated when the task load increments or decrements across these boundaries. If a value is specified that is at the lower end of the 1-25 scale, then that will cause an increase in the frequency of updates to the RS Server across the task load range. For workloads in QUEUE mode, this will result in a task load more evenly distributed across the CICS regions in the workload target scope **(assuming all other health and link factors are equal)** . However, the utilization of the RS server will be correspondingly increased, which may consequently result in a higher utilization of your

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description

Optimization enablement state	WLMOPTEN	This field reports whether the current target region will support the optimized workload routing function.
		
		The possible values are:
		• ENABLED
		  – This target region will support the optimized workload routing requests.
		• DISABLED
		  – This region will not allow optimized workload routing requests, and will not contact the Region Status server for querying or broadcasting the current region state.
		
		This value may be modified for this specific region using the 'MASs known to CICSplex' views, or the 'CICS system definition' views.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Task load queue mode	WLMQMODE	This attribute specifies how the queued task load of a target CICS region is to be evaluated: • **MAXTASK** - specifies that both active and MAXTASK queued tasks are to be included in the task load evaluation for the region. • **ALL** - specifies that the task load evaluation for the region will include active tasks, tasks queued for the MAXTASK limit **and** tasks that are queued because of a TRANCLASS limit. • **N_a** - specifies that the current region is not at a high enough level to support the use of this attribute. You will not be able to change it, and the WLM route decision process will ignore it. The default value is **ALL.** This value is specified within the CICSPlex SM CICS system definition object. If you want this value to be changed, you must modify the system definition for the current region and then restart it. You may change the value in an active CICS region by using the CICSPlex SM MAS object. When the region restarts it will revert to the value specified in the system definition.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Task load health threshold	WLMTHRSH	This specifies a percentage threshold of the current region's task load, which is calculated by dividing the current task count by the maximum task count. When the load for a target region reaches this threshold, then WLM considers the region to be relatively unhealthy. This will cause higher link weights to be applied to the WLM routing algorithm when evaluating this region. When a target scope covers local and remote regions relative to the router, then WLM will favour local targets over remote ones. The effect of this attribute is that when this load threshold in the local regions is achieved, then WLM will start to favour remote targets instead. When all targets in the scope achieve this load threshold, then WLM will revert to favouring local targets again. The value range is from 1 to 100, and the default value is 60. This value is specified within the CICSPlex SM CICS System Definition object. If you want this value to be changed, you must modify the system definition for the current region and then restart it. You may change the value in an active CICS region by using the CICSPlex SM MAS object. When the region restarts it will revert to the value specified in the system definition. If this value is set to 0, then the current region is not at a high enough level to support the use of this attribute. You will not be able to change it, and the WLM route decision process will ignore it.

Table 16. Fields in WLMATARG views (continued)

Field	Attribute name	Description
Workload count	WRKLDCNT	This is a count of the workloads which have designated this region as a dynamic routing target. The workload count is set to zero (0) if: • the reporting CMAS is not the owning CMAS. • the owning CMAS is a version prior to CICS TS 4.1. • the owning CMAS is participating in a workload but has no routers connecting to it.

Definitions - WLMAWDEF

The **Active workload definition** (WLMAWDEF) views display information about active workload definitions installed in a workload that is within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Definitions

*Table 17. Views in the supplied **Active workload definitions** (WLMAWDEF) view set*

View	Notes
Active workload definitions EYUSTARTWLMAWDEF.DETAILED	Detailed information about a selected workload definition.
Active workload definitions EYUSTARTWLMAWDEF.DISCARD	Discard an active workload definition.
Active workload definitions EYUSTARTWLMAWDEF.TABULAR	Tabular information about active workload definitions associated with a workload that is within the CICSplex identified as the context.

Actions

Table 18. Actions available for WLMAWDEF views

Action	Description
DISCARD	Discard an active workload definition.

Fields

Table 19. Fields in WLMAWDEF views

Field	Attribute name	Description
Scope name of set of target systems	AORSCOPE	The name of the CICS system or CICS system group to which transactions associated with the workload definition are directed.
Description	DESC	A description of the workload definition.
Terminal LU name	LUNAME	The logical unit name used in matching a transaction with the workload definition.
Workload definition	NAME	The name of the workload definition.
Process type	PROCESSTYPE	The specific or generic process type used in matching a transaction with the workload definition.
		Terminal LU name and User ID must both be set to '*'. A Transaction group of blanks or a specific name can be specified. You may only separate a workload by Transaction group and Process type or by Transaction group, Terminal LU name and User ID.
Transaction group	TRANGRP	The name of the transaction group associated with the workload definition.
		If this field is blank, it means no transaction group was defined; the workload definition is using the default transaction group associated with its workload specification.
		Note: The hyperlink to the WLMATGRP view is not valid when this field is blank.
User ID	USERID	The user ID used in matching a transaction with the workload definition.
Workload name	WORKLOAD	The name of the workload specification to which the workload definition is associated.
System ID of workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Transaction groups - WLMATGRP

The **Active workload transaction groups** (WLMATGRP) views display information about transaction groups installed in a workload that is within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Transaction groups

Table 20. Views in the supplied **Active workload transaction groups** *(WLMATGRP) view set*

View	Notes
Active workload transaction groups EYUSTARTWLMATGRP.ACTIVE	Set the workload active.
Active workload transaction groups EYUSTARTWLMATGRP.DETAILED	Detailed information about a selected transaction group.
Active workload transaction groups EYUSTARTWLMATGRP.DORMANT	Set the workload dormant.
Active workload transaction groups EYUSTARTWLMATGRP.TABULAR	Tabular information about transaction groups associated with a workload that is within the CICSplex identified as the context.

Actions

Table 21. Actions available for WLMATGRP views

Action	Description
ACTIVE	Set the workload active.
DORMANT	Set the workload dormant.
GET	(Required) The name of an active workload.

Fields

Table 22. Fields in WLMATGRP views

Field	Attribute name	Description
Acceptable abend level	ABENDCRIT	The abend probability for a transaction associated with the default transaction group that should cause a target region to be considered unhealthy.
Acceptable target region load level	ABENDTHRESH	The abend probability for a transaction associated with the default transaction group that should cause a target region's load level to be doubled.

Table 22. Fields in WLMATGRP views (continued)

Field	Attribute name	Description

Automatic affinity creation	AFFAUTO	Indicates whether CICSPlex SM is to automatically create an affinity relationship for transactions associated with the transaction group.
		• YES
		  – An affinity is created using the values in the Affinity relationship and Affinity lifetime fields.
		• NO
		  – An affinity is not automatically created (but can be created by a customized version of the dynamic routing program EYU9WRAM).
		• N/A
		  – There are no values in the **Affinity relationship** and **Affinity lifetime** fields, therefore, no affinity is created.

Affinity relationship	AFFINITY	The affinity relation used when processing occurrences of the transaction group. The affinity relation values are: • GLOBAL - All users at all terminals • LUNAME - Terminal logical unit name • NONE - No affinity was defined • N/A - This field is not applicable • USERID - User ID • BAPPL - CICS BTS Business Application

Table 22. Fields in WLMATGRP views (continued)

Field	Attribute name	Description
Affinity lifetime	AFFLIFE	The affinity lifetime to be used when processing occurrences of the transaction group. The affinity lifetime values are: • DELIMIT - Until the pseudoconversation mode is END • LOGON - For the duration of the terminal session • PCONV - For the duration of the pseudoconversation • PERMANENT - As long as the workload is active • SIGNON - As long as the user session is active • SYSTEM - As long as the AOR to which transactions are routed is active • ACTIVITY - As long as the CICS BTS activity is active • PROCESS - As long as the CICS BTS process is active • NONE - No affinity lifetime was defined • N/A - This field is not applicable
Event name	EVENTNAME	The name of an analysis definition (RTADEF) or status definition (STATDEF) that may affect the routing of transactions in this workload. If a real-time analysis event is generated by this definition, WLM uses the information as part of the AOR selection criteria. An analysis or status definition can optionally be associated with a workload when the workload specification is created. If this field is blank, no analysis or status definition is associated with the workload. **Note:** The EVENT view is displayed only if an event of the specified type has occurred.
Primary search criterion	FILTER	Identifies whether the user name (USERID) or the logical unit name (LUNAME) is to be used as the primary search criteria for transactions associated with the transaction group.

Table 22. Fields in WLMATGRP views (continued)

Field	Attribute name	Description
Transaction group status	STATUS	Indicates how an AOR is to be selected for transactions associated with the transaction group: • ACTIVE - Selects an AOR from the AOR scope identified with the associated workload definition. • DORMANT - Uses the AOR associated with the transaction when it was defined to CICS.
Transaction group	TRANGRP	The name of the transaction group.
Workload	WORKLOAD	The name of the workload in which the transaction group is active.
Workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Dynamic transactions - WLMATRAN

The **Active workload dynamic transactions** (WLMATRAN) views display information about installed dynamic transaction definitions associated with a workload that is within the CICSplex identified as the context.

Supplied views

To access from the main menu, click:

Active workload views > Dynamic transactions

Table 23. Views in the supplied **Active workload dynamic transactions** *(WLMATRAN) view set*

View	Notes
Active workload dynamic transactions EYUSTARTWLMATRAN.DETAILED	Detailed information about a selected active transaction.
Active workload dynamic transactions EYUSTARTWLMATRAN.FORCE	Discard a transaction from a transaction group.
Active workload dynamic transactions EYUSTARTWLMATRAN.TABULAR	Tabular information about active transactions associated with a workload that is within the CICSplex identified as the context.

Actions

Table 24. Actions available for WLMATRAN views

Action	Description
FORCE	Discard a transaction from a transaction group.

Fields

Table 25. Fields in WLMATRAN views

Field	Attribute name	Description
Start or end of pseudo-conversation	PSEUDOMODE	Indicates whether the transaction is the first (START) or last (END) transaction in a pseudo-conversation. If this field is blank, it means the transaction is neither the first nor the last in a pseudo-conversation.
Transaction group	TRANGRP	The name of the transaction group.
Transaction	TRANID	The identifier of an active transaction.
Workload name	WORKLOAD	The name of the workload in which the transaction group is active.
System ID of workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Transaction group affinities - WLMATAFF

The **Active workload transaction group affinities** (WLMATAFF) views display information about the active affinities for a transaction group installed in a workload within the CICSplex identified as the context. An affinity becomes active when the first transaction associated with the transaction group is routed to a target region.

Supplied views

To access from the main menu, click:

Active workload views > Transaction group affinities

Table 26. Views in the supplied **Active workload transaction group affinities** *(WLMATAFF) view set*

View	Notes
Active workload transaction group affinities EYUSTARTWLMATAFF.DETAILED	Detailed information about a selected active affinity.
Active workload transaction group affinities EYUSTARTWLMATAFF.FORCE	Discard an affinity entry. The affinity is reestablished when the next transaction within the affected transaction group is encountered.
Active workload transaction group affinities EYUSTARTWLMATAFF.TABULAR	Tabular information about the active affinities for a transaction group associated with a workload within the CICSplex identified as the context.

Actions

Table 27. Actions available for WLMATAFF views

Action	Description
FORCE	Discard an affinity entry. The affinity is reestablished when the next transaction within the affected transaction group is encountered.

Fields

Table 28. Fields in WLMATAFF views

Field	Attribute name	Description
Affinity relationship	AFFINITY	The affinity relation used when processing a transaction associated with the transaction group. The affinity relation values are: • GLOBAL - All users at all terminals. • LUNAME - Terminal logical unit name. • NONE - No affinity relation was defined. • USERID - User ID. • BAPPL - CICS BTS Business application.
Target region	AOR	The name of the CICS system to which transactions associated with the transaction group are to be routed.
BTS activity ID	CBTSKEY	The hexadecimal representation of the Affinity Key. It is shown in this additional format because part of the key may not be displayable in normal character representation.

Table 28. Fields in WLMATAFF views (continued)

Field	Attribute name	Description
Key that identifies creator of affinity	KEY	Up to 52 characters identifying who invoked a transaction, comprising the transaction group and their location. Depending on the affinity relation and lifetime values, this key will be some combination of the user ID, logical unit name, routing region name, and terminal ID, in the following format: userid.luname.rtrname.termid. If one or more of these values does not apply to the affinity, that part of the key is left blank. For BAPPL affinities, this field contains the Activity ID of the CICS BTS activity. A value of **GA** is displayed for global affinities.
Affinity lifetime	LIFETIME	The affinity lifetime used when processing a transaction associated with the transaction group. The affinity lifetime values are: • DELIMIT - Until the pseudoconversation mode is END. • LOGON - For the duration of the terminal session. • NONE - No affinity lifetime was defined. • PCONV - For the duration of the pseudoconversation. • PERMANENT - As long as the workload is active. • SIGNON - As long as the user session is active. • SYSTEM - As long as the target region is active. • ACTIVITY - As long as the CICS BTS activity is active. • PROCESS - As long as the CICS BTS process is active.
Terminal LU name	LUNAME	The logical unit name of the terminal of the CICS system to which transactions associated with the transaction group are to be routed.
The activity ID of the CBTS activity	RESERVD2	The ID of the CBTS activity.
Routing region terminal	TERMID	The terminal ID of the CICS system to which transactions associated with the transaction group are to be routed.

Table 28. Fields in WLMATAFF views (continued)

Field	Attribute name	Description
Routing region	TORNAME	The name of the CICS system to which transactions associated with the transaction group are to be routed.
Transaction group	TRANGRP	The name of an active transaction group. A value of **$$DTGA$$** represents the default transaction group, which is used for any transactions that are not associated with a transaction group.
User identifier	USERID	The user identifier ID.
Workload name	WORKLOAD	The name of the workload in which the transaction group is active.
System ID of workload owner	WRKLOWNER	The 4-character CICS system ID of the CMAS that created the workload.

Chapter 9. About workload view route fields

Use the "Active workload target distribution factors" and "Summarized active target region distribution trends" views together with route fields statistics displayed in the active workload views to understand what is happening in workload management.

You can use the route fields statistics information in the "Summarized active target region distribution trends" view to verify that your existing workload is running correctly, and that it is not losing transactions. The "Summarized active target region distribution trends" view also provides a new perspective on events inside WLM during the routing process.

Using the "Active workload views", you can highlight potential issues with your setup. For example, if routing is called and continually retrying to discover other available targets.

You can see counts of what is happening inside WLM; for example, the number of `Route completes` versus the number of `Route selects`. An example of this is the `Route notifies` field which shows you when you are linking to a program that is defined as **DYNAMIC(YES)** and you have provided a SYSID.

Using the "Summarized active target region distribution trends" view with the "Active workload target distribution factors" view can help you understand WLM routing decisions and behavior of CICSPlex SM. You might want to understand why some regions are receiving more work than others, and an analysis of `Route Selections` shows which regions are receiving more work than others.

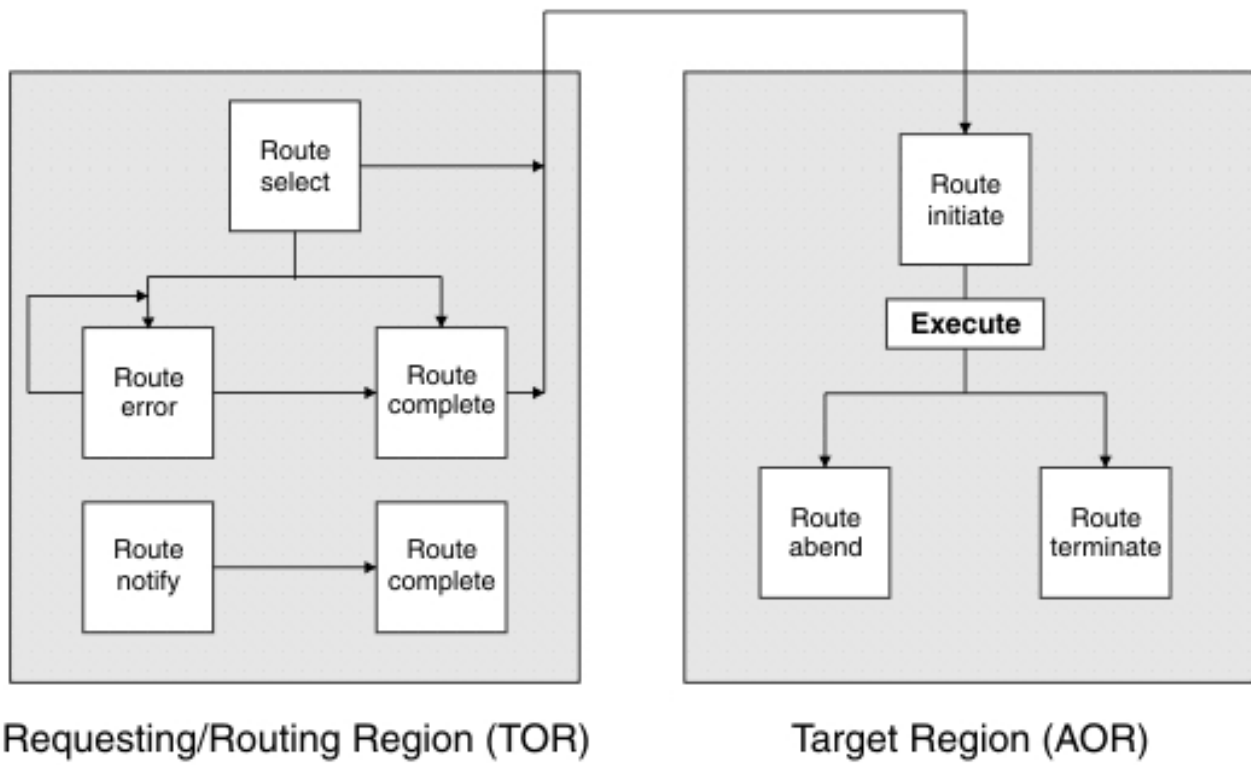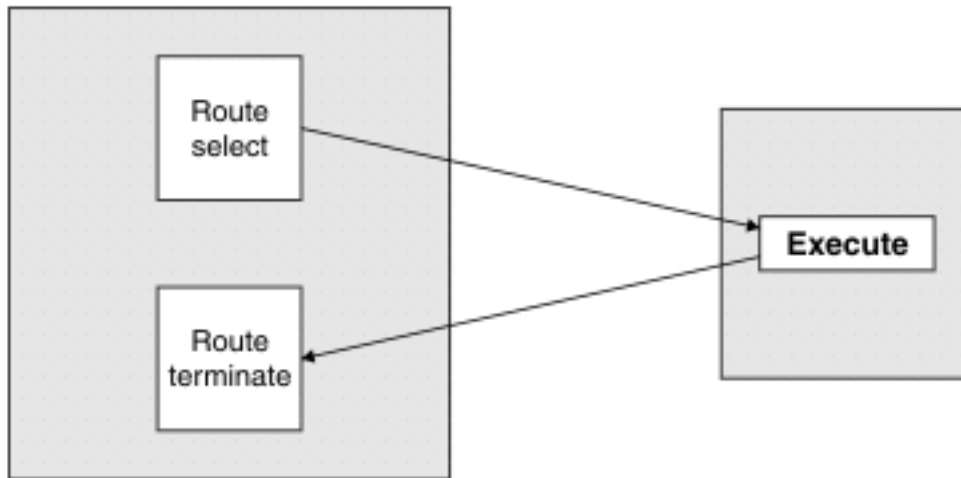Figure 10 on page 120 illustrates the route field processes involved in distributed routing.

Requesting/Routing Region (TOR)   Target Region (AOR)

Figure 10. Conceptual view of distributed routing

Figure 11 on page 121 illustrates the route field processes involved in dynamic routing.

Requesting/Routing Region (TOR)   Target Region (AOR)

Figure 11. Conceptual view of dynamic routing

These definitions describe the route fields:

Route select
> Route select is updated when this region is selected as a target by CICSPlex SM workload management.

Route initiate
> Route initiate is updated when a task routed using the distributed workload model starts on a target system.

Route error
> Route error is updated when the region selected by CICSPlex SM is unreachable; for example, the connection is out of service, or no sessions are available. CICSPlex SM then attempts to select another region. This reselection is not counted as a Route select, and the Route select count for any subsequent region is not updated. A high number of route errors can indicate that there are insufficient sessions to run the workload. The lack of sessions can cause increased response time and CPU time because CICSPlex SM must try the routing again, potentially several times.

Route complete
> Route complete is updated when a task that is routed using the distributed workload model starts on the target system. Route complete indicates to the routing system that its responsibility for this task is complete.

Route notify
> Route notify is updated when a task is routed to a target region that is selected by the SYSID option on the LINK or START command. Route notify informs CICSPlex SM of the routing; CICSPlex SM does not choose the region. Route notify is a variant of static routing, in which the program or transaction is defined as Dynamic, but the API that calls it specifies a SYSID.

Route abend

Route abend is updated when a task is routed to a target region and subsequently abends; for example, because the transaction is not defined in that system or the program is unavailable.

Route terminate

Route terminate is updated when a task has completed in a target region, whether at the end of a distributed program link (DPL) or a dynamic transaction routing (DTR) request, or when a task that is routed using the distributed workload model finishes.

Related reference:

"Active target regions - WLMATARG" on page 93
The **Target regions in an active workload** (WLMATARG) views display information about all target regions that are associated with workloads within the CICSplex identified as the context.

Related information:

When the dynamic routing program is invoked

When the distributed routing program is invoked

Chapter 10. Example tasks

All the workload management examples are based on the same configuration. The CICSplex, PLXPROD1 consists of one TOR, CICSPT01, and three AORs, CICSPA01, CICSPA02, and CICSPA03. You will see how the roles played by these CICS regions vary, depending on the nature of the individual task.

These sections include a number of typical workload management example tasks and illustrates how these tasks can be carried out using the Web User Interface (WUI).

For any task, you must be aware of the scope, that is, of the CICS systems, with which you are working. If the scope is a single CICS system, any data you retrieve from CICSPlex SM relates to that single system. If the scope is a group of CICS systems, the data relates to all of the systems in the group. If the scope is a CICSplex, the data relates to every system in that CICSplex. For all of the examples in these sections, the initial scope is CICSplex PLXPROD1.

Managing a workload

This example describes how to use the Web User Interface (WUI) to get CICSPlex SM to manage a workload - that is, to route all work from a single routing region to a suitable target region.

For this task, a "suitable" target region is the one with the shortest queue of work requests, relative to the maximum number of tasks permitted in the target region. This queue of work, also called the load count, is the queue of all active and queued user tasks. By default, tasks queued for both MAXTASKS and TRANCLASS are included in the load count. Use of the "Task load queue mode" attribute in the CSYSDEF resource table allows sites to exclude tasks queued for TRANCLASS from the load count. For more information about the "Task load queue mode" attribute in the CSYSDEF resource table, see CICS system definitions - CSYSDEF.

The TOR (CICSPT01) is the requesting region and the routing region, and the three AORs (CICSPA01, CICSPA02, and CICSPA03) are all target regions. None of the CICS regions are currently running.

If some of your work requests cannot be routed freely (perhaps you want work requests from a particular user always to go to the same target region, for example), do not worry. You will see how to add that requirement in a later example task ("Routing a specific transaction to a specific target region" on page 138).

1. Create a CICS system group that includes all the target regions among which the work requests ("the workload") can be routed dynamically.
   - From the main menu, click **Administration views > Topology administration views > System groups** to open the **System group definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the **Create...** button, to open the **System group definitions** create view.
   - Type in the following:

System group name	CSGTGTS1
Description	All target regions in CICSplex PLXPROD1

- Click **Yes** to create the system group

  The **System group definitions** tabular view is redisplayed, this time showing an entry for CICS system group CSGTGTS1.

  At this point, the group CSGTGTS1 exists, but is empty.

2. The next step is to tell CICSPlex SM which target regions belong to the group. To add target regions to CICS system group CSGTGTS1:
   - From the main menu click **Administration views > Topology administration views > System definitions** to open the **CICS system definitions** tabular view
   - Select the entries for the CICS systems CICSPA01, CICSPA02, and CICSPA03 and click the **Add to CICS system group...** button.
   - In the **Group which member will join** field, type in CSGTGTS1 and click **Yes to 3 remaining**. This adds the three selected systems to your new group.

3. Create a workload specification:
   - From the main menu click **Administration views > Workload manager administration views > Specifications** to open the **WLM specifications** tabular view.
   - Click the **Create...** button, and provide the following information:

WLM specification name	WLSPAY01
Description	Manage payroll workload in PLXPROD1
Primary search criterion	User ID
Default target scope	CSGTGTS1
Algorithm type	QUEUE

Leave the remaining fields empty or accept the defaults.

Note:
- A **Primary search criterion** value of user ID is shown in this example, though in fact it does not matter whether you specify user ID or LUNAME, because the **Primary search criterion** value has no effect on simple workload routing. It is used only for some kinds of workload separation, which is the subject of a later example. You must supply a value because CICSPlex SM does not know, at this stage, that you are not going to use this workload specification for workload separation.
- The **Default target scope** value is the name of the single target region, or group of target regions, to which work requests can be routed.
- The **Algorithm type** value, QUEUE, tells CICSPlex SM to select the target region that has the shortest queue of work requests.
- The **Description** is optional, but is worth providing. (When you are confronted with a list of specification names, and have no way of telling one from another, you will appreciate its value.)

Click **Yes**. The **WLM specification** tabular view is redisplayed, this time showing an entry for the new WLM Specification, WLSPAY01.

4. Tell CICSPlex SM about the region that is going to be routing the work requests to the target regions in group CSGTGTS1. To associate the workload specification with a routing region:
   - In the **WLM specifications** view, select the entry for the WLSPAY01 specification, and click the **Associate CICS system...** button.
   - In the **CICS system** field, enter the name of the routing region (CICSPT01, in this example) and click **Yes**.

To check that the association between the routing region and the workload specification has worked:

- On the **WLM specifications** tabular view, click the name WLSPAY01 to show the details of this specification.
- Click the link **CICS systems associated with this workload specification** to show the **WLM specifications to CICS system links** tabular view (LNKSWSCS object).

Note: You can also access this view from the main menu by clicking **Administration views > Workload management administration views > Specifications to system links**.

5. Activate workload management in the routing region:
   - From the main menu click **Administration views > Topology administration views > System definitions** to open the **CICS system definitions** tabular view.
   - Select the entry for CICSPT01 and click the **Update...** button, to open a detail view of CICSPT01.
   - Change the **AOR dynamic routing mode** field to YES. Click **Yes** to return to the **CICS system definition** tabular view.

   This change takes effect when the target region CICSPT01 is next started.

6. Activate workload management in the target regions:
   - From the **CICS system definitions** tabular view, select the entry for CICSPA01 and click the **Update...**, to open a detail view of CICSPA01.
   - Change the **Workload manager status** field to YES from the drop-down menu. Click **Yes** to return to the **CICS system definitions** tabular view.

   This change takes effect when the target region CICSPT01 is next started.

   Repeat this step for target regions CICSPA02 and CICSPA03.

When the routing region and the target regions have been started, you can check that the workload is active from the main menu by clicking **Active workload views > Active workloads**. This opens the **Active workloads** tabular view, showing the workload specification WLSPAY01 as active.

To see which target regions are being routed to, click **Active workload views > Target regions in an active workload**. The displayed view shows all active target regions being routed to by workload WLSPAY01. All the target regions listed belong to the CICS system group CSGTGTS1.

How to establish an optimized workload

You can use a CICS region status server to share CICS region status data in a sysplex rapidly to support optimized workload management. A region status server services only region status requests, rather than region status and user application requests.

About this task

CICS region status data is broadcast to the sysplex using a data table named after the hosting CICSplex for the region. Each region in the CICSplex is described by a single record in the CICSplex data table. The data tables are held in coupling facility structures, with access controlled by a coupling facility data table (CFDT) server. You must set up one CFDT server for each pool in an MVS image.

You can put related groups of region status tables in separate pools. For example, you might have one pool for production and another for test. A pool is defined as a list structure in the coupling facility resource management (CRFM) policy. The pool name is used to form the server name with the prefix DFHCF and is specified in the startup JCL for the server.

Note: You must use different pool names for your region status server if you have two separate CICSplexes of the same name in the sysplex.

To set up and manage a region status server, follow these steps:

Procedure

1. Optional: For the best performance, define a list structure for a region status server pool. For more information, see Defining a list structure for a region status server.

   This step is optional if you have an existing CFDT pool that you can use to store your CICSplex data tables. However, the throughput of your optimized workloads might be impeded by any user application activity to the specified pool name, and any application throughput to the pool might be affected by the sysplex optimized workloads.

   Note: You must use a different pool name from the pool name that you use for the RS server if you already have a CFDT with the same name as your CICSplex.

2. Define and start a region status server job to run in an MVS batch region. For more information, see Defining and starting a region status server region.

What to do next

After you have successfully started your region status server, you can issue commands to manage the region status server and delete it if required. For more information, see Controlling region status servers and Deleting region status server pools.

Related concepts:

"Optimized dynamic workload routing implementation" on page 29
CICSPlex SM provides dynamic workload management for CICS. CICSPlex SM can augment its workload management decisions using current status information posted directly from CICS by using a region status (RS) server.

Defining a list structure for a region status server

The region status server pool is defined in the list structure for a coupling facility data table. You define the list structure in a coupling facility resource manager (CFRM) policy.

About this task

You must allocate storage in the coupling facility to store CICS status.

CICS records the status of a CICS region in a coupling facility data table named after the CICSplex to which the region belongs. That table must belong to a CFDT pool that is named in the CICSplex definition for that CICSplex. The default name is DFHRSTAT. In each z/OS image, there must be a region status server for each

region status pool that will serve the CICS regions belonging to that CICSplex. A CICSplex data table contains one region status record for each region in that CICSplex.

Define the structure in the current coupling facility resource management (CFRM) policy using the IXCMIAPU utility. For an example of this utility, see member IXCCFRMP in the SYS1.SAMPLIB library. An example of a policy statement for a region status server pool is shown Figure 12 on page 128.

Procedure

1. Specify the name of the list structure. The name is formed by adding the prefix DFHCFLS_ to your chosen pool name, giving DFHCFLS_*poolname*. The default pool name as implemented by CPSM is DFHRSTAT.

   You define and modify CICSplexes using the EYUSTARTCPLEXDEF view set. Using the CPLEXDEF detail view, you can modify the coupling facility (CF) tuning parameters for the region status (RS) server, which provide sysplex optimized workload routing.

   Note: You can also modify the default region status (RS) pool name that will be used by all regions in the CICSplex. When you do not to use the default name DFHRSTAT, you must change the name before starting any other regions in the CICSplex. CPSM will not prevent you from changing the pool name while the CICSplex is active. If you make a change while the CICSplex is active, all CMAS and MAS regions in the CICSplex must be restarted as soon as possible. Failure to do so can result in inconsistent data in the CPSM WLM views and WLM optimization is deactivated until all the regions in the CICSplex are restarted.

2. Specify the size of the list structure. You can allocate an initial and maximum size using the **INITSIZE** and **SIZE** parameters in the CRFM policy definition. For an accurate estimate of storage requirements, use the IBM CFSizer tool available at http://www.ibm.com/systems/support/z/cfsizer/.

   A region status record is approximately 40 bytes long.

   For example, if PLEX1 contains 100 regions, PLEX2 contains 300 regions, and PLEX3 contains 1000 regions, the required structures are as follows:

   - Poolname = DFHRSTAT, Table name = PLEX1, 100 regions x 40 bytes = 4 000 bytes total
   - Poolname = DFHRSTAT, Table name = PLEX2, 300 regions x 40 bytes = 12 000 bytes total
   - Poolname = DFHRSTAT, Table name = PLEX3, 1000 regions x 40 bytes = 40 000 bytes total

3. Specify the preference list of coupling facilities in which the policy can be stored.

4. When you have updated the CFRM new policy with the new structure definition, activate the policy using the MVS command:

   `SETXCF START,POLICY,POLNAME=`*policyname*`,TYPE=CFRM.` Where policyname is the CFRM policy being st

   Note that defining the CFRM policy statements for a list structure does not create the list structure. The structure is created the first time an attempt is made to connect to it, which occurs when the first coupling facility data table (CFDT) server that refers to the corresponding pool is started.

Example

```
 STRUCTURE  NAME(DFHCFLS_DFHRSTAT)
    SIZE(1000)
    INITSIZE(500)
    PREFLIST(FACIL01,FACIL02)
```

Figure 12. Example definition of a list structure for region status servers

Defining and starting a region status server region

When you start a region status server, you activate a pool in an MVS image for that server.

Before you begin

Before you start a region status server region, you must define the region status server structure to be used for the pool. For information about defining a region status server list structure, see Defining a list structure for a region status server.

About this task

You can start the server as a started task, started job, or as a batch job. This task explains how to start a region status server job, to run in an MVS batch region. The job or task must start the region status server program, DFHCFMN, from the CICS authorized library, CICSTS41.CICS.SDFHAUTH.

Procedure

1. Specify the DFHCFMN program either in a SYSIN data set defined in the JCL, or in the **PARM** parameter on the EXEC statement.
2. Specify the mandatory and optional startup parameters for the DFHCFMN program. If you specify a startup parameter in both the SYSIN data set and the **PARM** parameter, the **PARM** value overrides the SYSIN value because the **MVS START** command can override the **PARM** value.
   a. You must specify a SYSPRINT DD statement for the print file.
   b. You must specify a SYSIN DD statement for the server parameters.

      Tip: To ensure that all pool-related parameters are consistent across MVS images, you must use the same SYSIN parameter data set, or an identical copy of it, for all servers accessing the same pool, and to specify in the PARM field any parameters that vary between servers.
   c. You must specify the region status pool name.
   d. You can specify the **REGION** parameter. This parameter ensures that the coupling facility data table server region has enough storage to process the maximum number of data table requests that can run concurrently.
   e. You can specify **TIME=NOLIMIT**. The server task remains in a wait, during most normal processing, because server processing is performed under the TCB of the client CICS region. If you omit this parameter, your server job might fail with abend S522 (wait limit exceeded), depending on the JWT value specified in the SMFPRM*xx* member of SYS1.PARMLIB.
   f. Specify additional parameters as required. For example, you might want to control the maximum number of queues that are to be supported in the pool and the number of buffers that the server is to allocate.

Results

The region status server is running, ready to receive and broadcast region status data to the CICS regions connected to it. The CICS regions connect through the poolname specified in the CICSplex definition.

Region status server JCL example

```
//PRODRSS1 JOB  ...
//RSSERVER EXEC PGM=DFHCFMN,REGION=40M,TIME=NOLIMIT    CICS CFDT Server for RS
//STEPLIB  DD   DSN=CICSTS41.CICS.SDFHAUTH,DISP=SHR    Authorized library
//SYSPRINT DD   SYSOUT=*                               Messages and statistics
//SYSIN    DD   *
POOLNAME=DFHRSTAT                                      Pool name
MAXTABLES=100                                          Allow up to 100 tables
/*
```

Figure 13. Sample JCL to start a region status server address space

Controlling region status servers

You can issue commands to control a region status server, using the MVS **MODIFY (F)** command to specify the job or started task name of the server region, followed by the server command.

About this task

The general form of an MVS modify command, using the short form F, is as follows:

F *job_name,command parameters...* comments

You use the MODIFY command to pass information to a job or started task. In this task, you use the following commands to control the region status servers.

Procedure

- To modify the server initialization parameters, use the MVS **SET** command:

  SET *keyword=operand[,keyword=operand,...]*

  The **SET** command can be abbreviated to **T**, as for the MVS **SET** command. See The SET command options for details.
- To display the values of one or more parameter values or statistics summary information on the console, use the **DISPLAY** command:

  DISPLAY *keyword[=operand][,keyword[=operand,]...]*

  The valid keywords for **DISPLAY** are all the initialization parameters, plus an additional set described under DISPLAY and PRINT command options.
  The **DISPLAY** command can be abbreviated to **D**, as for the MVS **DISPLAY** command.
- To print the output that the **DISPLAY** command produces, use the MVS **PRINT** command:

  PRINT *keyword[=operand][,keyword[=operand,]...]*

  The **PRINT** command produces the same output as DISPLAY, supporting the same keywords, but on the print file only.
- To delete a table, use the **DELETE TABLE**=*name* command. The table must not be in use for this command to succeed. You can abbreviate the command to **DEL**.

- To stop the server normally, use the **STOP** command. The server waits for any active connections to end first, and prevents any new connections while it is waiting. You can abbreviate the command to **P**. You can also use the **MVS STOP** command, which is equivalent to issuing the server STOP command through the **MVS MODIFY** command. The syntax of the **STOP** command is:

  STOP|P *[jobname.]identifier*[**,**A=*asid*]

- To terminate the server immediately, use the **CANCEL** command. You can also specify whether the server automatically restarts with the RESTART option. For information about CANCEL RESTART see The CANCEL command options.

- The server also responds to Cross System Extended Services (XES) events such as an operator **SETXCF** command to alter the structure size. If the server can no longer access the coupling facility, it automatically issues a server **CANCEL** command to close itself down immediately.

The SET command options

You can use the SET command to modify groups of server initialization parameters.

These system initialization parameter groups are:

- The statistics parameters
- The debug trace parameters
- The lock wait parameters
- The warning parameters
- The automatic ALTER parameters.

See Coupling facility data table server parameters for details of these keywords.

The following **SET** keywords are used to modify the server's recovery status of an inactive CICS region that had unresolved units of work when it last terminated:

RESTARTED=*applid*
>   Establish a temporary recoverable connection for the given APPLID. This resolves any units of work that were in commit or backout processing when the region last terminated, and indicates whether there are any remaining indoubt units of work.

>   This keyword can be abbreviated to **RESTART** or **REST**.

COMMITTED={*applid*|*applid.uowid***}**
>   Establish a temporary recoverable connection for the specified APPLID and commit all indoubt units of work, or, if *uowid* is also specified, commit that specific unit of work.

>   This command should be used **only** when it is not possible to restart the original CICS region to resolve the work normally, because it can result in inconsistency between coupling facility data table resources and other CICS resources updated by the same unit of work.

>   This keyword can be abbreviated to **COMMIT** or **COMM**.

BACKEDOUT={*applid*|*applid.uowid***}**
>   Establish a temporary recoverable connection for the specified APPLID and back out all indoubt units of work, or, if *uowid* is also specified, back out that specific unit of work.

>   This command should be used *only* when it is not possible to restart the original CICS region to resolve the work normally, because it can result in

inconsistency between coupling facility data table resources and other CICS resources updated by the same unit of work.

This keyword can be abbreviated to **BACKOUT** or **BACK**.

Use the following **SET** parameters to modify options relating to a specific table:

TABLE=name
specifies the table to which the following table-related parameters in the same command are to be applied. This parameter is required before any table-related parameters.

MAXRECS=number
Modify the maximum number of records that can be stored in the table specified by the preceding **TABLE** parameter.

If the maximum number is set to a value less than the current number of records in the table, no new records can be stored until records have been deleted to reduce the current number to within the new maximum limit. For a recoverable table, this also means that records cannot be updated, because the recoverable update process adds a new record on the rewrite operation then deletes the original record when the transaction completes.

This keyword can also be specified as **MAXNUMRECS**.

AVAILABLE={YES|NO}
Specify whether the table named by the preceding **TABLE** parameter is available for new OPEN requests. If the table is made unavailable, a CICS region that subsequently issues an OPEN request for the table receives a response indicating that it is unavailable, but regions that currently have the table open are not affected. Even when a table is marked as unavailable, a server can implicitly open it on behalf of a CICS region to allow recoverable work to be resolved during restart processing.

This keyword can be abbreviated to **AVAIL**.

Examples of the SET command: The following example changes the statistics options:
```
SET STATSOPT=BOTH,EOD=21:00,STATSINT=06:00
```

The following example modifies the maximum number of records allowed in the specified table:
```
SET TABLE=PAYECFT1,MAXRECS=200000
```

DISPLAY and PRINT command options
You can use the DISPLAY (and PRINT) commands to display the values of any initialization parameters plus some additional information.

Some of the parameters that provide additional information support generic names. You specify generic names using the following wildcard characters:

- An * (asterisk symbol). Use this anywhere in the parameter value to represent from 0 to 8 characters of any value. For example, CICSH* to represent all the CICS APPLIDs in a CICSplex identified by the letter H.

- A % (per cent symbol). Use this anywhere in the parameter value to represent only one character of any value. For example, CICS%T* to represent all the TOR APPLIDs in all CICSplexes.

The parameters supported by the DISPLAY and PRINT commands are as follows:

APPLIDS

Display the APPLID and MVS system name for every CICS region that currently has a recoverable connection to the pool. This command returns information not only for the server to which the MODIFY command is issued, but for all other servers connected to the same pool.

This keyword can be abbreviated to **APPLID**, **APPLS** or **APPL**.

APPLID={_applid_|_generic_**}**

Display the APPLID and MVS system name for each region that currently has a recoverable connection to the server's pool, and whose APPLID matches _applid_ or _generic_. This command returns information not only for the server to which the MODIFY command is issued, but for all other servers connected to the same pool.

applid Use this for a specific APPLID, which should match only one region in the sysplex.

generic Use a suitable generic value when you want to obtain information about several regions.

If _applid_ or _generic_ is not specified, the server treats this as equivalent to the command DISPLAY APPLIDS.

This keyword can also be specified as **APPLIDS**, **APPLS** or **APPL**.

ARMREGISTERED

Shows whether ARM registration was successful (YES or NO).

CONNECTIONS

Display the jobnames and applids of the regions currently connected to the server to which the command is issued.

This keyword can be abbreviated to **CONN**.

TABLES

Display the names of all tables currently allocated in the pool.

TABLE={_name_|_generic_name_**}**

Display information about the attributes and status of a specific table, or of a set of tables whose names match the generic name.

If no table name is specified, this is treated as equivalent to DISPLAY TABLES.

TABLEUSERS

Display the CICS APPLIDs of the regions that are currently using each of the tables currently defined in the pool.

This keyword can be abbreviated to **TABLEU**.

TABLEUSERS={_name_|_generic_name_**}**

Display the CICS APPLIDs of the regions that are currently using the specified table, or using each of the set of tables whose names match the generic name.

If no table name is specified, this is treated as equivalent to DISPLAY TABLEUSERS.

This keyword can be abbreviated to **TABLEU**

UOWIDS

Display the applids of all regions that currently have unresolved recoverable units of work, together with the number of units of work that are currently in doubt, or are in the process of being committed or backed out.

This keyword can be abbreviated to **UOWS**.

UOWIDS={_applid_|_generic_applid_**}**v**{**_applid_**.***|_generic_applid_**.*}**
Display, for the specified regions if they currently have unresolved recoverable units of work, information about those units of work. The information returned depends on the form of operand used.

applid | _generic_applid_
This form of operand displays the number of units of work that are currently in doubt, or are in the process of being committed or backed out.

If you specify _applid_, the server displays UOW information for a specific APPLID, which should correspond to only one region in the sysplex.

If you specify _generic_applid_ the server displays UOW information for all the APPLIDs that match the generic APPLID specified.

applid.***** | _generic_applid_.*****
This form of operand displays:

- The state and local UOWID of each individual unit of work, followed by
- A summary of the number of units of work that are currently in doubt, or are in the process of being committed or backed out.

If you specify _applid_.*, the server displays the UOW information for a specific APPLID, which should correspond to only one region in the sysplex.

If you specify _generic_applid_.*, the server displays UOW information for all the APPLIDs that match the generic APPLID specified.

This keyword can be abbreviated to **UOWS**.

UOWID=_applid.uowid_
Display the state of an individual unresolved unit of work, identified by its applid and local unit of work ID (UOWID). Enter the local UOWID as 16 hexadecimal digits.

This keyword can be abbreviated to **UOW**.

DISPLAY and PRINT options for statistics summaries:

Use the following parameters to display or print statistics:

CFSTATS
Display statistics for coupling facility interface accesses and responses from the server.

This keyword can also be specified as **CFST** or **STATSCF**.

POOLSTATS
Display usage statistics for the pool list structure as a whole. This is based on information returned by coupling facility access requests, therefore it is only as current as the most recent request made through the server to which the command is issued.

This keyword can be abbreviated to **POOLST**.

TABLESTATS
Display statistics for requests, processed by the server to which the command is issued, for each table plus a summary of all requests processed, including those that are not table-specific, such as unit of work control.

Note that only tables with a non-zero number of requests since the start of the current statistics interval are shown.

This keyword can also be specified as **TABLEST**.

TABLESTATS={*name***|***generic_name***}**
Display request statistics for the specified table or tables.

name   A specific table name in the pool accessed by the server. Returns statistics for this table only.

generic_name
A generic name that you can use to obtain statistics about a number of tables. Returns statistics for any table name that matches the generic name.

This keyword can be abbreviated to **TABLEST**.

STORAGESTATS
Display main storage allocation statistics for the server address space.

This keyword can be abbreviated to **STORAGEST** or **STGST**.

DISPLAY and PRINT options for combined lists of information:

These keywords represent combined lists of information:

PARAMETERS
Display the main parameter values. These are POOLNAME, SECURITY, SECURITYPREFIX, statistics options, and list structure options.

This keyword can be abbreviated to **PARM** or **PARMS**.

ALLPARAMETERS
Display all parameter values.

This keyword can be abbreviated to **ALLPARMS**.

STATISTICS
Display all available statistics.

This keyword can be abbreviated to **STAT** or **STATS**.

INITIALIZED
Display the parameters and statistics that are usually displayed when initialization is complete. This is equivalent to PARM, POOLSTATS, STGSTATS.

This keyword can be abbreviated to **INIT**.

ARM
Display all ARM-related parameter values:
- ARMELEMENTNAME
- ARMELEMENTTYPE
- ARMREGISTERED

This keyword can be coded as **ARMSTATUS**.

The CANCEL command options
You can use the CANCEL command to request an automatic restart.

Specify the following parameter:

RESTART={NO∨YES}

Terminate the server immediately, specifying whether or not automatic restart should be requested. The default is RESTART=NO.

If the server encounters an unrecoverable problem with the coupling facility connection, consisting either of lost connectivity or a structure failure, it cancels itself using the CANCEL RESTART=YES command. This terminates the existing connection and shuts down the server. A new instance of the server job is then started.

A server can also be restarted explicitly using either the server command CANCEL RESTART=YES or the MVS command CANCEL jobname,ARMRESTART.

You can also enter RESTART on its own for RESTART=YES, NORESTART for RESTART=NO.

Deleting region status server pools

You can delete a region status server pool by deleting its coupling facility list structure. You might do this for a service upgrade, or when a clean sysplex restart is required.

Before you begin

You can delete a structure only when no servers are connected to the pool; otherwise, MVS rejects the command.

About this task

For example:

```
SETXCF FORCE,STRUCTURE,STRNAME=DFHCFLS_poolname
```

You can verify that the pool has been successfully deleted by issuing the XCF command shown here:

```
D XCF STRUCTURE,STRNAME=DFHCFLS_poolname
```

Note that if you delete a region status server structure while CICS regions and workload are running, you disable CICSPlex SM WLM optimized functions.

What to do next

When you attempt to start a server for a pool that has been deleted (or attempt to reload the pool), it is allocated as a new structure. The newly allocated structure uses size and location attributes specified by the currently active CFRM policy and other values determined by the server initialization parameters (in particular, **MAXTABLES**).

Adding a region to an existing target region scope

This example describes how to use the Web User Interface (WUI) to increase the number of regions in an existing target scope without disrupting an existing workload.

Assume that you have implemented workload management in CICSplex PLXPROD1, using workload specification WLSPAY01, and that work requests are being routed among target regions CICSPA01, CICSPA02, and CICSPA03. These target regions all belong to CICS system group CSGTGTS1. Now you want to add

a fourth region CICSPA04 to group CSGTGTS1. Region CICSPA04 has been defined to CICSplex PLXPROD1 and is running and is linked to the routing region CICSPT01

1. Add target region CICSPA04 to CICS system group CSGTGTS1.
   - From the Web User Interface main menu click **Administration views > Topology administration views > System definitions** to open the **CICS system definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Select the entry for CICSPA04, and click the **Add to CICS system group...** button. The **Add to CICS system group** view is displayed.
   - In the **Group which member will join** field, enter the name CSGTGTS1 and click **Yes**.

2. Update the CICSPlex SM definition of target region CICSPA04:
   - From the **CICS system definitions** tabular view, select the entry for CICSPA04 and click the **Update...** button.
   - Change the **Workload manager status** field to YES from the menu. Click **Yes** to confirm the update.

   This change takes effect when the target region CICSPA04 is next started.

   When the target region CICSPA04 has been started, you can check that the workload is active by clicking **Active workload views > Target regions in an active workload**. This opens the **Target region in an active workload** view showing all target regions (including CICSPA04) to which work requests in this workload can be routed.

Removing a region from a target region scope

CICS system group CSGTGTS1 contains four target regions (CICSPA01, CICSPA02, CICSPA03, and CICSPA04) in CICSplex PLXPROD1. Work requests are distributed among these target regions, and the routing is controlled by workload specification WLSPAY01.

This example describes how to use the Web User Interface (WUI) to remove region CICSPA04 from the group CSGTGTS1, without disrupting the active workload.

1. Remove target region CICSPA04 from CICS system group CSGTGTS1:
   - From the Web User Interface main menu click **Administration views > Topology administration views > System groups** to open the **System group definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click CSGTGTS1 in the **System group name** field to open a detail view and click the **CICS systems in this CICS system group** link. This opens the **CICS system to CICS system group links** tabular view.
   - Click the Record check box beside the entry for CICSPA04 and click the **Remove...** button. This opens the **Remove** confirmation view.
   - Click **Yes** to confirm the update.

2. To check that CICSPA04 has been removed, from the main menu click **Active workload views > Target regions in an active workload**. This opens the **Target region in an active workload** view showing all target regions to which the workload can be routed. CICSPA04 should not appear in the list.

Adding a routing region to an active workload

This example describes how to use the Web User Interface (WUI) to add a routing region to an active workload, without disrupting that workload.

Assume that you are still managing the workload in CICSplex PLXPROD1, using workload specification WLSPAY01, and that work requests are being routed by CICSPT01 among the target regions in CICS system group CSGTGTS1. Now you want to add a second routing region - CICSPT02 - to the workload. Region CICSPT02 has been defined to CICSplex PLXPROD1 (using the **CICS system definitions** views), is running, and is linked to the target regions CICSPA01, CICSPA02, and CICSPA03.

1. Update the CICSPlex SM definition for CICS system CICSPT02:
   - From the Web User Interface main menu click **Administration views > Topology administration views > System definitions** to open the **CICS system definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Select the record for CICSPT02 and click the **Update...** button.
   - Change the **AOR dynamic routing mode** field to YES.
   - Click **Yes** to confirm the update. This change takes effect when routing region CICSPT02 is next started.

2. Associate CICSPT02 with workload specification WLSPAY01:
   - From the main menu, click **Administration views > Workload manager administration views > Specifications**.
   - On the **WLM specifications** view, click the Record check box beside the entry for WLSPAY01 and click the **Associate CICS system...** button.
   - In the **CICS system** field, type in CICSPT02 and click **Yes** to confirm the update.

When CICSPT02 has been restarted, you can verify that it has been added to WLSPAY01 as follows:
- Open the **WLM specification** tabular view and click on the entry for WLSPAY01. This opens a detail view.
- Click the **CICS systems associated with this workload specification** link. Both CICSPT01 and CICSPT02 should be listed in the **WLM specifications to CICS system links** tabular view.

To check that CICSPT02 is part of the active workload, from the main menu, click **Active workload views > Routing regions in an active workload** This opens a tabular view showing entries for both CICSPT01 and CICSPT02.

Quiescing a target region in an active workload

This example describes how to use the Web User Interface (WUI) to quiesce the target region CICSPA03, which belongs to the active workload WLSPAY01.

You might need to do this so that you can apply maintenance to a region, for example. The regions CICSPT01 and CICSPT02 are routing work requests among three target regions (CICSPA01, CICSPA02, and CICSPA03) when you perform this task.

1. List the target regions associated with workload WLSPAY01.
   - From the Web User Interface main menu click **Active workload views > Target regions in an active workload** to open the **Target region in active workload** view.

If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.

- In the **Workload name** field type WLSPAY01 and click **Refresh**. This redisplays the **Target region in active workload** view. The three CICS regions CICSPA01, CICSPA02 and CICSPA03 are listed. Their status is active.

2. Quiesce target region CICSPA03:
   - On the **Target region in active workload** view, select the entry for target region CICSPA03 and click the **Quiesce...** button. This opens the **Quiesce** confirmation view.
   - Click **Yes** to confirm the action. The **Target region in active workload** view is redisplayed, showing the **Target region status** value for CICSPA03 changed to QUIESCED. No new work requests are routed to the target region, though any work already running there is allowed to complete.

Routing a specific transaction to a specific target region

This example describes how to use the Web User Interface (WUI) to define some workload separation requirements to CICSPlex SM. Specifically, you want CICSPlex SM always to route the transaction PAY1 to the target region CICSPA02, which belongs to CICS system group CSGTGTS1.

Note that you are still working in CICSplex PLXPROD1, and that workload routing, from a single CICSPT01 among target regions in the group CSGTGTS1, is in effect.

1. If the transaction to be routed is to be started with EXEC CICS START, define the transaction as ROUTABLE.

2. Create a transaction group:
   - From the main menu, click **Administration views > Workload manager administration views > Transaction group definitions**. This opens the **Transaction group definitions** view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.

   - Click the **Create...** button, and provide the following information:

Name	TRGPAY01
Description	Send PAY1 to CICSPA02
Affinity relation and lifetime checking status	ACTIVE
Primary search criterion	User ID

     You can leave the remaining fields or accept the defaults.

     Click **Yes**. The **Transaction group definitions** view is redisplayed, now showing the name of the transaction group TRGPAY01.

3. Add transaction PAY1 to transaction group TRGPAY01:
   - In the **Transaction group definitions** view, select the entry for TRGPAY01, and click the **Add transaction...** button.
   - In the **Transaction name** field, type the name PAY1 and click **Yes** to confirm. The **Transaction group definitions** view is redisplayed.

4. Create a workload definition:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions**. This opens the **WLM definitions** view, listing any workload definitions already created in PLXPROD1.
   - Click the **Create...** button, and provide the following information:

Workload management definition	WLDPAY01

Description	Separate TRGPAY01 to CICSPA02
Transaction group name	TRGPAY01
Scope name of set of target systems	CICSPA02

- Click **Yes** to confirm.

5. Create a workload group. (A workload group is essential if you want a workload definition to be installed automatically when the routing region that is routing the transactions is started.)
   - From the main menu, click **Administration views > Workload manager administration views > Groups**. This open the **WLM groups** view, listing any workload groups already created in PLXPROD1.
   - Click the **Create...** button, and type in the following:

Workload management group	WLGPAY01
Description	Workload group for WLDPAY01

- Click **Yes** to confirm. The **WLM groups** view is redisplayed.

6. Add the workload group WLGPAY01 to the existing workload specification WLSPAY01:
   - In the **WLM groups** view, select the entry for WLGPAY01, and click the **Add to WLM specification...** button.
   - In the **Specification name** field, enter the name of the existing workload specification, WLSPAY01, and click **Yes**. The **WLM groups** view is redisplayed.

7. Add the workload definition to the workload group:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions** to open the **WLM definitions** view.
   - Select the entry for WLDPAY01, and click the **Add to WLM group...** button.
   - In the **Resource group name** field, type WLGPAY01 and click **Yes**. The **WLM definition** view is redisplayed.

8. Install the workload group into the active workload.

   Because the workload WLSPAY01 is already active, you have to install the new workload group WLGPAY01 explicitly. If you did not install WLGPAY01, it would not take effect until the routing region CICSPT01 and the target regions in CICS system group CSGTGTS1 were next started.
   - From the main menu, click, **Administration views > Workload manager administration views > Groups** to open the **WLM groups** tabular view.
   - Select the entry for WLGPAY01 and click the **Install...** button.
   - In the **Workload name** field, type WLSPAY01, and, in the **Workload owner** field, type in the SYSID of the system on which the workload specification WLSPAY01 was created.

   Click **Yes** to confirm

Because you are reusing a workload specification that is already active in CICSplex PLXPROD1, and have installed the workload group, the workload separation you have defined in this example takes immediate effect.

You can check that the new workload definition WLDPAY01 is active by opening the **WLM definitions** view. The **WLM definitions** view should include an entry for WLDPAY01 in workload WLSPAY01. When transaction PAY1 is next started, by any user and from any terminal, CICSPlex SM routes it to target region CICSPA02.

Routing particular transactions from a given user to a specific target region

This example describes how to use the Web User Interface (WUI) to route particular transactions from a given user to a specific target region.

This example task again describes how to use the Web User Interface in a refinement of the previous example ("Routing a specific transaction to a specific target region" on page 138). This time, the user ID value is to be an additional factor in determining where transactions are to be routed: transactions PAY6, PAY7, PAY8, and PAY9, when started from user ID USRPAY03, must be routed to target region CICSPA03 in CICSplex PLXPROD1.

1. Create a transaction group.
   * From the Web User Interface main menu, click **Administration views > Workload manager administration views > Transaction group definitions**. This opens the **Transaction group definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   * Click the **Create...** button, and provide the following information:

Name	TRGPAY02
Description	Send USRPAY03's transactions to CICSPA03
Affinity relation and lifetime checking status	ACTIVE
Primary search criterion	USERID

     You can leave the remaining fields or accept the defaults.
   * Click **Yes** to confirm. The **Transaction group definitions** tabular view is redisplayed.

2. Identify the transactions that belong to group TRGPAY02:
   * In the **Transaction group definitions** tabular view, select the entry for TRGPAY02, and click the **Add transaction...** button.
   * In the **Transaction name** field, type in the name of the first transaction PAY6, and click **Yes** to confirm.

     Repeat this step for three more transactions: PAY7, PAY8, and PAY9.

3. Create a workload definition:
   * From the main menu, click , **Administration views > Workload manager administration views > Definitions**. This opens the **WLM definitions** tabular view, listing any workload definitions already created in PLXPROD1.
   * Click the **Create...** button, and provide the following information:

Workload management definition	WLDPAY02
Description	Separate TRGPAY02 to CICSPA03
Transaction group name	TRGPAY02
User ID	USRPAY03
Scope name of set of target systems	CICSPA03

   * Click **Yes** to confirm.

4. Add the workload definition to the existing workload group:
   * From the main menu, click , **Administration views > Workload manager administration views—>Definitions** to open the **WLM definition** view.
   * Select the entry for WLDPAY0 and click the **Add to WLM group** button.

- In the **Resource group name** field, type WLGPAY01 (the name of the workload group you created in the previous example). Workload group WLGPAY01 is already associated with the active workload specification WLSPAY01.
- Click **Yes** to confirm.

5. Install the new workload definition into the active workload:

   Because group WLGPAY01 is already associated with the active workload WLSPAY01, changes you make to that group will not take effect until the routing region CICSPT01, and the target regions in CICS system group CSGTGTS1, are next started. To make the new workload definition take effect immediately, you must install it explicitly in WLSPAY01:
   - Open the **WLM definitions** view again, select the entry for WLDPAY02, and click the **Install...** button.
   - In the **Workload name** field, type in WLSPAY01 and in the **Workload owner** field, type in the SYSID of the system on which the workload specification WLSPAY01 was created.

   Because you have explicitly installed the workload definition WLDPAY02 in the active workload WLSPAY01, the workload separation requirements you have defined in this example take immediate effect.

Honoring a pseudoconversational transaction

This example describes how to use the Web User Interface (WUI) to ensure that multiple transactions, among which there is an affinity, are routed to the same target region.

As before, you are working in CICSplex PLXPROD1 and are routing transactions from CICSPT01 to the target regions in CICS system group CSGTGTS1.

1. Create a transaction group:
   - From the main menu, click **Administration views > Workload manager administration views > Transaction group definitions**. This opens the **Transaction group definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the **Create...** button, and provide the following information:

Name	TRGPAY03
Description	Pseudoconversational transaction
Affinity relation and lifetime checking status	ACTIVE
Primary search criterion	USERID
Affinity relationship	USERID
Affinity lifetime	PCONV

     Notice that the **Affinity relationship** and **Affinity lifetime** fields must be completed. These values tell CICSPlex SM that the transactions in this group constitute a pseudoconversational transaction (PCONV), and that this affinity lasts while those transactions are coming from the same user ID (USERID). If one of them is initiated from a different user ID, CICSPlex SM can select a different target region. Of course, the same type of affinity will then come into play in that second target region. You can ignore any fields that have been left blank or accept the defaults.
   - Click **Yes** to confirm. The **Transaction group definitions** tabular view is redisplayed.

2. Identify the transactions that belong to group TRGPAY03:

- In the **Transaction group definitions** tabular view, select the entry for TRGPAY03 and click the **Add transaction...** button.
- In the **Transaction name** field, type in the name of the first transaction PAY2 and click **Yes** to confirm.

  Repeat this step for three more transactions: PAY3, PAY4, and PAY5.

  You can see that PAY2 starts the pseudoconversation and PAY5 ends it.

3. Create a workload definition:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions**. This opens the **WLM definitions** view, listing any workload definitions already created in PLXPROD1.
   - Click the **Create...** button, and provide the following information:

Workload management definition	WLDPAY03
Description	TRGPAY03 to the same target region
Transaction group name	TRGPAY03
Scope name of set of target systems	CSGTGTS1

   - Click **Yes** to confirm.

4. Add the workload definition to the workload group:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions** to open the **WLM definitions** tabular view.
   - Select the entry for WLDPAY03 and click the **Add to WLM group...** button.
   - In the **Resource group name** field, type WLGPAY01.
   - Click **Yes** to confirm.

5. Because group WLGPAY01 is already associated with the active workload WLSPAY01, changes you make to that group will not take effect until the routing region CICSPT01, and the target regions in CICS system group CSGTGTS1, are next started. To make the new workload definition take effect immediately, you must install it explicitly in WLSPAY01. To install the new workload definition into the active workload:
   - Open the **WLM definitions** view again, select the entry for WLDPAY03, and click the **Install...** button.
   - In the **Workload name** field, type in WLSPAY01, and in the **Workload owner** field, type in the SYSID of the system on which the workload specification WLSPAY01 was created.

Because you have explicitly installed the workload definition WLDPAY03 in the active workload WLSPAY01, CICSPlex SM is able to honor this pseudoconversational transaction immediately. Be aware that you are able to use the single workload specification WLSPAY01 for both workload routing and workload separation because you did *not* specify default **Affinity relationship** and **Affinity lifetime** values in WLSPAY01. Had you done so, you would have had to create different workload specifications for workload routing and workload separation.

Deactivating a workload definition

This example describes how to use the Web User Interface (WUI) to deactivate a workload definition.

This example describes how to use the Web User Interface (WUI) to deactivate the workload definition WLDPAY02 created in the example "Routing particular transactions from a given user to a specific target region" on page 140.

1. Display active workload definitions:
   - From the main menu, click **Active workload views > Definitions**. This opens the **Active workload definitions** view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - In the **Active workload definitions** view, type WLSPAY01 and click **Refresh**. The active workload definitions associated with workload specification WLSPAY01 are listed.
2. Discard workload definition WLDPAY02:
   a. Select the entry for WLDPAY02, and click the **Discard...** button. This opens the **Discard** confirmation view.
   b. Click **Yes** to confirm the action.

Be aware that, when you deactivate an active workload definition, you also deactivate any transaction groups associated with it if they aren't referenced by another workload definition in the same workload.

Updating an active workload definition

This example describes how to use the Web User Interface (WUI) to update an active workload definition and then reinstall it in the active workload.

In the example "Routing particular transactions from a given user to a specific target region" on page 140, you created the transaction group TRGPAY02 and named it in the workload definition WLDPAY02. In this example, you'll see how to remove TRGPAY02 and replace it with a new transaction group, TRGPAY04, which has already been created.

1. Display active workload definitions:
   - From the main menu, click **Active workload views > Definitions**. This opens the **Active workload definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - In the **Active workload definitions** view, type WLSPAY01 and click **Refresh**. The active workload definitions associated with workload specification WLSPAY01 are listed.

     Make a note of the value in the **System ID of workload owner** field for WLDPAY02 (CM1B, in this example).
2. Update workload definition WLDPAY02.
   - From the main menu, click **Administration views > Workload manager administration views > Definitions** to open the **WLM definition** tabular view.
   - Select the entry for WLDPAY02 and click the **Update...** button. The **WLM definitions** create view is displayed.
   - In the **WLM definitions** create view, change the **Transaction group name** to TRGPAY04 and change the **Description** text to "Separate TRGPAY04 to CICSPA03"
   - Click **Yes**. The **WLM definitions** tabular view is redisplayed.
3. Install the updated workload definition in WLSPAY01:

   In the **WLM definitions** tabular view, select the entry for WLDPAY02 and click the **Install...** view. The **Install** view is displayed. In the **Workload name** field, type WLSPAY01. In the **Workload owner** field, type the 4-character ID of the workload owner that you made a note of in step 1. Click **Yes**. The updated workload definition is installed in workload WLSPAY01.
4. Check that the updated workload definition has been installed:

- From the main menu, click **Active workload views > Definitions**. This opens the **Active workload definitions** tabular view showing the updated definition. Check that TRGPAY02 has been replaced by TRGPAY04.

5. Check that transaction group TRGPAY02 is inactive and that transaction group TRGPAY04 is now active:
   - From the main menu, click **Active workload views > Transaction groups** to view the status of the two transaction groups.

   Note:

   Updating the **User ID**, **Terminal LU name**, **BTS process type**, or **Scope name of set of target systems** fields in a workload definition prevents the workload definition from being reinstalled dynamically. To reinstall the workload definition into an active workload, you must:
   - From the **Active workload definitions** tabular view, click the **Discard...** button to discard the active workload definition
   - From the workload management **Definitions** view, click the **Install...** button to install the workload definition into the workload.

   Alternatively, to reinstall workload definitions with changed attributes, use a batch API program to disable access to the affected application, discard the **Active workload definitions** view, install the **WLM definitions** view, and re-enable the affected application.

Discarding an active transaction from a workload

This example describes how to use the Web User Interface (WUI) to discard an active transaction from a workload.

1. Display active transactions.
   - From the main menu, click **Active workload views > Dynamic transactions**.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - The **Active workload dynamic transactions** tabular view shows the active transactions associated with workload specification EYUWLS02

2. Discard transaction PAY2:
   - From the **Active workload dynamic transactions** view, select transaction PAY2, and click the **Force...** button. The **Force** confirmation view is displayed.
   - Click **Yes** to confirm the action.

Updating a workload specification

This example describes how to use the Web User Interface to update a workload specification

This example describes how to use the Web User Interface to update the workload specification WLSPAY01, which you created in the example "Managing a workload" on page 123. The effects of this task need to be considered carefully. In particular, the updated workload specification cannot take effect immediately unless you also stop and then restart both the routing region with which the workload specification is associated and the target regions to which the routing region routes transactions.

1. Update workload specification WLSPAY01.
   - From the Web User Interface main menu click **Administration views > Workload manager administration views > Specifications** to open the **WLM specifications** (WLMSPEC) tabular view.

If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.

- Select the entry for WLSPAY01 and click the **Update...** button.
- Change the **Algorithm type** field from QUEUE to GOAL
- Click **Yes**. The view is redisplayed showing the updated entry for WLSPAY01.

2. Display the **Active workload** view:
   - From the main menu, click **Active workload views > Active workloads**.
   - In the **Active workloads** tabular view, type in the workload name WLSPAY01 and click **Refresh**.

The **Active workloads** tabular view is redisplayed. You will see that the algorithm type for WLM specification WLSPAY01 is still QUEUE. This is because region CICSPT01 doesn't know about the changes you've made.

If you want the updated workload specification to take effect immediately, use the **CICS regions** view to stop the routing regions and the target regions to which they route, and then restart them. The regions must all be shut down together and not restarted until each CMAS that had CICS elements participating in the named workload issues message EYUWM0410I confirming that the workload specification has terminated successfully. If CICS regions that are members of the workload restart before receiving message EYUWM0410I, the existing workload specification will continue to be used and the updates to the workload specification will not be in effect. After the routing regions are restarted, display the **Active workloads** tabular view and you will see that the **Algorithm type** field has been updated to GOAL.

Using real-time analysis to select a target region for workload routing

This Web User Interface (WUI) example describes how to use CICSPlex SM's real-time analysis functions to produce data that will help in the selection of a target region during workload routing.

In particular, the number of items on the temporary storage queue will be monitored for each target region to which work can be routed. When the number of items goes above 50, a real-time analysis event notification (severity HS) and an external message will be issued. When an event notification is issued, CICSPlex SM's workload management function is notified and uses the information, in addition to the standard queue algorithm criteria, in selecting the best target region.

A CICS system group CSGTGTS3 has already been created and contains four target regions (CICSPA01, CICSPA02, CICSPA03, and CICSPA04). The target regions are currently running. Work is currently being routed among these target regions by the routing region CICSPT03.

1. Create a real-time analysis evaluation definition:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Evaluations**. This opens the **Evaluation definitions** tabular view, listing any evaluation definitions already created in PLXPROD1.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the **Create...** button, and provide the following information:

Name	RTEPAY15
Description	TSQ NUMITEMS > 50
Sample interval	300
Resource table name	MTSQGBL

Instance identifier of evaluated resource	*
Method of evaluating results in result set	ANY
Separate task indicator	NO
Name of field being evaluated	PUTQAUX
Evaluation type	VALUE
Evaluation logical operator	GT
Evaluation data value	50
Severity assigned when result meets criteria	HS
Name of a view that may provide extra information	MTSQGBL

- Click **Yes** to create the new evaluation definition.

2. Create a real-time analysis action definition:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Actions**. This opens the **Action definitions** view.
   - Click the **Create...** button, and provide the following information:

Action	RTAPAY15
Description	NUMITEMS IN TSQ > 50
Generate event option	YES
Name of view that may provide useful information	TSQ
Action priority	255
Message to send when event occurs	AUX TSQUEUE PUTQ ITEMS > 50
Generate external message option	YES
External message sent when event occurs	AUX TSQUEUE PUTQ ITEMS > 50
External message sent when event is cleared	AUX TSQUEUE PUTQ ITEMS < 50
Generate SNA generic alert option	NO
MVS automatic restart	NO

- Click **Yes** to create the new RTA action definition. The **Action definitions** tabular view is redisplayed.

3. Create an analysis definition:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Definitions**. This opens the **RTA definitions** view.
   - Click the **Create...** button, and provide the following information:

Name	RTDPAY15
Description	TSQ NUMITEMS FOR WLM /RTA
Execute evaluation modification string	NO
Analysis interval	300
Action definition name	RTAPAY15
Count of true evaluations before VLS raised	0001
Count of false evaluations before VLS resolved	0001
Count of true evaluations before LS raised	001
Count of false evaluations before LS resolved	001
Count of true evaluations before LW raised	001
Count of false evaluations before LW resolved	001
Count of true evaluations before HW raised	001

Count of false evaluations before HW resolved	001
Count of true evaluations before HS raised	001
Count of false evaluations before HS resolved	0001
Count of true evaluations before VHS raised	0001
Count of false evaluations before VHS resolved	0001
Count of false evaluations before VHS resolved	0001
Evaluation expression	RTEPAY15

- Click **Yes** to create the new analysis definition. The **Analysis definitions** tabular view is redisplayed.

4. Create an analysis group:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Groups**. This opens the **RTA groups** tabular view.
   - Click the **Create...** button, and provide the following information:

RTA group	RTGPAY09
Description	RTA/WLM Group

- Click **Yes** to create the new analysis group. The **RTA groups** tabular view is redisplayed.

5. Add the analysis definition to the analysis group:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Definitions**. This opens the **RTA definitions** view.
   - Click the record check box beside the entry for RTDPAY15 and click the **Add to RTA group...** button. The **Add to RTA group** view is displayed
   - In the **Resource group name** field type RTGPAY09 and click **Yes**. The **RTA definitions** tabular view is redisplayed

6. Create an analysis specification:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Specifications**. This opens the **RTA specifications** tabular view.
   - Click the **Create...** button, and provide the following information:

RTA specification name	RTSPAY09
Description	Workload management with RTA

- Click **Yes** and the **RTA specifications** tabular view is redisplayed, listing the new RTA specification.

7. Add the analysis group to the analysis specification:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Groups**. This opens the **RTA groups** tabular view.
   - Click the record check box beside the entry for RTGPAY09 and click the **Add to RTA specification...** button. The **Add to RTA specification** view is displayed
   - In the **RTA specname** field, type RTSPAY09 and click **Yes**. The **RTA groups** tabular view is redisplayed

8. Set the scope of the analysis specification.:
   - From the main menu, click **Administration views > RTA MAS resource monitoring > Specifications**. This opens the **RTA specifications** tabular view.

- Click the record check box beside the entry for RTGPAY09 and click the **Associate CICS group...** button. The **Associate CICS group** view is displayed
- In the **CICS system group** field, type CSGTGTS3 and select the **Force** option. Click **Yes** and the **RTA specifications** tabular view is redisplayed.

9. Activate real-time analysis in the target regions in CSGTGTS3:
   - From the main menu, click **Administration views > RTA system availability monitoring > CICS system definitions**. This opens the **CICS system definitions** tabular view.
   - Click the record check box beside the entry for CICS system CICSPA01, click the **Update...** button, and provide the following information:

CICS system definition name	CICSPA01
Description	Target region 1 on System A
Real time analysis status	YES
Severity for system availability monitoring event	NO
Severity for short-on-storage (SOS) event	NO
Severity for system dump event	NO
Severity for transaction dump event	NO
Severity for CICS-at-maximum-tasks event	NO
Severity for CICS-stalled event	NO

- Click **Yes** to confirm the change. The CICS system definition is updated and the change, which is permanent, takes immediate effect. You do not have to restart CICS system CICSPA01. Repeat this step for the target regions CICSPA02, CICSPA03, and CICSPA04.

10. The workload specification WLSPAY02 is already being used for workload routing among the target regions in CSGTGTS3. You must update the specification to add the real-time analysis data to the standard target region selection criteria. To update the workload specification:
    - From the main menu, click **Administration views > Workload manager administration views > Specifications**. This opens the **WLM specifications** tabular view.
    - Click the record check box beside the entry for WLSPAY02, click the **Update...** button, and provide the following information:

```
Name                                  WLSPAY02
Description                            Workload using RTA for target region
                                      selection
Primary search criterion              USERID
Default target scope                  CSGTGTS3
RTA event name                        RTDPAY15
Acceptable level of abend probability 0
Acceptable abend load threshold       0
Algorithm type                        QUEUE
```

- Click **Yes** to update the specification.

Notice that the **RTA event** field value is the name of the analysis definition you created in step 3 on page 146.

When the routing region CICSPT03 and the target regions in CICS system group CSGTGTS3 are next started, the routing region routes transactions among the

target regions using both the standard queue algorithm criteria and the analysis definition RTDPAY15 to select a target region.

Dynamic routing with EXEC CICS START TERMID

This example describes how to use the Web User Interface (WUI) to set up dynamic routing capability for a transaction started with EXEC CICS START, that specifies a terminal ID and a transaction ID, and to use the GOAL algorithm to select the target region.

Note: You should check the system requirements before trying to route EXEC CICS START TERMID dynamically. See "Workload requirements" on page 5.

In this example, a program running in CICSPA01 begins with EXEC CICS START, which is associated with terminal TRM1, to run transaction PAY1, for which you require a 2-second response time. Terminal TRM1 is associated with region CICSPT01. Transaction PAY1 may execute in any region connected to CICSPT01, that is, in CICSPA01, CICSPA02, or CICSPA03.

This example uses the environment that has already been created as part of earlier examples. You are working in CICSplex PLXPROD1, which comprises TOR CICSPT01 and AORs CICSPA01, CICSPA02, and CICSPA03 in CICS system group CSGTGTS1. Transaction group TRGPAY03 has transactions PAY1, PAY2, PAY3, and PAY4 associated with it. Workload definition WLDPAY03 was defined to tell CICSPlex SM that transactions in group TRGPAY03 must go to a target region in CICS system group CSGTGS1.

As you want to use the GOAL algorithm, you need to define, in MVS Workload Manager, a Service Class with the required response time and allocate that Service Class to transaction PAY1. For example, you could specify:
- A Service Class of Fast that has an average response time of 2 seconds.
- A classification rule that associates Classification Subsystem CICS with transaction ID PAY1 and Service Class Fast.

For more information about Service Classes, see Service classes.

In CICSPlex SM:
1. Create a workload specification.
   - From the main menu, click **Administration views > Workload manager administration views > Specifications**. This opens the **WLM specifications** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the **Create...** button, and provide the following information:

Name	WLSDYN01
Description	Dynamic routing START
Primary search criterion	USERID
Default target scope	CSGTGTS1
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	GOAL

   - Click **Yes** to creat the specification.

You must supply:
- A name for the specification (WLSDYN01 in this example).
- A **Primary search criterion** value. USERID is shown in this example, though in fact it doesn't matter whether you specify USERID or LUNAME, because the **Primary search criterion** value has no effect on simple workload routing. It is used only for some kinds of workload separation, but you have to supply a value because CICSPlex SM doesn't know, at this stage, that you aren't going to use this workload specification for workload separation.
- A **Default target scope** value, which is the name of the single target region, or group of target regions, to which transactions can be routed.
- An **Algorithm type** value. For this example, use GOAL, because the criteria for selecting the target region are based on the requirement that the transaction has a response time of 2 seconds.

When you click **Yes**, the **WLM specifications** tabular view is redisplayed, this time showing an entry for the new workload specification, WLSDYN01.

2. The next step is to tell CICSPlex SM about the region that's going to be routing the work requests to the target regions in group CSGTGTS1. To associate the workload specification with a routing region:
   - On the **WLM specifications** tabular view, click the Record check box beside the entry for the WLSDYN01 specification and click the **Associate CICS system...** button.
   - Type WLSDYN01 in the **CICS system** field and click **Yes**. The **WLM specifications** tabular view is redisplayed and you can check that the association between the routing region and the workload specification has been created.

3. Activate workload management in the routing region:
   - From the main menu, click **Administration views > Topology administration views > System definitions**. This opens the **CICS system definitions** tabular view.
   - Click the Record check box beside the entry for CICSPT01 and click the **Update...** button.
   - In the **Workload manager status** field, select YES from the drop-down menu. This change takes effect when CICSPT01 is next started.

4. Activate workload management in the target regions.
   - From the main menu, click **Administration views > Topology administration views > System definitions**. This opens the **CICS system definitions** tabular view.
   - Click the Record check box beside the entry for CICSPA01 and click the **Update...** button.
   - In the **AOR dynamic routing mode** field, select YES from the drop-down menu. This change takes effect when the target region CICSPA01 is next started.

   Repeat this step for target regions CICSPA02 and CICSPA03.

5. Install program definitions:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Program definitions**. This opens the **Program definitions** tabular view.
   - Click the Record check box beside the entry for CICSPA01 and click the **Update...** button.
   - Set the **Dynamic routing status** field to NO from the drop-down box.
   - Click **Yes** to confirm. The **Program definitions** tabular view is redisplayed.
   - Click the Record check box beside the entry for CICSPA01 and click the **Install...** button.
   - Type CICSPA01 in the **Target scope value** field and click Yes to confirm.

Repeat this step for CICSPA02 and CICSPA03.
6. Install transaction definitions:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Transaction definitions**. This opens the **Transaction definitions** tabular view.
   - From the **Transaction definitions** view, select PAY1 and click the **Install...** button. Type CICSPA01 in the **Target scope value** field.
   - Click Yes to confirm.

   You can either update the transaction definitions to specify these field values, or you can specify override values when you install the transaction definitions. For details, see *CICSPlex System Manager Managing Business Applications*.

In this example task, a program running in CICSPA01, the requesting region, issues an EXEC CICS START command that specifies a transaction ID of PAY1 and a terminal ID TRM1. The START command is function shipped to CICSPT01, the TOR that owns the specified terminal. CICSPT01 acts as the routing region and invokes the dynamic routing exit, which selects the target region. All the AORs in CICS system group CSGTGS1 are possible target regions; the actual target region is selected on the basis of the GOAL criterion of a response time of 2 seconds. CICSPlex SM obtains the Service Class of transaction PAY1 and the identity of the target region to which that Service Class is allocated, from a CICSPlex SM-maintained table.

Dynamic routing of an inbound client DPL request

This example describes how to use the Web User Interface (WUI) to set up dynamic routing capability for a DPL request from a CICS client, and to use the GOAL algorithm to select the target region.

Note: You should check the system requirements before trying to dynamically route inbound client DPL requests. See "Workload requirements" on page 5.

In this example, a request is received to run transaction PAY1 to invoke client program PAYPROG1. PAYPROG1 issues an EXEC CICS LINK command to server program PAYPROG2. You require transaction PAY1 to have a 2-second response time.

This example uses the environment that was used for "Dynamic routing with EXEC CICS START TERMID" on page 149.

As you want to use the GOAL algorithm, you need to define, in MVS Workload Manager, a Service Class with the required response time and allocate that Service Class to the transaction. For example, you could specify:
- A Service Class of Fast with a average response time of 2 seconds.
- A classification rule that associates Classification subsystem CICS with transaction ID PAY1 and Service Class Fast.

For more information about Service Classes, see Service classes.

In CICSPlex SM:
1. The first step is to set the dynamic routing status value for program PAYPROG1. To do this:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Program definitions**. This opens the **Program definitions** tabular view.

If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.

- Click the Record check box beside the entry for PAYPROG1 and click the **Update...** button. From the drop-down box, set the **Dynamic routing status** field to NO.
- Click **Yes** to confirm.

2. Install program definitions:
   - From the **Program definitions** tabular view, click the Record check box beside the entry for PAYPROG1 and click the **Install...** button.
   - Type CICSPA01 in the **Target scope value** field.
   - Click **Yes** to confirm.

   Repeat this step to install PAYPROG1 in target scopes CICSPA02 and CICSPA03.

   For details of defining and installing program definitions, see *CICSPlex System Manager Managing Business Applications*.

3. Install the transaction definition:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Transaction definitions**. This opens the **Transaction definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - From the **Transaction definitions** view, click the Record check box beside the entry for PAY1 and click the **Install...** button.
   - Type CICSPA01 in the **Target scope value** field.
   - Click **Yes** to confirm.

   Repeat this step to install PAY1 in target scopes CICSPA02 and CICSPA03.

   The transaction definition should point to the mirror program DFHMIRS. For details of defining and installing transaction definitions, see Transaction resource definitions , in the*CICSPlex System Manager Managing Business Applications* book.

Dynamic routing of a peer-to-peer DPL request

This example describes how to use the Web User Interface (WUI) to set up dynamic routing for a peer-to-peer DPL request, and to use the GOAL algorithm to select the target region.

Note: You should check the system requirements before trying to dynamically route peer-to-peer DPL requests. See "Workload requirements" on page 5.

In this example, transaction PAY1 runs program PAYPROG1, which issues an EXEC CICS LINK command to program PAYPROG2. You require transaction PAY1 to have a response time of 4 seconds.

This example uses the environment that was used for "Dynamic routing with EXEC CICS START TERMID" on page 149. However, because this is a peer-to-peer dynamic linking request, only the AORs are involved and each AOR may act as a requesting, routing, or target region.

As you want to use the GOAL algorithm, you need to define, in MVS Workload Manager, a Service Class with the required response time and allocate that Service Class to the transaction. For example, you could specify:
- A Service Class of Medium with an average response time of 4 seconds.

- A classification rule associating Classification Subsystem CICS with transaction ID PAY1 and Service Class Medium.

For more information about Service Classes, see Using the goal algorithm.

In CICSPlex SM:

1. The first step is to set the dynamic routing status value for program PAYPROG1. To do this:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Program definitions**. This opens the **Program definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the Record check box beside the entry for PAYPROG1 and click the **Update...** button.
   - Set the **Dynamic routing status** field to NO from the drop-down box.
   - Click **Yes** to confirm.

2. Install program definitions:
   - From the **Program definitions** tabular view, click the Record check box beside the entry for PAYPROG1 and click the **Install...** button.
   - Type CICSPA01 in the **Target scope value** field.
   - Click **Yes** to confirm.

   Repeat this step to install PAYPROG1 in target scopes CICSPA02 and CICSPA03.

   For details of defining and installing program definitions, see *CICSPlex System Manager Managing Business Applications*.

   You don't need to install program definition PAYPROG2 in the regions, but if you do, PAYPROG2 should be defined as dynamic.

3. Install the transaction definition:
   - From the main menu, click **Administration views > Basic CICS resource administration views > Resource definitions > Transaction definitions**. This opens the **Transaction definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - From the **Transaction definitions** tabular view, Click the Record check box beside the entry for PAY2 and click the **Install...** button.
   - Type CICSPA01 in the **Target scope value** field.
   - Click **Yes** to confirm.

   The transaction definition should point to the mirror program DFHMIRS.

   Repeat this step to install PAY2 in target scopes CICSPA02 and CICSPA03.

Routing CICS BTS activities

This example describes how to use the Web User Interface (WUI) to manage a CICS BTS-related workload.

This example uses the configuration that has been used for earlier examples. You are working in CICSplex PLXPROD1, which comprises AORs CICSPA01, CICSPA02, and CICSPA03 in CICS system group CSGTGTS1. These three systems may act as routing and target regions. In addition, it is assumed that the RLS file for the BTS process type is accessible to all CICS system in CICS system group CSGTGTS1, and that all the systems in CICS system group CSGTGTS1 are interconnected.

Note: You should check the system requirements before trying to dynamically route CICS BTS activities. See "Separating CICS BTS activities" on page 155 and "CICS release requirements for dynamic routing" on page 28.

1. Activate workload routing for the systems in CSGTGTS1.
   - From the main menu, click **Administration views > Topology administration views > System definitions**. This opens the **System Definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the record check box beside the entry for CICSPA01 and click the **Update...** button.
   - Select YES from the drop-down box for both the **Workload manager status** field and in the **AOR dynamic routing mode** field . These changes takes effect when the target region CICSPA01 is next started.

   Repeat this step for target regions CICSPA02 and CICSPA03.

2. Create a workload specification:
   - From the main menu, click **Administration views > Workload manager administration views > Specifications**. This opens the **WLM specifications** tabular view.
   - Click the **Create...** button, and provide the following information:

Name	WLSCBTS
Description	Routing CICS BTS activity
Primary search criterion	USERID
Default target scope	CSGTGTS1
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

   - Click **Yes** to confirm. The **WLM specifications** tabular view is redisplayed.

   You must supply :
   - A name for the specification (WLSCBTS in this example).
   - A primary search criterion value. USERID is shown in this example, though in fact it doesn't matter whether you specify USERID or LUNAME, because the primary search criterion value has no effect on simple workload routing. It is used only for some kinds of workload separation, but you have to supply a value because CICSPlex SM doesn't know, at this stage, that you aren't going to use this workload specification for workload separation.
   - A default target scope value, which is the name of the single target region, or group of target regions, to which transactions can be routed. In this example, use CSGTGTS1.
   - An Algorithm Type value. For this example, use QUEUE.

3. Associate the workload specification with routing region scope CSGTGTS1.
   - Click the Record check box beside the entry for WLSCBTS and click the **Associate CICS system...** button.
   - In the **CICS system** field, type CSGTGTS1.
   - Click **Yes** to confirm. The **WLM specifications** tabular view is redisplayed.

4. Specify the system initialization parameter DSRTPGM is set to EYU9XLOP.

   You can do this either in the system initialization parameter of each region in the CICS system group, or by using the **CICS system definitions** view.

5. Activate workload management:
   - From the main menu, click **CICSPlex SM operations views > MASs known to CICSplex**. This opens the **MASs known to CICSplex** tabular view.

- Click on CICS system name CICSPA01 open the **MASs known to CICSplex** detailed view for CICSPA01.
- In the **Workload manager status** field, select YES from the drop-down list to start managing workloads for this CICS system.
- Click **Apply changes**.

Repeat this step to activate workload management for CICSPA02 and CICSPA03.

6. Program your BTS activities to run asynchronously.

When the routing and target regions in system group CSGTGS1 are next started, BTS activities are routed among the target regions.

Separating CICS BTS activities

This example describes how to use the Web User Interface (WUI) to separate a CICS BTS-related workload.

In this example, BTS activity BTSACT1 has an affinity of LIFETIME and runs under transaction ID BTS1 and process type SALES. This example uses the configuration that has been used for the example in "Routing CICS BTS activities" on page 153. Similarly, the system initialization parameter DSRTPGM must be set to EYU9XLOP.

Note: You should check the system requirements before trying to dynamically route CICS BTS activities. See CICS System Connectivity and "CICS release requirements for dynamic routing" on page 28.

1. Create a transaction group:
   - From the main menu, click **Administration views > Workload manager administration views > Transaction groups definitions**. This opens the **Transaction group definitions** tabular view.

     If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   - Click the **Create...** and provide the following information:

Name	TRGCBTS1
Description	CICS BTS transaction group
Affinity relation and lifetime checking status	ACTIVE
Primary search criterion	USERID
Affinity relationship	BAPPL
Affinity lifetime	ACTIVITY
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

     You can ignore any fields that have been left blank.
   - Click **Yes** to redisplay the **Transaction group definitions** tabular view, now showing the name of the transaction group TRGCBTS1.

     Notice that the **Affinity relationship** and **Affinity lifetime** fields must be completed. These values tell CICSPlex SM that the transactions in this group constitute a BTS affinity, and that this affinity lasts while those transactions are coming from the same BTS application. If one of them is initiated from a different BTS application, CICSPlex SM can select a different target region. Of course, the same type of affinity will then come into play in that second target region.

2. Identify the transactions in group TRGCBTS1:

- From the **Transaction group definitions** view select the entry for TRGCBTS1 and click the **Add transaction...** to open the **Add transaction** tabular view.
- In the **Transaction name** field, type BTS1 and click **Yes** to add the transaction to the Transaction group. The **Transaction group definition** view is redisplayed.

3. Create a workload definition:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions**. This opens the **WLM definitions** tabular view.
   - Click the **Create...** button and provide the following information:

Workload management definition	WLDCBTS3
Description	Separate CICS BTS activities
Transaction group name	TRGCBTS1
BTS process type	SALES
Scope name of set of target systems	CSGTGTS1

   - Click **Yes** and the **WLM definitions** tabular view is redisplayed.

   These values tell CICSPlex SM that transactions in group TRGCBTS1, and of process type SALES, must go to a target region in group CSGTGTS1. CICSPlex SM can select the most appropriate target region at the time the transaction is initiated.

4. Add the workload definition to the workload group:
   - In the **WLM definition** tabular view, click the Record check box beside the entry for the WLDCBTS1 and click the **Add to WLM group...** button. The **Add to WLM group** view is displayed.
   - In the **Resource group name** field, type WLGCBTS1 and click **Yes**. The **WLM definitions** tabular view is redisplayed.

5. Add the workload group to a workload specification:
   - From the main menu, click **Administration views > Workload manager administration views > Groups**. This opens the **WLM group** tabular view.
   - In the **WLM group** view, click the Record check box beside the entry for the WLDCBTS1 and click the **Add to WLM specification...** button. The **Add to WLM specification** view is displayed.
   - In the **Specification name** field, type WLGCBTS1 and click **Yes**. The **WLM groups** tabular view is redisplayed.

Managing an enterprise bean workload

This example describes how to use the Web User Interface (WUI) to manage an enterprise bean workload.

In an enterprise bean environment, the TOR CICSPT01 is the listener, and the enterprise bean may run in any of the AORs, CICSPA01, CICSPA02, and CICSPA03 in response to a client request. There are MRO links between the regions.

Defining the workload management environment

To implement the dynamic routing of enterprise beans, specify the relevant parameters in the CICS system initialization parameters, the CICS system definitions, and the CPSM WLM definitions.

- Define the CICS region environment:
  1. Set the DSRTPGM system initialization parameter in all regions to EYU9XLOP in one of the following ways:
     - In the system initialization table (see *CICS System Definition Guide*).

- On the PARM parameter in the startup job (see *CICS System Definition Guide*).
- In the **Distributed routing program** field of the **CICS region** detailed view (see *CICSPlex System Manager Operations Views Reference*).

2. Set the IIOPLISTENER system initialization parameter to NO in the AORs. (The default value is YES which is correct for the listener region.)

3. Use the **CICS system definitions** view to define the listener region (CICSPT01) and the AORs. Set the **Workload manager status** fields to YES in all regions. Set the **AOR dynamic routing mode** field to YES in the AORs. If the listener region is not an AOR, set the **AOR dynamic routing mode** field to NO. See *CICSPlex System Manager Administration*.

   If you are using BAS, you should include the statement:

   ```
   MASPLTWAIT(YES)
   ```

   in the EYUPARM file for all listener regions, to ensure that the local CICSPlex SM environment is properly established at MAS initialization time. If you do not, and there are enterprise beans queued for execution when the MAS initializes, it is possible that the routing requests for the first few enterprise beans will be rejected. By including this EYUPARM statement, the CICS PLTPI processing will suspend until the critical components of the local CICSPlex SM environment complete their initialization.

   Note: You may still see the "Waiting for workload" message in the MAS message log. Assuming that your WLM definitions relating to the MAS are correct, this is not an error condition. It is reporting that execution of any queued enterprise beans is temporarily suspended until the local workload is established. When workload integration completes, the queued beans will continue to be processed automatically.

4. Create two CICS system groups using the **System group definitions** view. The first group (EJBCSG01 in this example) contains the listener region and the AORs. The second group (EJBCSG02) should contain only the AORs. See *CICSPlex System Manager Administration*.

- Create the enterprise bean environment. See *Java Applications in CICS* for a detailed discussion of the environment needed for running enterprise beans under CICS.

  Use CEDA or BAS to define and install the following:

  1. A TCP/IP Service definition for the IP port number, which specifies the enterprise bean request receiver CIRR as the **CICS transaction ID** (TRANSACTION) attribute. See *CICS Resource Definition Guide* for details of the CEDA definition or *CICSPlex System Manager Managing Business Applications* for details of the BAS definition.

  2. A CorbaServer definition for a logical server comprising the three AORs. The TCP/IP Service name must be specified in the CorbaServer **TCP/IP service for unauthenticated protocol** (UNAUTH) attribute. See *CICS Resource Definition Guide* for details of the CEDA definition or *CICSPlex System Manager Managing Business Applications* for details of the BAS definition.

  3. A transaction definition for the default request processor transaction CIRP (program DFHJIIRP). See *CICS Resource Definition Guide* for details of the CEDA definition or *CICSPlex System Manager Managing Business Applications* for details of the BAS definition.

4. A definition for the DJAR that your beans are to be deployed into. See *CICS Resource Definition Guide* for details of the CEDA definition or *CICSPlex System Manager Managing Business Applications* for details of the BAS definition.

5. Install the TCP/IP definition in the listener region and the AORs.

6. Install transaction CIRP as dynamic in the listener region.

7. Install the CorbaServer and DJAR definitions in the AORs.

- Create the workload management definitions:

   If all enterprise beans are to be routed across all available AORs, the only definition you need is a workload specification (WLMSPEC object):

   1. Create the workload specification:

      a. From the main menu, click **Administration views > Workload manager administration views > Specifications**. This opens the **WLM specifications** tabular view.

      b. Click the **Create...** button, and provide the following information:

Workload management specification name	EJBSPEC1
Description	Distributed EJB Workload
Primary search criterion	USERID
Automatic affinity creation option	N/A
Default target scope	EJBCSG02
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

      c. Click **Yes** to create the workload specification.

      In this definition, the **Default target scope** field specifies the group which contains AORs only (EJBCSG02). This is because all dynamic transactions are to be routed to the AORs through this **WLM specifications** view.

   2. Add the workload management specification to the group of all MASs (EJBCSG01).

      This is because the scope of the WLM routing processing must cover all of the regions, the listener region for routing decisions and the AORs, so that their workloads are made visible to CICSPlex SM. On the other hand, the target scope of the transactions directed by the workload management specification covers just the regions in which the routed transactions may be executed. In other words, all regions must be aware of this workload management specification, but only the group of AORs may execute the dynamic transactions routed through it.

   3. You can use the **WLM specifications to system group links** view to display the system groups associated with specification EJBSPEC1:

      – From the main menu, click **Administration views > Workload manager administration views**.

      – From the **Workload manager administration views** menu, click **Specifications to system group links** to display the **WLM specifications to system group links** view.

      When all of the MASs are started, ensure that each MAS confirms:

      ```
      EYUNL0160I xxxxxxxx Workload registration complete
      ```

      where *xxxxxxxx* is the corresponding MAS name. At that point, the workload management environment should be ready to route the execution of enterprise beans.

Running the enterprise bean workload management task

Restart the MASs and ensure that all the resources needed by each region are installed.

You can use the **CorbaServers** view to monitor the CorbaServer status:

*   From the main menu, click **CICS operations views > Enterprise Java component operations views**.
*   From the **Enterprise Java component operations views** menu, click **CorbaServers** to display the **CorbaServers** tabular view.

You can use the **CICS-deployed JAR files** view to monitor DJAR status:

*   From the main menu, click **CICS operations views > Enterprise Java component operations views**.
*   From the **Enterprise Java component operations views** menu, click **CICS-deployed JAR files** to display the **CICS-deployed JAR files** tabular view.

When all the CorbaServers and their associated DJARs are INSERVICE:

*   Display the **CorbaServers** tabular view.
*   Select each CorbaServer in one of the AORs by clicking the Record check box beside each entry.
*   Click the **Publish...** button. This causes the attributes of the CorbaServer, its associated DJARs, and the beans contained in them to be identified to the Java Naming and Directory Interface (JNDI).

On completion, the CICS routing and execution environment should be ready to run the enterprise beans.

When the initial process is run on the client, it uses the services of JNDI to identify a TCP/IP port. This port is used to pass a bean execution request to the configured listener region. The request receiver transaction CIRR is invoked within that region and issues a START request to the request processor transaction CIRP. This transaction has been redefined as dynamic and so the listener calls the DSRTPGM routing exit program to select a target region. In this case that program is EYU9XLOP, which will drive the workload routing services of CICSPlex SM to select a suitable AOR. This AOR name is returned to the routing exit in the listener, which will route the execution of CIRP to the selected AOR. Finally, the CorbaServer in the target AOR receives the request and executes the enterprise bean on behalf of the original client. The usage count value of the CIRP transaction across each of the AORs should increase with each execution of the client program. This can be verified by checking **Number of times transaction used** field for the CICSPlex SM transaction ID CIRP in the **Local or dynamic transactions** view.

Separating enterprise beans in a workload

You can use the normal workload management workload definition commands to isolate the execution of enterprise beans to specific CorbaServers in specific regions.

To do this, you must associate a bean name with a CICS transaction, so that workload management can route that transaction to a predetermined CICS region.

You also need a larger definition set than for simple enterprise bean workload routing. As well as a workload specification to control the workload operation, you

need sets of workload management definitions and transaction group definitions beneath it to implement the bean separation.

Using the workload routing definition set described in "Managing an enterprise bean workload" on page 156 as a starting point, add the following definitions to it:

1. Copy the definition of the CIRP transaction that you created for workload routing under a different transaction name for each bean that you want to be separated, in the listener and all the AORs.

   For example, if you want to separate three beans (*Alpha, Beta and Gamma*), copy the current CIRP definition three times as transactions EJB1, EJB2 and EJB3.

2. When you have completed the transaction definitions, you must define request models for each of the beans to associate the bean name with a transaction. If you specify the **Interface name** (INTERFACE) attribute as BOTH, you need define only one request model for each bean. See the *CICS Resource Definition Guide* or *CICSPlex System Manager Managing Business Applications* for more details.

3. Install the TCP/IP service definition in the listener and the AORs, and the request model definitions in the listener.

4. Install the request processor transaction CIRP as dynamic in the listener region, and the CIRP clones (EJB1, EJB2 and EJB3) in the listener and the AORs.

5. Create transaction group definitions (TRANGRP objects) to isolate the CICS transactions:
   - From the main menu, click **Administration views > Workload manager administration views > Transaction group definitions**. This opens the **Transaction group definitions** tabular view.
   - Click the **Create...** button, and provide the following information:

Name	EJBTRGP1
Description	Group for Alpha Bean transid
Affinity relation and lifetime checking status	ACTIVE
Primary search criterion	USERID
Automatic affinity creation option	N/A
Acceptable level of abend probability	0
Acceptable abend load threshold	0

   - Click **Yes**. The **Transaction group definitions** view is redisplayed, now showing the name of the transaction group EJBTRGP1.

     Note that CICSPlex SM cannot manage any logical affinities that may exist between enterprise beans, so ensure that the **Affinity relationship** field and the **Affinity lifetime** field are left blank and the **Acceptable level of abend probability** field is zero. (Any values specified here will be ignored by CICSPlex SM affinity processing.) Repeat this definition for transaction groups EJBTRGP2 and EJBTRGP3.

6. Adding transaction EJB1 to group EJBTRGRP1
   - From the main menu, click **Administration views > Workload manager administration views > Transaction group definitions**. This opens the **Transaction group definitions** tabular view.
   - Select transaction group EJBTRGRP1 and click the **Add transaction...** button.
   - In the **Add transaction** view, type EJB1 in the **Transaction name** field.
   - Click **Yes** to add EJB1 to group EJBTRGRP1

Repeat this to add transaction EJB2 to group EJBTRGP2 and transaction EJB3 to group EJBTRGP3.

7. Create a workload definition for each of the transactions to be separated:
   - From the main menu, click **Administration views > Workload manager administration views > Definitions**. This opens the **WLM definitions** view, listing any workload definitions already created.
   - Click the **Create...** button, and provide the following information:

Workload management definition	EJBWDEF1
Description	Alpha Bean
Transaction group	EJBTRGP1
Scope name of set of target systems	CICSPA01

   - Click **Yes** to confirm.

   This definition associates the transactions in group EJBTRGP1 (in this case just the EJB1 transaction) with a specific scope (EJBTRGP1). Repeat this definition twice to separate transaction group EJBTRGP2 to MAS CICSPA02 and transaction group EJBTRGP3 to CICSPA03.

8. Create the workload management specification:
   - From the main menu, click **Administration views > Workload manager administration views > Specifications** to open the **WLM specifications** tabular view.
   - Click the **Create...** button, and provide the following information:

WLM specification name	EJBSPEC2
Description	Separated EJB Workload
Primary search criterion	USERID
Automatic affinity creation option	N/A
Default target scope	EJBCSG02
Acceptable level of abend probability	0
Acceptable abend load threshold	0
Algorithm type	QUEUE

   - Click **Yes** to confirm.

9. Create a workload management group to allow the association of the workload management definitions to the workload management specification. Create a group named EJBGRP1 and add workload management definitions EJBWDEF1, EJBWDEF2, and EJBWDEF3 to it.

10. Add the new group to a WLM specification.

    From the **WLM groups** view, click the record check box beside the entry for EJBGRP1 and click **Add to WLM specification** to add EJBGRP1 to the workload specification you have just defined (EJBSPEC2). You can verify the management definition hierarchy by selecting this workload management specification and clicking the **Map** button.

11. Add the workload manager specification to the system group comprising all MASs, that is, the listener and the AORs. The target scope is still the group which consists of the AOR MASs only (EJBCSG02).
    - From the main menu, click **Administration views > Workload manager administration views**.
    - From the **Workload manager administration views** menu, click **Specifications** to display the **WLM specifications** tabular view.
    - Select the entry for EJBSPEC2 and click the **Associate CICS group...** button.

- Type into EJBCSG01 in the **CICS system group** field and click one of the options Force, Null, or None.
- Click **Yes** to create the association between WLM specification EJBSPEC2 and CICS system group EJBCSG01.
- From the main menu, click **Administration views > Workload management administration views > Specifications to system group links** to display the **WLM specifications to system group links** view, which will confirm the association between specification EJBSPEC2 and CICS system group EJBCSG01.

.

12. When all of the MASs are restarted, ensure that each MAS confirms:

    EYUNL0160I *xxxxxxxx* Workload registration complete

    where *xxxxxxxx* is the corresponding MAS name. At that point, the workload management environment should be ready to separate execution of enterprise bean *Alpha* to MAS CICSPA01, *Beta* bean to MAS CICSPA02, and *Gamma* bean to MAS CICSPA03.

13. To inspect the use counts for each transaction and expect to see them incremented each time one of these beans is driven from your client:
    - From the main menu, click **Local or dynamic transactions**.
    - On the **Local or dynamic transactions** tabular view (LOCTRAN object), enter EJB* into the Transaction ID field and click **Refresh.**. The EJB* transactions are displayed with a count of the number of times each transaction is used.

You may, if you want, introduce more granularity into the separation of your enterprise beans by separating them by bean method calls. Thus, for example, you can send Bean1.method1() to CICS1 and Bean1.method2() to CICS2. To do this you must define your transactions, copying the CIRP transaction definition as described earlier. For each of the methods to be separated, you need to define a request model with the **Interface type** (INTERFACE) attribute defined as REMOTE and associate one of the transactions with it. You also need a request model with **Interface type** (INTERFACE) attribute defined as either HOME or BOTH to handle calls to the local region and direct them to the appropriate AOR. Then continue with the instructions for separation of enterprise beans given earlier

Managing a Link3270 bridge workload

These examples describe how to use the Web User Interface (WUI) to manage a Link3270 bridge workload.

In the case of Link3270 bridge requests, the client application in the requester region calls the Link3270 bridge using EXEC CICS LINK, EXCI or ECI, and passes a communication area to the bridge router program, DFHL3270, which runs in the router region. The transaction ID that is used for Link3270 bridge workload routing is the name that is passed to DFHL3270 in the communication area and is not necessarily the same as the transaction name entered at the terminal or workstation. The target regions contain the bridge environment in which the target transaction runs. The target regions must be at CICS Transaction Server for z/OS, Version 2 Release 2 or later because earlier releases do not contain the correct Link3270 bridge environment.

When CICSPlex SM is in use and the CICSPlex SM routing exit, EYU9XLOP, is specified as the system initialization parameter DTRPGM parameter, DFHL3270

uses CICS distributed program linking to pass control to EYU9XLOP. The mirror program, DFHMIRS, passes the following information to EYU9XLOP in the DFHDYPDS communication area:

- A DYRTYPE value of 8, which indicates a Link3270 bridge request type
- An eight-character bridge token in the DYRBRTK field
- The transaction ID of the transaction that is to execute in the target region in the DYRTRAN field

For more information about the Link3270 bridge see the *CICS External Interfaces Guide*.

CICS distributed program linking is described in detail in the *CICS Intercommunication Guide*

Link3270 bridge workload example

In this example CICSPT01 is the router region and the target regions are CICSPA01, CICSPA02 and CICSPA03.

1. If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
2. Set the DTRPGM system initialization parameter to EYU9XLOP in all regions. (See *CICS System Definition Guide*.)
3. Update definitions
   a. From the Web User Interface main menu, click **Administration views > Topology administration views > System definitions** to open the **CICS system definition** tabular view.
   b. Select the entry for CICSPT01 and click **Update** to open a detail view of CICSPT01.
   c. Scroll down to the **Workload manager status** field and select **YES** from the menu.
   d. Scroll down to the **AOR dynamic routing mode** field and select **YES** from the menu .
   e. Click **Yes** at the bottom of the view to return to the **CICS system definitions** tabular view. (See *CICSPlex System Manager Administration* for a description of the CICS system definition view.)

      This change takes effect when the target region CICSPA01 is next started.

      Repeat this for the regions CICSPA01, CICSPA02 and CICSPA03.
4. Create a CICS system group
   a. From the main menu click **Administration views > Topology administration views > System groups** to open the **System group definitions** tabular view.
   b. Scroll to the bottom of the view and click **Create**, to create a system group called CSGTGTS1

      CSGTGTS1, in this example, is to contain the regions that are to act as targets. (See *CICSPlex System Manager Administration* for a description of the **System group definitions** view.)
5. Add the target regions to CSGTGTS1.
6. Create a workload specification
   a. From the main menu click **Administration views > Workload manager administration views > Specifications** to open the **WLM specifications** tabular view (WLMSPEC object).
   b. Scroll to the bottom of the view, click **Create**, and provide the following information:

WLM specification name
    BRSPEC01
Description
    Link3270 Bridge Workload
Primary search criterion
    USERID
Automatic affinity creation option
    N/A
Default target scope
    BRITGTS1
Algorithm type
    QUEUE

Leave the remaining fields empty or accept the defaults.

You must supply:

- The name of the workload specification. In this example it is called BRSPEC01.

- A **Primary search criterion** value. USERID is shown in this example, though in fact it doesn't matter whether you specify USERID or LUNAME, because the **Primary search criterion** value has no effect on simple workload routing. It is used only for some kinds of workload separation, but you have to supply a value because CICSPlex SM doesn't know, at this stage, that you aren't going to use this workload specification for workload separation.

- A **Default target scope**, which is the name of the region or group of regions (BRITGTS1 in this example) to which work is to be routed.

- An **Algorithm type**. This example uses QUEUE but you can specify either QUEUE or GOAL for Link3270 bridge requests.

7. Associate the workload specification with the routing region scope

  - On the **WLM specifications** tabular view, select the record for BRSPEC01 and click the **Associate CICS system...** button.

  - Enter the routing region scope into the **CICS system** field and click **Yes**.

When the regions are next restarted, the workload will be routed across the target regions. You can use the **Active workloads** view (WLMAWORK object) to check that workload specification BRSPEC01 is active. You can use the **Target region in active workload** view (WLMAWAOR object) to see to which target regions workloads are being routed.

Separating a Link3270 bridge workload

You can separate Link3270 bridge workloads by user ID or transaction group. You can also separate by LU name, but only if you are overriding the NETNAME that the bridge generates automatically.

For Link3270 bridge workloads the LU name is the eight–character NETNAME of the terminal running the client transaction that started the Link3270 bridge, rather than the NETNAME of the bridge facility itself.

This example uses the same configuration as that described in Chapter 7, "Creating workload management definitions using the WUI," on page 65.

To separate by bridge facility NETNAME you must modify the EYU9WRAM module. See "Separating Link3270 bridge workloads" on page 15 for more information. CICS routes all transactions running under the same bridge facility to the same target region. You cannot force them to go to different regions.

The following example describes how to separate a bridge workload by user ID and transaction group. Add the following definitions to those that you created in Chapter 7, "Creating workload management definitions using the WUI," on page 65.

1. Creating a transaction group
   a. From the Web User Interface main menu, click **Administration views—>Workload manager administration views—>Transaction group definitions**. This opens the **Transaction group definition** view, listing any transaction groups already defined in PLXPROD1.

      If the current context is not PLXPROD1, specify PLXPROD1 in the **Context** field and click **Refresh**.
   b. Scroll to the bottom of the view, click **Create**, and provide the following information:

      Transaction group name
      > TRGBRI01

      Description
      > Link3270 bridge transaction group

      Affinity relation and lifetime checking status
      > ACTIVE

      Primary search criterion
      > USERID

      Automatic affinity creation option
      > N/A

      You can leave the remaining fields or accept the defaults.
   c. Click **Yes**. The **Transaction group definition** view is redisplayed, now showing the name of the transaction group TRGBRI01.

   The **Affinity relationship** and **Affinity lifetime** fields must be left blank and the **Automatic affinity creation option** field set to **N/A** because CICSPlex SM does not handle affinities between Link3270 bridge transactions.

   A complete description of the **Transaction group definition** view is given in Transaction group definitions - TRANGRP.
2. Identify the transactions in group TRGBRI01.
   a. In the **Transaction group definition** view, select the entry for TRGPAY03, and click **Add transaction** .
   b. Type the name BRI1 in the **Transaction name** field, and click **Yes** to confirm. The **Transaction group definition** is redisplayed.
3. Repeat the previous two steps for any further transactions that you want to be routed to different regions.
4. Create a workload definition.
   a. From the main menu, click , **Administration views—>Workload manager administration views—>Definitions**. This opens the **Workload management definition** view.
   b. Scroll to the bottom of the view, click **Create**, and provide the following information:

      Workload management definition name
      > WLDBRI01

      Description
      > Separate Link3270 bridge activities

      Transaction group name
      > TRGBRI01

      Terminal LU name
      > *

      User ID
      > BRIUSER1

BTS process type
>   *
Scope name of set of target systems
>   CICSPA01
    c. Click **Yes** to confirm.

These values indicate that transactions in group TRGBRI01 entered by BRIUSER1 are to be routed to CICSPA01.

A complete description of the **Workload definitions** view is given in Definitions - WLMDEF.

5. Repeat the previous step for any further transaction groups you have created for transactions that are to be routed to different regions.
6. Create a workload group.

    A workload group is essential if you want a workload definition to be installed automatically when the routing region that's routing the transactions is started.
    a. From the main menu, click , **Administration views—>Workload manager administration views—>Groups**. This opens the **Workload management group** view, listing any workload groups already created in PLXPROD1.
    b. Click **Create** and type in the following:
    Workload management group name
    >   WLGBRI01
    Description
    >   Workload Group for WLDBRI01
    c. Click **Yes** to confirm. The **Workload management group** view is redisplayed.

    A complete description of the **Workload management group** view is given in Groups - WLMGROUP.
7. Add the workload definition WLDBRI01 and any other workload definitions you have created to WLGBRI01:

    Create a workload definition.
    a. From the main menu, click , **Administration views—>Workload manager administration views—>Definitions**. This opens the **Workload management definition** view.
    b. Select the entry for WLDBRI01, click **Add to WLM group**, and provide the following information:
    Workload management definition name
    >   WLDPAY01
    Description
    >   Link3270 bridge workload definition
    Resource group name
    >   WLGBRI01
    c. Click **Yes** to confirm.
    d. Repeat for any additional workload definitions that you created earlier.
8. Add workload group WLGBRI01 to workload specification BRSPEC01.
    a. From the main menu, click **Administration views—>Workload manager administration views—>Groups**. This opens the **Workload management (WLM) group** view.
    b. Select the entry for WLGBRI01, click **Add to WLM specification**, and type BRSPEC01 in the **Specification name** field.
    c. Click **Yes** to confirm.
9. Install definition into the active workload.
    a. From the main menu, click **Administration views—>Workload manager administration views—>Definitions**. This opens the **Workload management definition** view.

b. Select the entry for WLDBRI01, click **Install** to install it into the active workload. Click **Yes** to confirm. This ensures that the workload separation definitions you have just created take effect immediately.

c. Click **Yes** to confirm.

You can check that the workload definition is active using the **Workload definition installed in active workload** view.

Note: If you want to separate by luname you must enter LUNAME in the **Primary search criterion** field of the **Transaction group definition** create view and the luname in the **Terminal LU name** field of the **Workload management definition** create view. Refer to "Separating Link3270 bridge workloads" on page 15 for a description of the restrictions on the use of luname when separating Link3270 bridge workloads.

Part 4. Appendixes

Appendix. Sample programs

The sample calling sequence example helps you to access CICSPlex SM workload management facilities. The sample modules help you to compile your own router access module.

Sample calling sequence

This code example illustrates a sample calling sequence for a program that accesses CICSPlex SM workload management facilities. It is not intended to be used as a sample program and is, therefore, not complete in every detail.

```
*---------------------------------------------------------------------*
        DFHEISTG ,                      Define Workarea
WRK_WTRA      DS    CL(WTRA_LENGTH)
              DS    0D
WRK_UOWCOMM   DS    0C
WRK_UOW_RESP  DS    F
WRK_UOWCOMM_L EQU  *-WRK_UOWCOMM
        COPY  EYURWTRA                  Include DSECT to map WTRA
SRVPGM  DFHEIENT EIBREG=R11,DATAREG=R13,CODEREG=R12


*---------------------------------------------------------------------*
* Initialize the WTRA COMMAREA.                                       *
*---------------------------------------------------------------------*
        LA    R8,WRK_WTRA           --> WTRA
        USING EYURWTRA,R8           *** USING WTRA ***
        MVC   WTRA_SLENGTH,=AL2(WTRA_LENGTH)
                                    Set length of block.
        MVI   WTRA_ARROW,C'>'       Set arrow.
        MVC   WTRA_NAME,=C'EYURWTRA'  Set the name.
        MVI   WTRA_BLANK,C' '       Set blank delimit.
        MVC   WTRA_PGMNAME,=CL8'SRVPGM  '
                                    Set program name.
        MVC   WTRA_TERMID,=CL4'TRM1'  Set TermID.
        MVC   WTRA_USERID,=CL8'USR1'  Set USERID.
        MVC   WTRA_LUNAME(8),=CL8'.NET1'
                                    Set LUNAME.
        MVC   WTRA_TRANID,=CL8'TRN1'  Set TRANID.
        MVC   WTRA_SYSID,=C'SYS1'     Set SYSID.
        MVC   WTRA_APPLID,=C'APPLID1' Set Applid.
        MVI   WTRA_FUNC,WTRA_FUNCSEL  Set the Route Select Function.
        MVI   WTRA_DYRTYPE,WTRA_DYRTYPE_DYN
*---------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Select.                          *
*---------------------------------------------------------------------*
ROUTE_SELECT  DS  0H
        BAS   R5,LINK_WLM           Go do it.
        CLC   WTRA_RESPONSE,=F'0'   Call go OK?
        BNE   CHECK_OPTER           ..no.
        BAS   R5,START_UOW          Go Start the UOW.
        LTR   R15,R15               Work Completed?
        BZ    ROUTE_TERM            ..yes.
        BP    ROUTE_ABND            UOW gave non zero return code.
        C     R15,=F'-4'            SYSID error?
        BNE   ROUTE_ABND            ..no.
*---------------------------------------------------------------------*
* Invoke the WLM MAS Agent for Route Error.                           *
*---------------------------------------------------------------------*
ROUTE_ERROR   DS  0H
        MVI   WTRA_FUNC,WTRA_FUNCERR  Set the Termination Function.
```

```
              MVI   WTRA_ERR,WTRA_ERROUT    Say out of service.
              B     ROUTE_SELECT            Go Get another system.


      *----------------------------------------------------------------*
      * Invoke the WLM MAS Agent for Route Abend.                      *
      *----------------------------------------------------------------*
      ROUTE_ABND   DS   0H
              MVI   WTRA_FUNC,WTRA_FUNCABD  Set the Abend function.
              BAS   R5,LINK_WLM             Go terminate.
              CLC   WTRA_RESPONSE,=F'0'     OK?
              BE    EXIT_ABD                ..yes.
      CHECK_OPTER  DS   0H
              CLI   WTRA_OPTER,WTRA_CALLYES Call WLM for Term?
              BNE   WLM_CALLERR             ..no.


      *----------------------------------------------------------------*
      * Invoke the WLM MAS Agent for Route Termination                 *
      *----------------------------------------------------------------*
      ROUTE_TERM   DS   0H
              MVI   WTRA_FUNC,WTRA_FUNCTRM  Set the Termination Function.
              MVC   WTRA_NEXTTRAN,=CL8'TRN2'                           X
                                            Set the next TRANID.
              BAS   R5,LINK_WLM             Go terminate.
              CLC   WTRA_RESPONSE,=F'0'     OK?
              BE    EXIT_TERMOK             ..yes. .


      *----------------------------------------------------------------*
      * The WLM MAS AGENT returned an 8 in WTRA_RESPONSE               *
      *----------------------------------------------------------------*
      WLM_CALLERR  DS   0H


      *----------------------------------------------------------------*
      * Process completed successfully                                 *
      *----------------------------------------------------------------*
      EXIT_TERMOK  DS   0H


      *----------------------------------------------------------------*
      * Route Abend Call returned a 0                                  *
      *----------------------------------------------------------------*
      EXIT_ABD     DS   0H
      EXIT         DS   0H
              EXEC  CICS RETURN
      *----------------------------------------------------------------*
      * LINK_WLM     : Link to the WLM MAS AGENT                       *
      *----------------------------------------------------------------*
      LINK_WLM     DS   0H
              EXEC  CICS LINK PROGRAM(EYU9XLOP)                        X
                    COMMAREA(EYURWTRA) LENGTH(=AL2(WTRA_LENGTH))       X
              BR    R5                      Exit routine.

      *----------------------------------------------------------------*
      * START_UOW    : Start the Unit Work.                            *
      *----------------------------------------------------------------*
      START_UOW    DS   0H
              EXEC  CICS LINK PROGRAM(UOWPGM)                          X
                    COMMAREA(WRK_UOWCOMM) LENGTH(=AL2(WRK_UOWCOMM_L))  X
                    SYSID(WTRA_SYSID)                                  X
                    RESP(WRK_EIBRESP)
              CLC   WRK_EIBRESP,DFHRESP(NORMAL)                        X
                                            Did call go ok?
              BE    START_UOWL              ..yes.
              L     R15,=F'-4'              Assume SYSIDERR
              CLC   WRK_EIBRESP,DFHRESP(SYSIDERR)                      X
                                            Is there one?
              BE    START_UOWX              ..yes.
              L     R15,=F'-8'              Load Failure code.
              B     START_UOWX              Go exit.
      START_UOWL   DS   0H
```

```
                 L     R15,WORK_UOW_RESP        Load Response Code.
   START_UOWX     DS  0H
                 BR    R5                       Exit routine.
```

Sample user-replacement modules

Use these code examples to compile the EYU9WRAM module. When you replace the default CPSM router access module, EYU9WRAM, with your own module, use one of these code samples to compile it depending on the language of your module.

The sample user-replacement module procedures are:

Assembler language

```
//APPLPROG  EXEC EYUEITAL,
//          OUTC=*,
//          CPSMHLQ='CPSM410',
//          CICSHLQ='CICS660',
//          LMODDSN='user.load.library',
//          TRNPARM=('NOPROLOG,NOEPILOG'),
//          LNKPARM=('RENT,REUS,AMODE=31,RMODE=ANY,XREF,MAP,LIST')
//TRN.SYSIN  DD DISP=SHR,DSN=user.source.library(EYU9WRAM)
//LKED.SYSIN DD *
 INCLUDE SYSLIB(EYU9WAPI)
 NAME EYU9WRAM(R)
/*
```

Figure 14. Sample JCL for replacement module for Assembler language

C language

```
//APPLPROG  EXEC EYUEITDL,
//          OUTC=*,
//          CPSMHLQ='CPSM410',
//          CICSHLQ='CICS660',
//          EDCHLQ='SYS1',
//          COMHLQ='SYS1',
//          LMODDSN='user.load.library',
//          CPARM=('RENT,SOURCE,SHOWINC,TERM',
//          'AGGREGATE,LIST,OFFSET'),
//          LNKPARM=('RENT,REUS,AMODE=31,RMODE=ANY,XREF,MAP,LIST')
//TRN.SYSIN  DD DISP=SHR,DSN=user.source.library(EYU9WRAM)
//LKED.SYSIN DD *
 INCLUDE  SYSLIB(EYU9WAPI)
 NAME    EYU9WRAM(R)
/*
```

Figure 15. Sample JCL for replacement module for C language

> **Note:** When the C EYU9WRAM sample is compiled using Version 1.0 of the IBM C/370 compiler, EDC0244 warning message will occur because the compiler truncates some of the field names.

PL/I language

```
//APPLPROG  EXEC EYUEITPL,
//           OUTC=*,
//           CPSMHLQ='CPSM410',
//           CICSHLQ='CICS660',
//           PLIHLQ='SYS1.IBMSYS.SYS',
//           LMODDSN='user.load.library',
//           PLIPARM=('OBJECT,NODECK,INCLUDE,SYNTAX,LIST,MAP',
//           'STORAGE,OFFSET,XREF',
//           'LANGLVL(OS,SPROG),SYSTEM(CICS)'),
//           LNKPARM=('RENT,REUS,AMODE=31,RMODE=ANY,XREF,MAP,LIST')
//TRN.SYSIN  DD DISP=SHR,DSN=user.source.library(EYU9WRAM)
//LKED.SYSIN DD *
 INCLUDE  SYSLIB(EYU9WAPI)
 NAME    EYU9WRAM(R)
/*
```

Figure 16. Sample JCL for replacement module for PL/I language

COBOL language

```
//APPLPROG  EXEC EYUEITVL,
//           OUTC=*,
//           CPSMHLQ='CPSM410',
//           CICSHLQ='CICS660',
//           LMODDSN='user.load.library',
//           COBPARM=('LIB,OBJECT,RENT,RES',
//           'APOST,MAP,XREF,TRUNC(BIN)'),
//           LNKPARM=('RENT,REUS,AMODE=31,RMODE=ANY,XREF,MAP,LIST')
//TRN.SYSIN  DD DISP=SHR,DSN=user.SOURCE.library(EYU9WRAM)
//LKED.SYSIN DD *
 INCLUDE  SYSLIB(EYU9WAPI)
 NAME    EYU9WRAM(R)
/*
```

Figure 17. Sample JCL for replacement module for COBOL language

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Bibliography

CICS books for CICS Transaction Server for z/OS

General
CICS Transaction Server for z/OS Program Directory, GI13-0536
CICS Transaction Server for z/OS What's New, GC34-6994
CICS Transaction Server for z/OS Upgrading from CICS TS Version 2.3, GC34-6996
CICS Transaction Server for z/OS Upgrading from CICS TS Version 3.1, GC34-6997
CICS Transaction Server for z/OS Upgrading from CICS TS Version 3.2, GC34-6998
CICS Transaction Server for z/OS Installation Guide, GC34-6995

Access to CICS
CICS Internet Guide, SC34-7021

CICS Web Services Guide, SC34-7020

Administration
CICS System Definition Guide, SC34-6999
CICS Customization Guide, SC34-7001
CICS Resource Definition Guide, SC34-7000
CICS Operations and Utilities Guide, SC34-7002
CICS RACF Security Guide, SC34-7003
CICS Supplied Transactions, SC34-7004

Programming
CICS Application Programming Guide, SC34-7022
CICS Application Programming Reference, SC34-7023
CICS System Programming Reference, SC34-7024
CICS Front End Programming Interface User's Guide, SC34-7027
CICS C++ OO Class Libraries, SC34-7026
CICS Distributed Transaction Programming Guide, SC34-7028
CICS Business Transaction Services, SC34-7029
Java Applications in CICS, SC34-7025

Diagnosis
CICS Problem Determination Guide, GC34-7034
CICS Performance Guide, SC34-7033
CICS Messages and Codes, SC34-7035
CICS Diagnosis Reference, GC34-7038
CICS Recovery and Restart Guide, SC34-7012
CICS Data Areas, GC34-7014
CICS Trace Entries, SC34-7013
CICS Supplementary Data Areas, GC34-7015
CICS Debugging Tools Interfaces Reference, GC34-7039

Communication
CICS Intercommunication Guide, SC34-7018
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Databases
CICS DB2 Guide, SC34-7011
CICS IMS Database Control Guide, SC34-7016

CICS Shared Data Tables Guide, SC34-7017

CICSPlex SM books for CICS Transaction Server for z/OS

General
CICSPlex SM Concepts and Planning, SC34-7044
CICSPlex SM Web User Interface Guide, SC34-7045

Administration and Management
CICSPlex SM Administration, SC34-7005
CICSPlex SM Operations Views Reference, SC34-7006
CICSPlex SM Monitor Views Reference, SC34-7007
CICSPlex SM Managing Workloads, SC34-7008
CICSPlex SM Managing Resource Usage, SC34-7009
CICSPlex SM Managing Business Applications, SC34-7010

Programming
CICSPlex SM Application Programming Guide, SC34-7030
CICSPlex SM Application Programming Reference, SC34-7031

Diagnosis
CICSPlex SM Resource Tables Reference, SC34-7032
CICSPlex SM Messages and Codes, GC34-7035
CICSPlex SM Problem Determination, GC34-7037

Other CICS publications

The following publications contain further information about CICS, but are not provided as part of CICS Transaction Server for z/OS, Version 4 Release 1.

Designing and Programming CICS Applications, SR23-9692

CICS Application Migration Aid Guide, SC33-0768

CICS Family: API Structure, SC33-1007

CICS Family: Client/Server Programming, SC33-1435

CICS Family: Interproduct Communication, SC34-6853

CICS Family: Communicating from CICS on System/390, SC34-6854

CICS Transaction Gateway for z/OS Administration, SC34-5528

CICS Family: General Information, GC33-0155

CICS 4.1 Sample Applications Guide, SC33-1173

CICS/ESA 3.3 XRF Guide , SC33-0661

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Version 4 Release 1
CICSPlex SM Managing Workloads

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