

IBM IMS Workload Router for z/OS
2.7

User's Guide and Reference



Note:

Before using this information and the product it supports, read the information in [“Notices” on page 99.](#)

Fourth Edition (January 2023)

This edition applies to Version 2.7 of IBM IMS Workload Router for z/OS (program number 5697-B87) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this information

IBM® IMS Workload Router for z/OS® (also referred to as IMS Workload Router) is an IMS Tools product that works with the IMS Transaction Manager (TM) to route or balance the IMS transaction workload across multiple IMS systems in a sysplex or non-sysplex environment.

These topics provide instructions for installing, configuring, and using IMS Workload Router.

To use these instructions, you must have already installed IMS Workload Router by completing the instructions in the *Program Directory for IBM IMS Workload Router for z/OS* (GI10-9897), which is included with the product media and is also available on the IMS Tools Product Documentation page.

These topics are designed to help database administrators, system programmers, application programmers, and system operators perform the following tasks:

- Understand the capabilities of the functions that are associated with IMS Workload Router
- Install and operate IMS Workload Router
- Customize your IMS Workload Router environment
- Diagnose and recover from IMS Workload Router problems
- Use IMS Workload Router with other IMS products

To use these topics, you should have a working knowledge of:

- The z/OS operating system
- ISPF
- SMP/E
- IMS

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

- Links to [IBM Documentation](#) for the user guides ("HTML")
- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products
- Technical notes from IBM Software Support, referred to as "Tech notes"
- White papers that describe product business scenarios and solutions

Chapter 1. IBM IMS Workload Router for z/OS overview

IBM IMS Workload Router for z/OS (also referred to as IMS Workload Router) works with the IMS Transaction Manager (TM) to route or balance the IMS transaction workload across multiple IMS systems in a sysplex or non-sysplex environment.

Topics:

- [“What's new in IMS Workload Router” on page 1](#)
- [“What does IMS Workload Router do?” on page 2](#)
- [“Service updates and support information” on page 4](#)
- [“Product documentation and updates” on page 4](#)
- [“Accessibility features” on page 5](#)

What's new in IMS Workload Router

This topic summarizes the technical changes for this edition.

New and changed information is indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

Revision markers follow these general conventions:

- Only technical changes are marked; style and grammatical changes are not marked.
- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If a topic is changed by more than 50%, the entire topic is marked with revision markers (so it might seem to be a new topic, even though it is not).

Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

SC19-3227-03 - January 2023

Description	Related APARs
This enhancement supports OTMA descriptor names for the SERVCMD option.	PH50835
The following topics have been updated:	
• “SERVCMD option” on page 22	
• “Diagnostic trace” on page 27	
• “IWXOPTS” on page 40	
• “IWXROUTR” on page 48	
• “RLADD (add external router list entry)” on page 68	
• “RLSET (modify external router list entry)” on page 70	

SC19-3227-02 - April 2018

Description	Related APARs
IMS version support updated.	N/A

Description	Related APARs
The routed transaction workload must be defined to IMS in order for an SMB (scheduler message block) control block to be available to IMS Workload Router.	N/A
Diagnostic trace: IMS Workload Router internal trace entries	N/A

What does IMS Workload Router do?

IMS Workload Router provides flexibility in how the workload is routed and also allows routing to be changed dynamically. Without IMS Workload Router, you would need to design and code several Multiple Systems Coupling (MSC) user exits to achieve similar workload balancing.

IMS Workload Router software is integrated with IMS TM software, providing workload balancing that is completely transparent to end users and IMS applications.

IMS Workload Router manages the routing and execution of IMS transaction workloads using the IMS MSC feature. IMS Workload Router can use existing or new MSC network resources. IMS Workload Router supports all types of MSC physical links.

IMS Workload Router superimposes the roles of *router* (front end) and *server* (back end) systems on IMS systems in the IMS Workload Router configuration. Routers route the transaction workload to servers; servers process the transactions and return any responses to the router.

IMS Workload Router supports a configuration of one or more router systems coupled with one or more server systems. This makes IMS Workload Router adaptable to a wide variety of IMS system configurations.

IMS Workload Router highlights

- Using MSC, distributes IMS transactions that originate from network input or program-to-program message switches.
- Provides for weighted distribution of transactions, that is, different server (back end) systems can receive different parts of the workload.
- Provides an online, real-time administrator interface for monitoring and dynamically updating the IMS Workload Router configuration.
- Supports parallel MSC sessions between the router (front end) and server (back end) systems.
- Automatically recognizes and avoids routing transactions (including remote transactions) to unavailable server systems and MSC links.

Automatically reconfigures the workload when planned or unplanned outages occur.

- Allows routing to single paths or links, or to a system of IMS Workload Router-defined paths or links.
- Has sophisticated surge detection and suppression capabilities to avoid potential performance problems.
- Supports the notion of transaction *affinity*.

Assigns transactions or groups of transactions to one or more designated server systems.

Affinities are useful for functional compatibility (transactions that cannot tolerate executing in different systems), performance, and tuning purposes (such as assigning CPU intensive transactions to more powerful central electronics complexes (CECs)).

Affinities are also useful for avoiding deadlock situations in a data sharing environment.

- Has a trace to help diagnose any IMS Workload Router problems.
- Is flexible and can be customized to meet the needs of different installations.
- Offers server options for both cloned and non-cloned DC networks.
- Requires no IMS user modifications to install.

IMS Workload Router benefits

In a **sysplex** environment, IMS Workload Router helps unlock the benefits of IBM's Parallel Sysplex® technology.

These benefits include:

- Reduced time and expense. With IMS Workload Router, workload balancing is more manageable than with multiple, stand-alone processors.
- Augmented computing capacity. IMS system capacity can be more easily augmented without the need for a processor upgrade.
- Increased system availability. System capacity can be added without interrupting service.

IMS subsystems can be added without changing applications, and scheduled maintenance can be done without shutting down the system.

- Flexibility in configuring workloads in a sysplex environment.

Peak processing demands and varied application workloads can be balanced against processor groups without affecting data design.

In a sysplex environment with shared queue, IMS Workload Router affinity routing lets you force IMS inbound transaction messages to be processed on the local system (the system where they arrive).

In a **non-sysplex** environment, IMS Workload Router can be used as a generalized routing tool to extend the availability, throughput, and response time objectives of installations using MSC.

Applicable environments

IMS Workload Router works in both a sysplex and non-sysplex environment.

In the sysplex environment, IMS Workload Router works well with both cloned and non-cloned IMS configurations.

Cloned IMS configuration

A cloned IMS configuration only applies in the sysplex environment. There are significant advantages to working with IMS Workload Router in a cloned configuration.

In a *cloned* configuration, the same application system resources (including transactions, programs, and databases) are shared among multiple IMS systems operating in a sysplex. With IMS Workload Router, the transaction workload can easily be shared among participating IMS systems.

Cloning offers greater availability for planned and unplanned outages because application system resources are accessible through multiple IMS systems. End users connecting to a failing IMS system can reestablish communications with one of the other cloned IMS systems to access their mission-critical applications.

Non-cloned IMS configuration

A non-cloned IMS configuration can exist in either a sysplex or non-sysplex environment.

In a non-cloned configuration, IMS Workload Router enhances use of MSC remote transactions by preventing remote transactions from being queued to MSC links that are inactive; IMS Workload Router indicates inactive status to the end user entering a transaction.

IMS Workload Router also helps eliminate MSC link failures by assigning remote destinations to a group of MSC links. If an IMS Workload Router-defined link fails, IMS Workload Router automatically reroutes work to an alternate link.

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

[IBM Support: IMS Workload Router for z/OS](#)

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM My Notifications service.

Information on the web

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

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- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products
- Technical notes from IBM Software Support, referred to as "Tech notes"
- White papers that describe product business scenarios and solutions

IBM Redbooks® publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The IBM Information Management System website shows how IT organizations can maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<https://www.ibm.com/software/data/ims/>

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4. Click **Continue** to specify the types of updates that you want to receive.
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To help us respond quickly and accurately, please include as much information as you can about the content you are commenting on, where we can find it, and what your suggestions for improvement might be.

Accessibility features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use a software product successfully.

The major accessibility features in this product enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. Refer to the following publications for information about accessing ISPF interfaces:
 - *z/OS ISPF User's Guide, Volume 1*
 - *z/OS TSO/E Primer*
 - *z/OS TSO/E User's Guide*

These guides describe how to use the ISPF interface, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Chapter 2. Concepts and planning information

IMS Workload Router functions as IMS Transaction Manager user exits. It distributes an IMS transaction workload among two or more IMS online systems interconnected through MSC (multiple system coupling) communications links.

IMS Workload Router distributes the IMS transaction workload among predefined paths or systems of paths. The paths are equivalent to MSC MSNAMEs defined to the IMS system. Multiple paths can be defined between IMS systems. Each path is associated with a goal, which is a percent of the total number of IMS transactions to be distributed to that path.

In addition to balancing the workload among IMS systems, IMS Workload Router balances the flow of work over MSC links within the configuration. IMS Workload Router is sensitive to the availability of MSC link components. If IMS Workload Router detects that an MSC link is not available, it automatically routes arriving transactions to another MSC link (including remote transactions). When the unavailable link later becomes available, IMS Workload Router automatically starts rerouting work to it.

The IMS Workload Router concept of *affinity* lets transactions be specifically or generically included or excluded from routing. Through affinity definitions, specific transactions can be directed toward certain paths or systems of paths, processed locally, or processed remotely. Affinity definitions let you designate specific transaction names, generic transaction names (such as abc*), affinity by IMS transaction scheduler class, or affinity by remote MSC system ID (sysid).

IMS Workload Router includes an online administrator interface. From a single point of control, the interface lets you monitor and dynamically change the IMS Workload Router configuration for a single IMS Workload Router system. The interface executes as an unauthorized IMS message processing program in a standard IMS message processing region.

The following topics describe these IMS Workload Router concepts and facilities in greater detail, and provides information to help you plan for using IMS Workload Router.

Topics:

- [“Hardware and software requirements” on page 8](#)
- [“IMS system cloning” on page 8](#)
- [“Routers and servers” on page 8](#)
- [“Remote destination routing \(RDR\)” on page 10](#)
- [“Routing conditions” on page 11](#)
- [“Paths” on page 12](#)
- [“Systems” on page 13](#)
- [“Affinities” on page 13](#)
- [“Surge suppression” on page 17](#)
- [“MSC routing exits” on page 19](#)
- [“Server system support” on page 21](#)
- [“MSC link resources in multiple router configurations” on page 23](#)
- [“MSC performance” on page 24](#)
- [“Configuration checkpoints” on page 25](#)
- [“IMS Workload Router post-processing utility” on page 25](#)
- [“Diagnostic trace” on page 27](#)
- [“IMS Workload Router storage use” on page 29](#)
- [“Determining whether IMS subsystem is active router” on page 30](#)

Hardware and software requirements

Before you install and configure IMS Workload Router, make sure that your environment meets the following minimum hardware and software requirements.

Hardware prerequisites

IMS Workload Router is designed to operate in any hardware environment that supports any supported release of IMS.

Software prerequisites

IMS Workload Router is designed to operate with any version of z/OS that supports the version of IMS that you are running. All supported releases of IMS are supported by IMS Workload Router.

IMS system cloning

IMS Workload Router was designed to enable implementation of a cloned IMS system configuration.

A *cloned* IMS system configuration is one in which the same application system resources (including transactions, programs, and databases) are shared among multiple IMS systems operating in a Parallel Sysplex configuration that is also sharing a common transaction workload. Transactions executing in such a configuration should have access to a common set of DL/I databases through IMS N-way or 2-way data sharing.

IMS Workload Router works well with both cloned and non-cloned system configurations. There are, however, significant advantages to using IMS Workload Router in a cloned environment.

Cloning can also be used to augment the capacity of existing parallel sysplex-compatible mainframes. By coupling these mainframes with additional processors, additional capacity can be added to an existing IMS system.

In addition to the increased capacity offered by cloning, significant availability enhancements can be gained for both planned and unplanned outages. Since application system resources are accessible through multiple IMS systems, the loss of an IMS system does not eliminate access to the application system and its data. End users connected to a failing IMS system can reestablish communication with one of the other cloned IMS systems to access cloned, mission-critical applications.

IMS Workload Router makes exploitation of cloning possible by balancing an IMS workload among the cloned IMS systems. IMS Workload Router is composed of two components: the router and the administrative interface:

- The *router* is the IMS Workload Router component responsible for routing individual IMS transactions throughout the sysplex.
- The *administrative interface* is a real time interface to the router that lets a system administrator monitor and adjust the IMS Workload Router configuration.

Routers and servers

IMS Workload Router superimposes the roles of router and server systems on IMS systems in the IMS Workload Router configuration. The purpose of routers and servers is to balance the IMS workload.

- An IMS Workload Router *router* system is an IMS Workload Router-capable IMS system that routes some portion of the inbound transaction workload to IMS server systems connected by MSC.

Note: The routed transaction workload must be defined to IMS in order for an SMB (scheduler message block) control block to be available to IMS Workload Router, which provides information used when making a routing decision.

- An IMS Workload Router *server* system processes the transactions received from router systems and returns any transaction responses to the original router system.

The following figure shows a three-way, cloned IMS system configuration with IMS Workload Router installed.

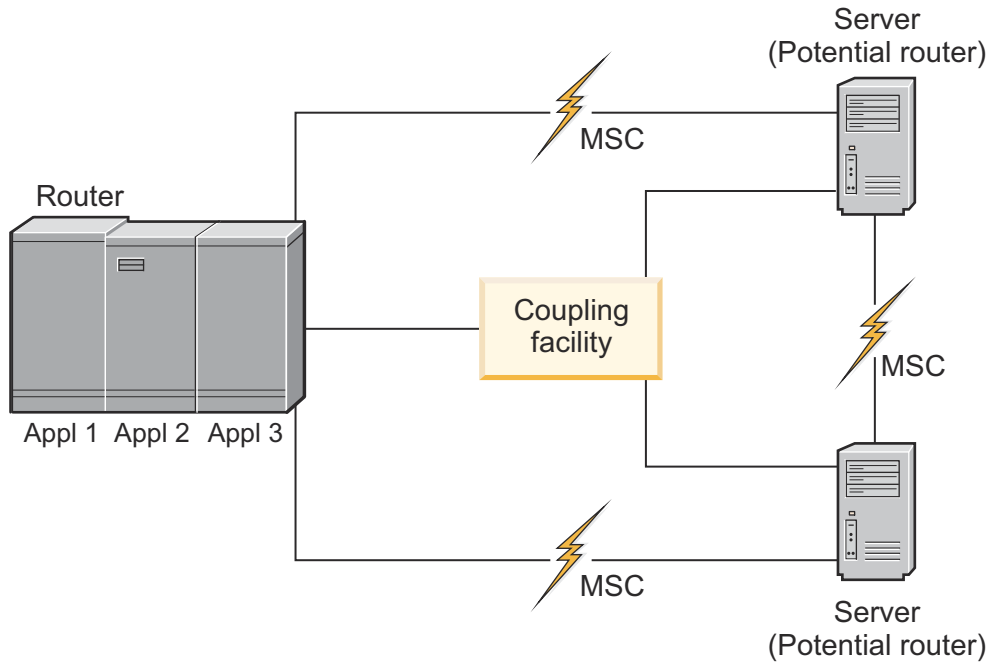


Figure 1. IMS Workload Router three-way cloned configuration

This figure shows a bank of routers connected by MSCs to two separate servers. These servers are connected to each other as well, for those times when they act as intermediate routers.

The following topics discuss the IMS Workload Router configurations shown in the figure.

IMS Workload Router configurations

A given IMS Workload Router configuration can be composed of one or more router systems and one or more server systems.

Single router configuration

A single router can be used with one or more server systems that function as "backend" transaction processing IMS systems.

Typically in such a configuration, end users physically connect and submit transactions to the router system. The router system distributes portions of the inbound workload to the server systems, perhaps localizing and processing some designated part of the workload itself.

Single server configuration

A single server system environment might be sufficient for augmenting the capacity of an existing IMS system. However, multiple server systems offer additional flexibility in terms of workload distribution and system availability. By design, IMS Workload Router is sensitive to the availability of MSC links in the IMS Workload Router configuration. Consequently, IMS Workload Router is also sensitive to the availability of server systems at the other end of those MSC links.

In a configuration of multiple server systems, IMS Workload Router automatically avoids routing messages to unavailable MSC links or servers in favor of available ones.

Multiple router configuration

Multiple router systems can be used much like single router system configurations. However, in a multiple router system configuration, end users can physically connect to any router system.

To balance IMS logons, you can partition groups of end users into different IMS systems.

Dual router and server configuration

Support is also provided for a configuration where IMS Workload Router plays a dual role of router and server. In such a configuration, IMS Workload Router acts as:

- A router to the inbound workload originating from end users
- A server to any inbound workload routed from other IMS Workload Router router systems

This configuration also allows transaction *swapping*.

Consider a configuration with two interconnected IMS Workload Router router systems where each plays the role of server to the other. End users could physically connect to either system and enter a variety of transaction types. With the IMS Workload Router affinity mechanism in place on both systems, certain transactions can be directed to one of the IMS systems, and other transactions to the alternate IMS system. This can be a desirable way of partitioning application workloads.

Levels of routing

IMS Workload Router has three levels of routing for maximum flexibility in configuring the IMS Workload Router environment.

Terminal routing

IMS Workload Router routes input transaction messages that originate from terminals, APPC/IMS partners, and OTMA clients.

Program routing

IMS Workload Router routes input transaction messages that originate from IMS application-to-application program message switches.

Affinity routing

This configuration is based solely on an IMS Workload Router affinity definition and is independent of the input source. (terminal or program input)

The affinity definition creates a relationship between the transaction destination and one or more preferred server systems.

Any of the three routing levels can be enabled or disabled independently of the others.

The IMS Workload Router administrative interface also provides functions for dynamically altering routing levels. You can initialize IMS Workload Router with a given set of routing levels and then, sometime later, dynamically re-configure the levels. In this way, IMS Workload Router supports the notion of "part-time" routing.

Consider, for example, an IMS system that could benefit from additional capacity during peak periods of the day. During that time only, one or more IMS Workload Router routing levels could be enabled to share a portion of the workload with one or more server systems. After the peak period, IMS Workload Router routing levels could again be disabled.

Remote destination routing (RDR)

The IMS Workload Router remote destination routing (RDR) feature enhances use of MSC between two or more IMS systems.

The IMS MSC function provides connectivity, message queueing, and message recovery between IMS systems so that transactions can be executed in remote IMS systems. MSC will continue being used to solve a multitude of important business problems including expanded capacity, data partitioning/isolation, and application-to-application connectivity. However, MSC architecture does not provide a way to automatically recover a failed MSC link.

Failure of an MSC link not only impacts the users of that link, but can also increase use of the IMS message queue. In some cases, the backlog of queued messages causes what is known as an IMS message queue overflow. This is a severe IMS system outage.

In addition, MSC itself does not provide any means for link load balancing. MSC does provide support for VTAM® parallel sessions (multiple communications links between two IMS partner systems). However, remote destinations can only be assigned to one MSC link (session) at a time. Therefore, link load balancing becomes the responsibility of both IMS system administrators and IMS application developers.

IMS Workload Router's RDR feature solves both of these MSC shortcomings. RDR is transparent to both IMS end users and existing IMS application programs. RDR automatically does link load balancing for IMS remote destinations that have been identified to IMS Workload Router through its affinity routing mechanism.

The MSC links used by RDR for load balancing are chosen and identified to RDR during the IMS Workload Router customization process. RDR can manage remote transactions that originate from the IMS communications network, as well as those originating from IMS application programs through the DL/I CHNG/ISRT call sequence. RDR also manages input from programs that use the IMS MSC-directed routing interface.

RDR is sensitive to MSC link availability, enabling it to bypass routing to unavailable MSC links and route instead to active links. For situations in which all designated MSC links are unavailable, RDR can be configured to return a *system unavailable* response to end users entering input destined for the partner IMS system(s). As a result, the IMS message queue backlog can be minimized, avoiding an IMS message queue overflow outage.

Routing conditions

The IMS Workload Router router can route input transactions that originate from input terminals (SLU2, 3270, ISC, and so on), APPC/IMS clients, OTMA clients, and IMS application-to-application program message switches driven through the DL/I CHNG and ISRT call sequence.

The routed transaction workload must be defined to IMS in order for an SMB (scheduler message block) control block to be available to IMS Workload Router, which provides information used when making a routing decision.

Routing restrictions

Due to IMS restrictions, the IMS Workload Router router cannot route input transactions that:

- Originate directly from MSC links.

Application-to-application program message switches from a message received over an MSC link can, however, be routed.

- Originate from ISC links where the input transaction code is not contained in the input message segment itself .

(In other words, where the code is contained in the VTAM FMH instead).

- Originate from IMS application-to-application program message switches where the originating application program has not successfully issued a Get Unique (GU) to the IMS message queue.

This includes non-transaction driven programs.

- Originate from IMS application-to-application program message switches through an alternate non-modifiable TP PCB with a "hardcoded" transaction code.
- Originate from immediate application-to-application program message switches through an alternate modifiable TP PCB if both the routing transaction and the target transaction are conversational.

IMS Workload Router can route immediate application-to-application program message switches through an alternate modifiable TP PCB if the target transaction is not conversational, regardless of whether the routing transaction is conversational or not.

- Originate from a deferred message within a conversational transaction.
- Are defined to IMS as Fast Path exclusive.

However, IMS Workload Router can route transactions defined as Fast Path potential.

Paths

An IMS Workload Router *path* is a destination or connection from an IMS Workload Router router IMS system to a given IMS Workload Router server IMS system.

Paths are defined to the IMS Workload Router router during IMS Workload Router customization. In general, an IMS Workload Router path has a one-to-one relationship with a specific IMS MSC MSNAME defined in the IMS SYSGEN for the router system. IMS Workload Router correlates a path with an MSC link through the path name, as path names are equivalent to the MSNAME that they represent.

Multiple paths between router and server systems are supported. Thus, using either MSC VTAM parallel session support and/or some combination of CTC, BSC, or MTM links, multiple access paths between two IMS systems can be defined for enhanced availability or link load-balancing.

For uniformity in prioritizing work, assigning affinity destinations, and calculating IMS Workload Router statistics, the router IMS system has an internal path representation. The path name for the router system is always LOCAL; LOCAL is an IMS Workload Router logical destination for transactions to be processed locally in the router system.

Paths are defined to IMS Workload Router with *weights*. These weights can be expressed in one of two ways:

1. As simple weighted values.

For example, if one path has a weight of 1 and a second path has a weight of 5, the second path is 5 times as likely to be used as the first path.

2. As a percent of the router-inbound workload that IMS Workload Router routes to a path.

A path with a weight of 20 should receive 20% of the router-inbound workload.

The CHKGOAL configuration parameter determines how these values are interpreted. If CHKGOAL=OFF is specified, the weights are treated as simple weighted values. If CHKGOAL=ON is specified, the weights are treated as percentages of the router-inbound workload.

The weighting of paths makes it possible to route larger or smaller parts of the workload to different IMS systems based on installation-defined criteria (such as processor capacity, speed of the MSC communications link, response time and throughput objectives, and so on).

For instance, assume an IMS Workload Router configuration of three IMS systems (IMS1, IMS2, and IMS3):

- IMS1 is defined as the router and is connected to IMS2 by PATH2.
- IMS1 is connected to IMS3 by PATH3.
- CHKGOAL=ON indicating the weights are interpreted as percentages.

The weighted path definitions in [Figure 2 on page 12](#) would process 60% of the router-inbound workload locally, route 20% to IMS2, and route 20% to IMS3:

```
LOCAL IWXPATH GOAL=60    (local path)
PATH2 IWXPATH GOAL=20    (path to IMS2)
PATH3 IWXPATH GOAL=20    (path to IMS3)
```

Figure 2. Sample path configuration for IMS1

For availability and/or link load-balancing purposes, it can be advantageous to define multiple paths between a router and a given server IMS system. If one path becomes unavailable, IMS Workload Router can still route part of the workload to the server through an alternate path.

By splitting the path weights between the paths, you can direct IMS Workload Router to do link load-balancing to make the most efficient use of the path or MSC link. Using the path definitions in [Figure 2 on page 12](#), PATH2 and PATH3 could represent two MSC VTAM parallel sessions between IMS1 and IMS2, with the 40% of the work destined for IMS2 equally divided between PATH2 and PATH3.

When the IMS Workload Router router detects an inactive path (which might be an MSC link with an error or that has not been started), it does not queue transaction messages for these paths (except for certain

types of affinities, as described in “Affinities” on page 13). Instead, the IMS Workload Router router selects a path with the next highest priority.

Additionally, the first time an inactive IMS Workload Router path is encountered by the router, a message is issued to both the MVS™ system console and the IMS master terminal informing them that the path is inactive.

Conversely, the first time the router detects an active IMS Workload Router path that was previously found to be inactive, a message is issued to both terminals. Thus, it is possible to use automated operations at either the MVS console or IMS master terminal to handle IMS Workload Router path outages.

Paths also let you manipulate IMS Workload Router resources independent of IMS's use of the MSC link for other purposes. For instance, you can take an IMS Workload Router path out of service with the administrative interface DISABLE function; this can be done without affecting IMS's use of the MSC link.

Systems

Systems are groups of IMS Workload Router paths that exist for two purposes.

- For assigning IMS Workload Router affinities to a group of paths, known as system targeted affinities (STA).
- For use with the IMS Workload Router administrative interface.

Through the administrative interface, systems are used to generate various displays and manipulate resources associated with the system (such as paths and affinities).

For example, all affinities assigned to a particular system could be dynamically reassigned to another system.

During IMS Workload Router customization, a four-character identifier is assigned to a system. The identifier is chosen by the person installing IMS Workload Router and has no relationship to any defined IMS resources. Therefore, the identifier could be an IMS system name and represent all paths connecting a router to a given server IMS system.

Alternatively, the identifier could be an application system name, such as APL1, and represent the set of paths that connect the router system to one or more servers capable of processing transactions for the APL1 application system.

The following figure shows a sample IMS Workload Router system and its related paths.

```
IWXSYS ID=IMS1      (system definition)
PATH1 IWXPATH GOAL=50 (path 1 to IMS1)
PATH2 IWXPATH GOAL=50 (path 2 to IMS1)
```

Figure 3. Sample IMS Workload Router system and related paths

Affinities

IMS Workload Router has strong support for transaction affinity, which is the ability to assign particular transactions to one or more destinations (server systems).

Affinity entries or affinities give you extensive flexibility in installing and customizing IMS Workload Router to meet business needs.

Purpose of affinities

Affinities are used for three reasons.

- The first is functional and can include situations in which certain transactions must process in the same server system each time.

For example, certain applications have dependencies on the sequence of a transaction message flow, which might be compromised in a cloned system environment.

Other applications require access to resources that are unavailable to all server systems, such as MVS/OS data sets, communications links, data retained in virtual memory, Db2® data, or even nonshared IMS databases.

- The second reason for affinities is for greater control over the distribution of the workload for performance reasons.

From the perspective of transaction response time, transaction throughput, and CPU utilization, it can be advantageous to route certain transactions to a given server system for execution.

Transactions that are resource intensive could be directed to systems with more capacity; less resource intensive work could be directed to systems with less capacity.

Similarly, transactions with a higher business priority could be directed to a high performance server, while transactions with a lower priority could be directed to a different server.

- The third reason for affinities is to identify RDR-managed destinations to IMS Workload Router.

Only remote destinations (transactions and MSNAMES) that have been identified through an affinity definition are candidates for RDR management.

Defining affinities

IMS Workload Router affinities associate a transaction or MSNAME destination with a particular path or set of paths that connects to one or more server IMS systems.

Affinities are identified to IMS Workload Router by any one of four criteria:

- A specific transaction code or MSNAME.

For example, an affinity for transaction code IVTNO could be defined so that each time an input message for transaction IVTNO was received by the router, the affinity would determine where to route the message.

- A generic transaction code or MSNAME mask.

For example, an affinity for a generic transaction code mask such as IV%N* could be defined so that each time an input message for any transaction code that matched the mask was received by the router, the affinity would determine where to route the message.

- An IMS remote SYSID affinity.

For example, a remote MSC SYSID affinity for SYSID 13 could be defined so that when an input message for any remote transaction code or MSNAME assigned to SYSID 13 was received by the router system, the affinity would determine where to route the message.

The remote SYSID affinity should be most useful if you are using the RDR feature.

- An IMS scheduler class.

For example, an affinity for IMS scheduler class 27 could be defined so that each time an input message for any transaction code assigned to class 27 was received by the router, the affinity would determine where to route the message.

When affinities are defined whose criteria overlap each other, the selection order is: first specific affinities, then generic affinities, then SYSID affinities, and lastly scheduler class affinities.

Affinity definitions assign transactions to a target destination. The assignment is in the form of a path or system association.

In terms of the affinity definition, the association is either explicitly defined by specifying a path or system name on the affinity definition, or implicitly defined by defining the affinity immediately after its associated path or system definition macro.

Remote or soft affinities

There is a form of affinity that does not require a path or system association; it is referred to as a remote affinity.

A remote affinity routes certain transactions to destinations in any available path (in path weight priority), with the lowest preference being given to the local path. Thus, any transaction or MSNAME input matching remote affinity criteria is routed to any available remote path.

If there are no available remote paths, the transaction is routed to the local path.

This type of affinity can be useful for work that ideally should be processed on a server system, but can be processed on the local system as a last resort.

Remote affinities specify a path name of REMOTE on the affinity definition.

This type of affinity is also referred to as a *soft* affinity, as it is flexible in its associated target path destination.

Firm or hard affinities

Affinities that reference a particular path or system are referred to as either firm or hard, based on an additional attribute that is specified in the affinity definition.

A firm affinity is somewhat similar to a soft affinity in that the local system is used as a last resort if the associated path or system is unavailable. Firm affinities specify QUEUE=LOCAL on the affinity definition.

A hard affinity creates an inflexible relationship between the transaction destination and the target path or system; there are no alternate paths or systems.

Instead, when an input message arrives in the router IMS system for a hard affinity and the target path or system is unavailable, there are generally two things the IMS Workload Router router can do:

- Queue the message to the path and let IMS transmit it when the path becomes available.

This choice is specified in the affinity definition as QUEUE=ON, and can have implications in terms of an end user's perception of what happened to the input transaction.

- Reject the input message, which is specified as QUEUE=OFF in the affinity definition.

In this case, if an input message arrives from a terminal device, APPC, or OTMA, IMS Workload Router sends a message to the device indicating that the target path is unavailable.

The rejection message is sent to these network destinations by redirecting the input message to the IMS Workload Router-supplied IWXNOQUE transaction.

If the input message is about to arrive via an application DL/I CHNG call, then the action taken by IMS Workload Router depends on an option selected in the PGMNOQUE= specification on the IWXOPTS macro during IMS Workload Router customization.

This parameter can be specified as one of the following:

- QUEUE, which conditionally overrides the QUEUE=OFF specification for the affinity when the input originates from an application program.
- A1, which returns an A1 PCB status code to the application issuing the DL/I CHNG call.
- U3303, which causes a pseudo abend with a user 3303 abend.

As a result, IMS does a dynamic backout of the application and either puts the input message on the suspend queue or on the normal queue as the next transaction to be processed (if the transaction is defined with SERIAL=YES on its TRANSACT macro).

Affinity destination matrix

The following table summarizes the affinity options.

The information shows what routing is used when specified paths are available or unavailable for each of the four affinity options: none, soft, firm, or hard.

Table 1. Affinity destination matrix

Affinity type	Routing when specified path(s) available	Routing when specified path(s) unavailable
None	Distributes in path goal priority	Local path is used if all remote paths are unavailable
Soft (remote)	Routes to remote paths within goal priority	Local path is used if all remote paths are unavailable
Firm (specific path/system)	Routes to specific path/system	When QUEUE=LOCAL, local path is used
Hard (specific path/system)	Routes to specific path/system	When QUEUE=YES, queue message to unavailable path When QUEUE=NO, terminal input is rejected with message and program CHNG call is rejected with A1 PCB status code or U3303 abend

Sample affinity definitions

The following example illustrates a variety of IMS Workload Router affinity definitions.

```

IWXSYS ID=IMS1 (system definition)
IWXAFIN MASK=(IVTNO,BSNEWS*),QUEUE=ON (hard system targeted affinity)
IWXAFIN CLASS=(1,3),QUEUE=OFF (hard system targeted affinity)
PATH1 IWXPATH GOAL=50 (path 1 to IMS1)
IWXAFIN SYSID=(27,38),QUEUE=LOCAL (firm path targeted affinity)
PATH2 IWXPATH GOAL=50 (path 2 to IMS1)
IWXAFIN SYSID=(30,32),PATH=REMOTE (soft remote affinity)

```

Figure 4. Sample affinity definitions

Logical paths

Logical paths, which are defined during IMS Workload Router customization, extend the power and flexibility of the affinity routing mechanism.

Logical paths are actually IMS Workload Router (physical) paths being used to create alternative views of the IMS Workload Router/MS network. When combined with system targeted affinity (STA), logical paths can be used to configure IMS Workload Router systems containing subsets of physical paths. IMS Workload Router affinities can then reference the system with logical paths.

Logical paths contain no path goal value of their own and are selected by the IMS Workload Router router based on the goal value of their associated physical path. However, logical paths can be disabled independently of their associated physical path. Affinity routing to a logical path can be disabled without impacting routing to the physical path.

The converse, however, is not true. Disabling a physical path impacts routing to both the physical path and any related logical paths.

A logical path can be defined as a *backup only* path. Backup paths are only used by IMS Workload Router affinity routing, and only under the following conditions:

- The affinity definition must be a system targeted affinity (associated with a group of paths, not an individual path).

In general, paths do not have backup paths; systems, however, can contain primary paths and backup paths.

- The primary path(s) are disabled or not available.

Thus, it is possible to isolate the use of particular path(s) to failure scenarios.

You can define to IMS Workload Router a system that contains virtually any combination of primary paths and backup paths. However, at least one of the paths defined for a system must be a primary path.

If multiple backup paths are defined for a given system, they all simultaneously become candidates for routing selection when primary paths are not available or are disabled. IMS Workload Router selects the backup path to route to based on the availability of its related MSC link and the IMS Workload Router routing goals specified for the associated IWXPATH. The backup path(s) might represent MSC links connecting to the same IMS system as the primary path(s) or to a different IMS system, if appropriate.

Using logical paths, you can create an IMS Workload Router system that is a combination of physical paths and logical paths.

You can also create a system that consists entirely of logical paths. A system that is defined to have all logical paths is referred to as a *logical system* and is identified as such by the IMS Workload Router administrative interface graphic use summary (GRUSM) function.

The following figure shows an example of an IMS Workload Router physical and logical system/path configuration definition.

```
*
*   IMS Workload Router Physical Configuration
*
      IWXSYS ID=IMSL                (local system)
LOCAL IWXPATH GOAL=0                (local path)
      IWXSYS ID=IMS1                (system definition)
PATH1 IWXPATH GOAL=25                (path 1 to IMS1)
PATH2 IWXPATH GOAL=25                (path 2 to IMS2)
PATH3 IWXPATH GOAL=25                (path 3 to IMS3)
PATH4 IWXPATH GOAL=25                (path 4 to IMS4)
*
*   IMS Workload Router Logical Configuration 1
*
      IWXSYS ID=IMSA                (logical system)
      IWXAFIN SYSID=30              (logical system affinity)
PATH1L IWXLPATH RPATH=PATH1        (path 1 to IMS1)
PATH2L IWXLPATH RPATH=PATH2        (path 2 to IMS2)
PATH3B IWXLPATH RPATH=PATH3,BACKUP=YES (backup path 3 to IMS3)
PATH4B IWXLPATH RPATH=PATH4,BACKUP=YES (backup path 4 to IMS4)
*
*   IMS Workload Router Logical Configuration 2
*
      IWXSYS ID=IMSB                (logical system)
      IWXAFIN SYSID=34              (logical system affinity)
PATH3L IWXLPATH RPATH=PATH3        (path 3 to IMS3)
PATH4L IWXLPATH RPATH=PATH4        (path 4 to IMS4)
PATH1B IWXLPATH RPATH=PATH1,BACKUP=YES (backup path 1 to IMS1)
PATH2B IWXLPATH RPATH=PATH2,BACKUP=YES (backup path 2 to IMS2)
```

Figure 5. Sample use of logical paths

Surge suppression

The IMS Workload Router balancing mechanism is based on distributing designated percents of the router inbound workload to server systems.

Occasionally, what is referred to as a routing surge can occur.

Routing surges

A routing surge is the result of a substantial difference between the goal established for an IMS Workload Router path, and the actual percent of transactions routed to the path.

A routing surge occurs when the IMS Workload Router router tries to compensate for the difference between the path goal and the actual transactions routed to the path by directing all inbound, eligible transactions to the under-utilized path. The result is immediate overloading of that path and its associated server system, as well as under-utilization of other server systems.

The typical cause of a routing surge is a change in the status of an IMS Workload Router path. For instance, consider an environment with:

- A router IMS system that has received 100,000 inbound transactions
- An inactive or disabled path with a goal of 30% and an actual routing percent of 0%

If the inactive/disabled path is suddenly enabled, the IMS Workload Router router attempts to compensate for under-utilization of that path by routing the next 30,000 eligible transactions to that path.

Routing surges can also occur when IMS Workload Router path goals or routing levels are changed through the IMS Workload Router administrative interface.

Routing surge prevention

To prevent routing surges, IMS Workload Router has both automatic and manual surge suppression facilities.

Surge suppression circumvents routing surges by resetting the internally maintained IMS Workload Router routing statistics. Routing is resumed with the goals in effect for each IMS Workload Router path as though no activity had thus far taken place.

Automatic surge suppression

Automatic routing surge suppression uses a predefined surge threshold that you specify during IMS Workload Router customization.

The threshold is in the form of a percent, between 0 and 100 inclusive; the number represents the maximum acceptable difference between a path goal and the actual percent of inbound transactions routed to the path.

A threshold specification of 0 is most sensitive, and a specification of 99 is least sensitive. Zero specifies that no difference between a path goal and the actual transactions routed is acceptable.

When IMS Workload Router checks for a routing surge and the result of the calculation (goal minus actual) exceeds the threshold specification, automatic surge suppression is invoked.

A specification of 100 disables automatic surge suppression, as the difference between the goal and actual can never be greater than 100 percent.

IMS Workload Router checks the automatic surge suppression threshold under these circumstances:

- When the router tries to direct a transaction to an active path that was previously inactive or disabled.
The path currently being accessed by the router is the only one checked for a routing surge.
- When the IMS Workload Router administrative interface is used to modify the IMS Workload Router configuration using the function GOALS or ENABL of any routing levels.

All IMS Workload Router-defined paths are checked for a routing surge.

Manual surge suppression

Manual surge suppression is invoked using the administrative interface LEVEL function. Like automatic surge suppression, this function resets the internal IMS Workload Router routing statistics.

However, when manual surge suppression is used, routing statistics are reset regardless of whether a routing surge exists.

Surge suppression messages

Regardless of which type of surge suppression is used, when surge suppression is invoked, IMS Workload Router issues system messages to the IMS MTO and OS console indicating that surge suppression is being driven.

Additionally, a system message is issued for each IMS Workload Router-defined system; the message provides the total number of transactions routed to that system before IMS Workload Router routing statistics were reset.

MSC routing exits

IMS Workload Router interacts directly with the DFSMSCE0 (IMS TM and MSC message routing and control user exit routine) entry points.

- The INIT entry point to perform IMS Workload Router initialization processing
- The terminal routing entry points (TRxxxx) and program routing entry point (PRCHNG)

The exits that receive control are determined by a vector table in DFSMSCE0, the TM and MSC message routing and control user exit.

The implementation of IMS Workload Router is generally simple and nondisruptive. However, it is recommended that you review your use of these exits if you have used them for Independent Software Vendor (ISV) or user-written exit routines.

You can use these exit routines to do additional installation-specific customization for IMS Workload Router if the need arises.

DFSMSCE1 (TM and MSC message routing vendor exit routine)

There are several entry points that can be used in the DFSMSCE1 exit.

Use the following entry points in the DFSMSCE1 exit:

- INIT
- TRBTAM
- TRVTAM
- TRAPPC
- TROTMA
- PRCHNG

INIT entry point

In both IMS Workload Router IMS router systems and server-only systems, the INIT entry point in DFSMSCE1 is used for initialization processing.

The IMS Workload Router version of this exit must be installed in the IMS SDFSRESL accessible to the IMS control region.

User or ISV initialization code can coexist with the IMS Workload Router DFSMSCE1 by using the user exit version of this exit, DFSMSCE0. Part of the IMS Workload Router initialization processing determines which exits IMS is using to perform transaction and program routing.

Terminal routing entry points

IMS Workload Router uses the terminal routing entry points (**TRBTAM**, **TRVTAM**, **TRAPPC**, and **TROTMA**) provided in DFSMSCE0 in a router system.

The use of these entry points is not affected by IMS Workload Router. If any of these are used in an IMS Workload Router system, it is given control before any routing decision is made by IMS Workload Router.

Any one of these entry point routines can influence the IMS Workload Router router's decision by changing the transaction destination name. The router uses the changed name during affinity processing. Also, any one of these entry point routines can determine that a transaction should not be routed to any server system.

To inform IMS Workload Router of this decision, the entry point routine passes a return code of decimal 12 (X'0000000C') in register 15 upon exit. IMS Workload Router will then route the transaction to the local system for execution.

You can use the IWXOPTS keyword UMSCEBRC to override the use of R15 in determining whether Workload Router will route the transaction to any server system. If the UMSCEBRC is set to YES, Workload

Router will not use the R15 value to determine whether it should route the transaction. The value found in the MSCEBRC half-word field of the MSCEB control block will be used to make this determination.

The SXPLFSPL field of the IMS Standard User Exit Parameter List (DFSSXPL) references the MSCEMSEB field of the DFSMSCECP control block. The MSCEMSEB field of the DFSMSCECP control block points to the MSCEB control block.

When the UMSCEBRC keyword is set to YES, Workload Router saves the value in the MSCEBRC field, initializes the field to binary zeros, and invokes the applicable TRxxxx exit. Workload Router saves the value that is returned from the TRxxxx exit in the MSCEBRC field, restores the original MSCEBRC value, then checks the returned MSCEBRC value for a nonzero value.

If the MSCEBRC value that is returned by the TRxxxx exit is binary zeros, Workload Router continues to make the routing decision.

If a nonzero value is found, Workload Router does not make the routing decision.

Program routing entry point (PRCHNG)

The use of the PRCHNG entry point is not affected by IMS Workload Router.

In an IMS Workload Router router system, PRCHNG is given control before any routing decision is made by IMS Workload Router. PRCHNG can influence the IMS Workload Router router's decision by setting the appropriate nonzero return code in register 15. It can also affect the router's actions by updating the appropriate fields in the user program routing parameter list, such as the destination name, based on the IMS-defined interface for this entry point.

Note that a return code of 0 (zero) in register 15 directs IMS Workload Router to route the transaction based on the IMS Workload Router routing algorithm and configuration.

To direct IMS Workload Router to route a transaction locally, PRCHNG should specify a nonzero return code in register 15. There is no need to modify the user exit parameter list.

Also, when PRCHNG is used in an IMS Workload Router router/server system, it has total responsibility for determining the destination of all LTERM-destined messages (similar to the use of PRCHNG in a server-only system), excluding MSNAME-directed routing.

In a server-only system, PRCHNG ensures the IMS Workload Router-routed transaction responses are returned to the originating system. The IMS default action taken for IMS remote transactions automatically returns all I/O PCB output to the originating input system.

Alternate TP PCB output, however, is not automatically returned. Instead, IMS invokes PRCHNG in the remote/server system to determine the destination for the output. The IMS Workload Router PRCHNG entry point for sever-only systems assumes this responsibility.

If additional function is required in this exit, you can provide your own PRCHNG exit, taking into consideration alternate PCB output.

The UMSCEBRC keyword can be used to override the use of R15 in determining whether Workload Router is to route transactions to any server system. If you set UMSCEBRC to YES, Workload Router will not rely on the R15 value, but will rely instead on the value found in the MSCEBRC half-word field of the MSCEB control block.

The SXPLFSPL field of the IMS Standard User Exit Parameter List (DFSSXPL) references the MSCEMSEB field of the DFSMSCECP control block. The MSCEMSEB field of the DFSMSCECP control block points to the MSCEB control block.

When the UMSCEBRC keyword is set to YES, Workload Router saves the value in the MSCEBRC field, initializes the field to binary zeros, and invokes the applicable PRxxxx exit. Workload Router saves the value that is returned from the PRxxxx exit in the MSCEBRC field, restores the original MSCEBRC value, then checks the returned MSCEBRC value for a nonzero value. If the MSCEBRC value that is returned by the PRxxxx exit is binary zeros, IMS Workload Router continues to make the routing decision.

If a nonzero value is found, Workload Router does not make the routing decision.

Server system support

An IMS Workload Router server system is an IMS system that executes transactions originating from one or more IMS Workload Router router systems.

IMS Workload Router supports two types of server systems: server-only systems and router/server systems.

A server-only system has a minimum amount of IMS Workload Router function installed. Its only function is to execute IMS Workload Router-routed transactions and return alternate TP PCB output back to the originating system.

A router/server system is a combination of both a router and server system. In its role as a router system, it is responsible for distributing inbound transactions to the server systems defined during IMS Workload Router customization. At the same time, it also plays the role of a server system to other IMS Workload Router router systems.

The presence of IMS Workload Router customization parameters and IMS Workload Router load modules in IMS SDFSRESL is what determines if a system is considered a router system. In addition to the IMS Workload Router load modules in SDFSRESL, the presence of MSC links originating from other IMS Workload Router router systems makes the IMS system a router/server system.

Server-only system

A server-only system has a minimum amount of IMS Workload Router function installed. Its only function is to execute IMS Workload Router-routed transactions and return alternate TP PCB output back to the originating system.

If the installation is using the DFSMSCEO PRCHNG entry point for program routing, DFSMSCE1 and IWXMSCP should be included in the SDFSRESL concatenation for the Server-only system.

Router/server system

A router/server system is a combination of both a router and server system. It is both a router system (it is responsible for distributing inbound transactions to the server systems defined during IMS Workload Router customization) and a server system to other IMS Workload Router router systems.

The use of a IMS Workload Router router/server system (instead of a server-only system) gives you the additional server options SERVALID and SERVCOMD.

SERVALID option

The SERVALID (server destination validation) option directs IMS Workload Router to validate the target destination for alternate TP PCB CHNG calls in the server system.

Under normal circumstances, IMS Workload Router returns alternate TP PCB CHNG/ISRT messages to the system from which the input transaction message originated. There is no assumption that the CHNG call destination exists in the server system.

IMS Workload Router does not require or assume that the IMS DC network has been cloned in the server system; therefore, IMS Workload Router normally does not validate the target of a CHNG call in the server system. However, this can impact the behavior of certain applications that depend on having IMS validate destinations and return an A1 PCB status code when an invalid destination is encountered.

For example, the application might choose a different destination from a list of destinations when it receives the A1 PCB status code. In order to provide transparency to applications that have this dependency, the SERVALID option can be used.

It is suggested that this option only be used in router/server systems with a cloned IMS DC network.

SERVCOMD option

IMS Workload Router normally returns alternate TP PCB output to the system from which the initial input message originated.

This includes output destined for MSC links, ISC terminals, APPC descriptor destinations, OTMA descriptor destinations, MSC remote terminals, and so on. IMS Workload Router makes no assumption that the resources for these various communications mechanisms exist in the server system; IMS Workload Router, therefore, returns alternate TP PCB output to the point of origin of the input message.

The SERVCMD (direct server communications) option directs an IMS Workload Router router/server system to retain and queue alternate TP PCB messages destined for certain types of communications destinations in the server system.

The use of SERVCMD=ON on the IWXOPTS configuration macro provides additional flexibility in allocating and placing communications resources, and in balancing communications traffic initiated from one or more server systems.

When used, SERVCMD queues messages for the following communications devices in the server system:

- MSC MSNAMES
- MSC remote logical terminals
- APPC (LU6.2) descriptor names
- OTMA descriptor names
- ISC (LU6.1) statically-defined logical terminals

Messages destined for any other types of logical terminals and their associated communications devices (3270, SLU2, SLU1, and so on) are always returned to the originating system.

It is suggested that this option only be used in router/server systems with cloned DC networks.

Remote destination routing (RDR) and servers

Server systems, configured as either server-only or router/server, have only one purpose: to execute transactions from IMS Workload Router router systems and return alternate TP PCB output back to the originating IMS system.

When using the remote destination routing (RDR) feature of IMS Workload Router to enhance MSC communications, it is unnecessary to install IMS Workload Router server support in either the local or remote IMS systems. In fact, the server system support can yield undesirable results in the RDR environment, such as alternate TP PCB output destined for the remote system going to the local IMS system.

When the IMS Workload Router router is installed in an IMS system, server support is automatically installed as well.

To deactivate server support in a router system, specify SERVCMD=ALL in the IWXOPTS configuration macro. This option deactivates IMS Workload Router server logic, and all alternate TP PCB output is retained and queued in the remote IMS system.

Mixed-mode server operations

When installed in the router/server environment, IMS Workload Router server support provides for mixed-mode operation.

Mixed-mode operation is useful for a number of purposes. Its usefulness can be simply illustrated through an example of IMS Workload Router server system operating in a sysplex environment in which the server system is also the target system for MSC remote transactions initiated from an external IMS system.

In its capacity as a server, IMS Workload Router (by default) redirects application program alternate PCB messages back to their originating system. This includes output generated by the execution of MSC remote transactions initiated from outside the sysplex.

For example, if a remote transaction generated alternate PCB output destined for a printer LTERM on the server system, the IMS Workload Router server (by default) will redirect that output back to the originating IMS system. The global SERVCMD=ALL option could be used to deactivate server support; however, this would impact sysplex users.

Mixed-mode operation is a way to reconcile such conflicts by extending the granularity of the SERVCMD options to each inbound MSC link defined to the router/server system. Mixed-mode operation is specified through a combination of:

- The SERVCMD=LIST parameter on the IWXOPTS configuration macro
- The definition of inbound MSC links through external router (IWXROUTR) configuration macros

SERVCMD=LIST directs the IMS Workload Router server to locate the external router table entry associated with the MSC link (MSNAME) from which the original transaction message arrived. The SERVCMD option defined for that external router is then used to determine the disposition of any output messages. If a given external router entry cannot be located, the IMS Workload Router global SERVCMD=OFF default is applied to the output message.

In cases where the input message did not originate from the system that sent it to the server system the IWXROUTR definition for this situation must specify the MSNAME that is associated with the SYSID of the originating IMS system.

MSC link resources in multiple router configurations

In an IMS Workload Router configuration with multiple router/server systems, it is important to consider the need for adequate MSC link resources. MSC link resources must support both I/O PCB and alternate PCB output from the IMS Workload Router server systems to the system from which the first transaction input message originated.

In a simple configuration with only two IMS Workload Router router/server systems, these considerations are negligible.

For example a configuration with two IMS Workload Router router/server systems includes IMS systems IMSA and IMSB. The IMSA system has MSC SYSID 1 assigned to it, and IMSB has SYSID 2. The MSC connection between IMSA and IMSB is defined as remote SYSID=2/local SYSID=1 from the perspective of IMSA, and remote SYSID=1/local SYSID=2 from the perspective of IMSB.

Suppose a transaction is initiated from a terminal user of IMSA, and IMS Workload Router routes that transaction to IMSB for execution. When the transaction responds to the terminal user through either the I/O PCB or an alternate modifiable TP PCB, the message is routed back to the originating SYSID (in this case SYSID=1). The message is returned to the originating system using the same MSC connection on which the original input message arrived (remote SYSID=1/local SYSID=2).

Now consider the impact of adding a third IMS system, IMSC with a SYSID of 3, to the configuration. This is shown in the following figure.

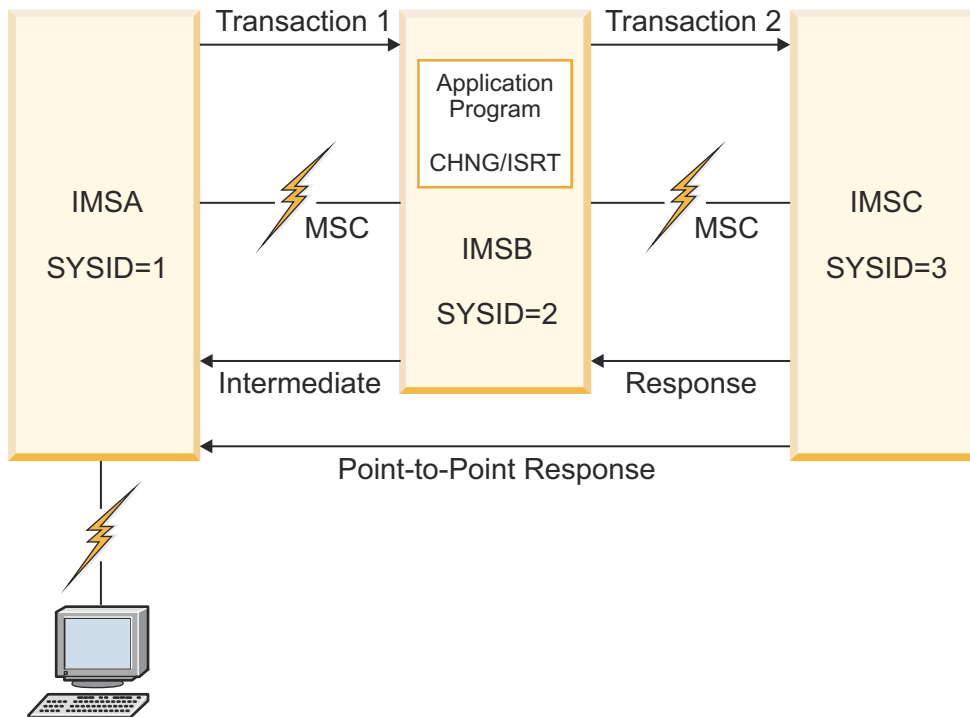


Figure 6. IMS Workload Router three-way router/server configuration

IMSC, an IMS Workload Router server system, is connected to IMSB through an MSC connection defined as:

- Remote SYSID=3/local SYSID=2 from the perspective of IMSB
- Remote SYSID=2/local SYSID=3 from the perspective of IMSC

A transaction is initiated from a terminal user of IMSA, and IMS Workload Router routes the transaction to IMSB for execution. The IMSB system is configured as a router/server with the IMS Workload Router program routing feature enabled.

The transaction executes and issues a DL/I CHNG/ISRT call to do a program message switch to a second transaction. The IMS Workload Router router in IMSB routes the new transaction to IMSC for execution. When the transaction executing in IMSC responds to the input terminal or issues a DL/I CHNG/ISRT call to an alternate modifiable TP PCB, the message is returned to the originating system with SYSID 1.

Therefore, an MSC connection must exist between IMSC and IMSA, with remote SYSID=1 from the perspective of IMSC. The MSC connection between IMSC and IMSA can be either a point-to-point connection, or the connection can be defined to pass through an intermediate IMS system.

This same situation exists when a transaction message is introduced to an IMS Workload Router configuration from a non-IMS Workload Router MSC connection. The origin SYSID of such messages is the local SYSID of the non-IMS Workload Router MSC system introducing the message.

Therefore, IMS Workload Router router/server systems should have a return MSC connection to any non-IMS Workload Router system capable of introducing input messages to one of the IMS Workload Router router systems.

MSC performance

Experience has shown that relatively high MSC transaction rates can be achieved in a properly tuned IMS system. Of primary importance to an MSC tuning effort is the IMS write ahead data set (WADS).

The proper placement of the WADS is crucial to MSC transaction rates; if at all possible, consider using DASD fast write. Additionally, a well tuned IMS message queue buffer pool is necessary. The size of the queue buffer pool should be set to keep I/O to the pool to a bare minimum. Also, consider using multiple message queue data sets to allow for parallel access to the message queue.

IMS Workload Router supports all physical MSC link access methods. Consider using native channel-to-channel links whenever possible, as they are the most efficient means of communication.

IMS Workload Router also supports multiple paths between router and server systems. The support for multiple paths can be used to balance high volumes of MSC traffic between IMS Workload Router router and server systems.

Configuration checkpoints

Managing change to the IMS Workload Router configuration is simplified through use of the IMS Workload Router checkpoint function.

When invoked, the checkpoint facility sends a snapshot of the real-time IMS Workload Router configuration to the IMS log data set. The checkpoint records are contained in IMS type X'E6' log records.

The IMS Workload Router post-processing utility can later recreate IMS Workload Router configuration macros from the checkpoint data. The generated set of macros is then used as input to the IMS Workload Router configuration process, yielding a synchronized IMS Workload Router configuration.

The checkpoint function can be invoked explicitly through the administrative interface using the CHKPT function, or automatically each time a change is made to the IMS Workload Router configuration with the administrative interface. The AUTOCKPT keyword on the IWXOPTS configuration macro controls automatic invocation of the IMS Workload Router checkpoint facility.

The administrative interface SET function lets you dynamically activate and deactivate automatic checkpointing.

IMS Workload Router post-processing utility

The log data that is produced by IMS Workload Router can be processed directly from an archived IMS system log data set (SLDS).

However, if you plan to use IMS Workload Router checkpoint data frequently, consider using the IMS Log Archive utility (DFSUARC0) copy function.

DFSUARC0 can copy IMS Workload Router checkpoint records to a separate data set while the IMS online log data sets (OLDS) are being archived. The output data set could be a sequential file or even a generation data group (GDG), whichever is more appropriate in your environment.

Use of DFSUARC0 is more efficient operationally because you don't need to pass large amounts of data (and associated tape mounts) through the IMS Workload Router post-processing utility. The IMS Workload Router post-processing utility does not require any other IMS log record types, just the X'E6' log records created by IMS Workload Router checkpoint processing.

Following is a sample COPY statement DFSUARC0 can use to copy IMS Workload Router checkpoint records to a separate data set with the ddname WLRCKPT:

```
COPY DDNOUT1(WLRCKPT) -  
  RECORD(OFFSET(5) FLDTYP(X) VALUE(E6) COND(E))
```

Following is a sample job stream for the post-processing utility. This job stream is supplied with IMS Workload Router in the installation data set (member IWXPOST):

```
//IWXPOST JOB installation job statement  
//IWXPGEN EXEC PGM=IWXPGEN0,REGION=3M  
//STEPLIB DD DSN=ims.reslib,DISP=SHR  
//          DD DSN=iwx.loadlib,DISP=SHR  
//CHKPT DD DSN=wlr.chkpt.input,DISP=SHR  
//PARMS DD DSN=wlr.chkpt.output(member),DISP=OLD  
//SYSPRINT DD SYSOUT=*  
//SYSIN DD *  
LIST=ALL
```

where:

- The `CHKPT DD` statement is for the data set containing the IMS Workload Router input checkpoint records.
- The `PARMS DD` statement is for the data set in which the generated IMS Workload Router configuration macros are placed.

Any partitioned or sequential data set with a logical record length of 80 bytes can be used.

- The instream `SYSIN DD` control data set should contain a single 80-byte control statement.

The control statement text must begin in the first column. Only one control statement is accepted during a given execution of the utility.

The control statement must have one of the following formats:

- `CHKPT=LAST`
- `CHKPT=token`
- `LIST=ALL`

The `CHKPT=LAST` control statement specifies that the last physical IMS Workload Router checkpoint records are to be used as input for generating IMS Workload Router configuration macros.

The `CHKPT=token` control statement specifies that the IMS Workload Router checkpoint with the specified *token* be used as input for generating IMS Workload Router configuration macros. A unique 16-byte IMS Workload Router checkpoint token is generated for each checkpoint.

If the checkpoint is generated by the administrative interface `CHKPT` function, the token is displayed as part of that function's output. If the checkpoint is generated by the `IWXOPTS AUTOCKPT` specification or through the administrative interface `CHKPT` function, the token is displayed at the IMS master terminal and the OS console.

The `LIST=ALL` control statement generates a complete list of the IMS Workload Router checkpoints contained in the input log. Sample output from this function follows. Note that the list of checkpoints is provided in reverse chronological order, with the most recent checkpoint first. Each output line represents a specific checkpoint.

LIST OF MOST TO LEAST RECENT CHECKPOINTS FOLLOWS:

TOKEN	STATUS	IMSLOG SEQ#	USERID	LTERM
-----	-----	-----	-----	-----
0096268104108782	COMPLETE CHKPT	00000000000003FD	TSOBM	X992B119
0096268104039091	COMPLETE CHKPT	00000000000003D8	TSOBM	X992B119

where:

- The `TOKEN` column displays the unique checkpoint token assigned to the checkpoint.
- The `STATUS` column indicates whether all related log records for the checkpoint were found on the input data set.

When this column contains the literal `COMPLETE CHKPT`, all related input log records were located.

The literal `INCOMPLETE CHKPT` indicates that the trailing end of the checkpoint data is missing.

The presence of `SEQUENCE ERROR/GAP` in the `STATUS` column indicates that there are either missing or out-of-sequence records in the input data.

- Also included in the report (but not shown here) are columns labeled `REQUEST`, `QUAL1`, `QUAL2`, and `QUAL3`.

Along with the `USERID` and `LTERM` fields, these columns provide information about the user of the administrative interface and the function that caused the checkpoint to be generated.

These columns mirror the administrative interface input fields with identical names.

Diagnostic trace

The diagnostic trace feature of IMS Workload Router helps with problems related to the IMS Workload Router router or router/server systems. The trace is not available in server-only systems.

The trace is activated and deactivated using the administrative interface SET function. The current status of the trace can be viewed through the administrative interface PARMs function.

Once the trace is activated, IMS Workload Router records images of key IMS Workload Router control blocks and data structures in the IMS system log data set. Trace data is in the form of IMS X'6701' log records.

The data can be formatted by the IMS file select and formatting print utility (DFSERA10) with the DFSERA30 print module, using the following sample control statement:

```
OPTION PRINT 0=5,T=X,V=6701,L=2,C=E,E=DFSERA30
```

After formatting with the DFSERA10/DFSERA30 utilities, IMS Workload Router trace entries are identified in the trace output with one of several trace identifiers that begin with NPR, CMP, MST, or MSP. The single character appended to one of these strings changes depending on which part of the router logic recorded the trace entry.

Trace entries are divided into labeled sections that identify contiguous virtual storage areas or CPU registers relevant to router logic at the time the trace entry is recorded. The sections labeled IWXCPOOL and IWXCPRM are particularly important areas of storage; they contain router input parameters and router output return codes. These storage areas can be interpreted using the assembler macro DSECT named IWXCPRM contained in the IMS Workload Router macro library.

The following table identifies the IMS Workload Router trace entries, when they are recorded by the router, and relevant information within the trace entry.

Table 2. IMS Workload Router internal trace entries

ID	Entry	Information
NPRA		No longer used.
NPRZ		No longer used.
CMPA		No longer used.
CMPB		No longer used.
CMPZ		No longer used.
MSTU	Terminal input Post-IWXMSCPR processing	Offset X'04' in section labeled REGS contains the value returned by the user exit in register 15. The section labeled MSCEB contains the return code value at offset x'1A' which was set by the user exit if the UMSCEBRC IWXOPTS option is used. A section labeled MSCEPRM for a length of X'A8' is produced. A section labeled IWXCPRM contains the IMS Workload Router work area. A section labeled WLRPARMS contains the IWXPARMs block for this IMS.
MSTA	Terminal input Post-destination verification processing	The section labeled SMBDEST contains the SMB control block mapped by the IMS IAPS macro. A section labeled WLRPARMS contains the IWXPARMs block for this IMS.

Table 2. IMS Workload Router internal trace entries (continued)

ID	Entry	Information
MSTZ	Terminal input Post-routing decision	The section labeled IWXPPOOL contains the following routing feedback: <ul style="list-style-type: none"> • IWXCPDST = destination MSC MSNAME (offset X'20') • IWXCPRET = router return code (offset X'28') • IWXCPSID = destination MSC SID (offset X'2C')
MSTQ	Terminal input Post-IMS Workload Router processing	A section labeled IWXPPOOL contains the IMS Workload Router work area. A section labeled MSCEPARM for a length of X'A8' is produced. A section labeled WLRPARMS contains the IWXPparms block for this IMS.
MSPA	Program input Post-destination verification processing	Section labeled SMBDEST contains the SMB control block mapped by IMS IAPS macro, or section labeled CNTDEST contains the CNT control block mapped by IMS ICLI macro.
MSPB	Program input Pre-user exit/routing entry	Section labeled DLA3PARM contains the input LTERM and destination names. Section labeled PST contains the IMS PST control block mapped by IMS IPST macro.
MSPU	Program input Post-IWXMSCP processing	Offset X'04' in section labeled REGS contains the value returned by the user exit in register 15. Offset X'1C' in section labeled REGS contains the value returned in register 15 by the DFSFNDST call using the MSPRDEST field in input. The possible values are documented in the DFSFNDST macro, which is found in the IMS SDFSMAC data set. The section labeled MSCEB contains the return code value at offset x'1A' which was set by the user exit if the UMSCEBRC IWXOPTS option is used. A section labeled MSCEPARM for a length of X'A8' is produced. A section labeled IWXPARM contains the IMS Workload Router work area. A section labeled WLRPARMS contains the IWXPparms block for this IMS. A section labeled PST contains the IMS PST control block mapped by IMS IPST macro.
MSPZ	Program input Post-routing decision	The section labeled IWWPOOL contains the following routing feedback: <ul style="list-style-type: none"> • IWXCPDST = destination MSC MSNAME (offset x'20') • IWXCPRET = router return code (offset x'28') • IWXCPSID = destination MSC SID (offset x'2C')

Table 2. IMS Workload Router internal trace entries (continued)

ID	Entry	Information
MSPY	Program input Post-OTMA destination verification processing (destination not found by DFSFNDST)	Offset X'04' in section labeled REGS contains the value returned in register 15 by the DFSYFND0 call using the MSPRDEST field in input. The possible values are documented in the DFSYFND macro, which is found in the IMS SDFSMAC data set. The section labeled CNTDEST contains the CNT control block mapped by IMS ICLI macro.
MSPC	Program input Post-OTMA destination verification processing (destination found by DFSFNDST)	Offset X'04' in section labeled REGS contains the value returned in register 15 by the DFSYFND0 call using the MSPRDEST field in input. The possible values are documented in the DFSYFND macro, which is found in the IMS SDFSMAC data set. The section labeled CNTDEST contains the CNT control block mapped by IMS ICLI macro.
MSPQ	Program input Post-IMS Workload Router processing	A section labeled IWXPPOOL contains the IMS Workload Router work area. A section labeled MSCEPARM for a length of X'A8' is produced. A section labeled WLRPARMS contains the IWXPparms block for this IMS.

IMS Workload Router storage use

IMS Workload Router uses the IMS "main" extended storage pool for working storage. The size of this pool is specified to the IMS control region in the WKAP parameter. Therefore, additional storage might need to be added to the main pool for using IMS Workload Router; otherwise, IWAITS can occur due to storage pool shortages.

The main pool can be monitored using the IMS /DIS POOL command or a vendor product that provides pool utilization and IWAIT reporting capability.

The maximum amount of storage used by IMS Workload Router at any one time is calculated as follows:

$$\text{Storage in bytes} = (n + m) * (368 + (p * 20))$$

where:

- *n* equals the maximum number of concurrent dependent regions (used only if implementing IMS Workload Router program routing or affinity routing)
- *m* equals the maximum number of concurrent terminal users + external APPC/IMS users + OTMA clients (used only if implementing IMS Workload Router terminal routing or affinity routing)
- *p* equals the total number of logical and physical paths defined to IMS Workload Router

The result should be converted to kilobytes and added to the current WKAP value for the target IMS system. For example, consider an environment with:

- 50 concurrent dependent regions
- 1000 concurrent terminal users
- 20 external APPC/IMS users
- 5 OTMA clients

- 10 defined IMS Workload Router Paths

Calculations for this environment are as follows:

```
Storage in bytes = (n + m) * (368 + (p * 20))
Storage in bytes = (50 + 1000 + 20 + 5) * (368 + (10 * 20))
Storage in bytes = (1075) * (368 + (200))
Storage in bytes = (1075 * 568)
Storage in bytes = 610,600
Storage in kilobytes = 597K
```

Determining whether IMS subsystem is active router

You can programmatically determine whether the IMS subsystem is an active Workload Router router by using the IBM IMS DFSSPOOL macro, which can be found in the IMS.SDFSMAC data set.

About this task

The following describes a method that can be used from within the TRxxxx/PRxxxx user exit entry points to make this determination.

Procedure

1. Ensure that your program includes the ISCD and DFSSPBLK DSECTS and that the SCD is addressable.
2. Use the IBM IMS DFSSPOOL macro (found in the IMS.SDFSMAC data set) that invokes the FIND option with the IWXP pool name to determine whether the current IMS subsystem is an active Workload Router router system.

The register value of Rx can be any register between R2 and R14.

For example:

```
ICM Rx,15,=CL4'IWXP'      WLR Pool name
DFSSPOOL FIND,POOL=(Rx)  Find the POOL
LTR R15,R15              Was it found?
BZ WLR_ACTIVE            YES:   WLR is active
                        NO:   WLR not active
```

Chapter 3. IMS Workload Router propagation

After completing the SMP/E installation, IMS Workload Router must be propagated across all the IMS systems that are to use the product.

The following topics describe what resources must be propagated.

If the SMP/E installation of IMS Workload Router has not been performed, refer to *Program Directory for IBM IMS Workload Router for z/OS* for installation instructions.

Topics:

- “[Installed data sets](#)” on page 31
- “[Process of propagation](#)” on page 32

Installed data sets

During the SMP/E installation, many data sets are created.

The following is a list of target library data sets that are created during the SMP/E installation of IMS Workload Router:

- *high.level.qualifier.SIWXL*MOD
- *high.level.qualifier.SIWXM*AC
- *high.level.qualifier.SIWXS*AMP

Note: The distribution library data set for load modules is named AIWXMOD to be compatible with previous releases of IMS Workload Router.

A review of the contents of these data sets is useful because different members are propagated depending on whether the system being supported is a router/server system or a server-only system.

The following summary describes the contents of each data set:

- SIWXLMOD (IMS Workload Router Program Library)

The Program Library contains the following executable modules:

- DFSMSCE1 - initialization routine for both router/server and server-only systems
- IWADMIN - administrative message processing routine (MPR) for router/server systems
- IWCTR0 - common routing module for router systems
- IWEDIT - administrative MPR's edit exit
- IWMSCP - program routing module for both router/server and server-only systems (uses MSCE0 Program Routing entry points)
- IWMSCTR - terminal routing module for router systems (uses DFSMSCE0 Transaction Routing entry points)
- IWNOQUE - terminal no-queue support MPR for router/server systems
- IWXPGEN0 - IMS Workload Router Post-Processing utility

- SIWXMAL (IMS Workload Router Macro Library)

The macro library contains the following IMS Workload Router macros used in the customization process:

- IWAFBRK - internal macro
- IWAFIN - affinity definition macro
- IWCPARM - router parameters DSECT
- IWGEN - internal macro

- IWXGLBLS - internal macro
- IWXLPATH - logical path definition macro
- IWXMSGPR - internal macro
- IWXOPTS - run time options macro
- IWXPARGS - IMS Workload Router initialization and termination parameters macro
- IWXPATH - path definition macro
- IWXROUTR - external router definition macro
- IWXRSRVD - internal macro
- IWXSYS - system definition macro
- SIWXSAMP (IMS Workload Router Sample Library)

The sample library contains the following sample data:

- IWXACBS - ACBGEN job
- IWXCUST - sample IMS Workload Router customization job
- IWXFMTS - MFSGEN job
- IWXPOST - sample checkpoint post-processing job stream
- IWXTRANS - sample IMS SYSGEN input

Process of propagation

What you propagate is determined by whether you are propagating to a router/server or a server-only system.

For an explanation of these terms, refer to [“Server system support” on page 21](#).

Router/server systems

For router/server systems, the process of propagation is as follows.

Procedure

1. Configure the MSC network.
2. Include the member IWXTRANS from the IMS Workload Router sample library SIWXSAMP (or your modified macros) in the IMS SYSGEN input.
3. Copy the member IWXEDIT from the IMS Workload Router program library SIWXLMOD into the IMS SYSGEN USERLIB of each router system.
4. Perform an IMS Control Blocks (CTLBLKS) SYSGEN for each IMS system.
5. If you are using the IMS TM and MSC Message Routing and Control User Exit Routine DFSMSCEO, ensure that it exists in the SDFSRESL data set of each IMS system.
6. Copy the following members from the IMS Workload Router program library (SIWXLMOD) into the SDFSRESL data set of each router/server system.
 - DFSMSCE1
 - IWXCTRX0
 - IWXMSCPR
 - IWXMSCTR
7. Generate the IMS Workload Router MFS screens into a format library for each router system using member IWXFMTS in SIWXSAMP.
8. Generate the IMS Workload Router ACB into an ACBLIB for each router system using member IWXACBS in SIWXSAMP.

9. Copy members IWXADMIN and IWXNOQUE from the IMS Workload Router program library into the Message Processing Region, PGMLIB, of each router system.

Server-only systems

For server-only systems, the process of propagation is as follows.

Procedure

1. Configure the MSC network.
2. Copy the members DFSMSCE1 and IWXMSCPR from the IMS Workload Router program library (SIWXMOD) into the SDFSRESL of each server-only system.

Chapter 4. Customizing IMS Workload Router

IMS Workload Router is customized using macro statements similar to those used in an IMS SYSGEN.

The following topics describe:

- How to customize IMS Workload Router
- A sample IMS Workload Router configuration
- The seven customization macros

Topics:

- [“Process of customization” on page 35](#)
- [“Customization macros” on page 36](#)
- [“Sample IMS Workload Router configuration” on page 37](#)
- [“Macro reference” on page 39](#)

Process of customization

The process of customization differs for router and server systems.

Customizing router/server systems

You can customize router/server systems by following this procedure.

Procedure

1. Code the customization macros, based on your analysis of workload, using the member IWXCUST in the sample data set SIWXSAMP as a model.

Once the macros have been coded, run the IWXCUST job stream.

For detailed descriptions of the IMS Workload Router customization macros and their parameters see: [“Customization macros” on page 36](#).

For an explanation of SIWXSAMP and its contents see [“Installed data sets” on page 31](#).

2. Code the IMS SYSGEN APPLCTN and TRANSACT macros, using member IWXTRANS in the sample data set SIWXSAMP as a model.

After these macros have been coded, run an IMS SYSGEN.

Detailed descriptions of the IMS APPLCTN and TRANSACT macros appear in *IMS System Definition*.

Detailed descriptions of the IMS Workload Router customization macros and their parameters appear in [“Customization macros” on page 36](#).

Customizing server-only systems

You can customize server-only systems by following this procedure.

Procedure

Copy members DFSMSCE1, IWXCTRX0, IWXMSCP, and IWXMCTR from the IMS Workload Router program library (SIWXLMO) into the SDFSRESL of each router system.

Customization macros

There are seven macros that are used to customize IMS Workload Router:

IWXPARGS

Begins and terminates the IMS Workload Router customization macros.

Must be coded as the first and last statement.

Two IWXPARGS macros must be coded for each IMS Workload Router configuration.

IWXOPTS

Defines values for the various IMS Workload Router general options.

Must be coded immediately after the first IWXPARGS statement.

One IWXOPTS macro must be coded for each IMS Workload Router configuration.

IWXSYS

Defines a group of IMS Workload Router paths.

Must be coded immediately after the IWXOPTS statement to define the local system.

Must be coded preceding each IWXPATH or IWXLPATH statement that defines the first path for a remote/server system.

A maximum of 2037 IWXSYS macros are allowed for each IMS Workload Router configuration.

IWXPATH

Defines a single IMS Workload Router path.

Must be coded after the IWXSYS statement that defines a group of paths.

IWXPATH can also follow other IWXPATH or IWXLPATH statements related to the same system, or can follow IWXAFFIN statements related to a preceding path.

A combined maximum of 2037 IWXPATH and IWXLPATH macros are allowed for each IMS Workload Router configuration.

IWXLPATH

Defines a single IMS Workload Router logical path.

Must be coded after the IWXSYS statement that defines a group of paths.

Must be coded anywhere after the IWXPATH macro that defines the related physical path.

IWXLPATH can also follow other IWXPATH or IWXLPATH statements related to the same system, or can follow IWXAFFIN statements related to a preceding path.

A combined maximum of 2037 IWXPATH and IWXLPATH macros are allowed for each IMS Workload Router configuration.

IWXAFFIN

Defines an affinity destination for one or more transactions, transaction classes, MSNAMES, or SYSIDs.

Can be coded anywhere after the IWXSYS statement for the local system.

Can be implicitly associated with a given system or path by coding it immediately after the related IWXSYS or IWXPATH statements, respectively.

Can be explicitly associated with a given system or path by coding it anywhere after the related system or path and specifying the SYSTEM= or PATH= keywords respectively.

IMS Workload Router customization allows a combined maximum of:

- 5000 specific affinities
- 5000 generic affinities
- 999 class affinities

- 255 SYSID affinities

IWXROUTR

Defines an external router list MSC link.

Can be coded anywhere after the IWXOPTS statement.

A maximum of 2,036 IWXROUTR macros are allowed.

Sample IMS Workload Router configuration

An example of the way that IMS Workload Router can be configured.

The following figure is sample code showing various IMS Workload Router affinity definitions. A description of the code, keyed to the alphabetic labels in the figure, follows the figure.

```

a      IWXPARMS BEGIN
b      IWXOPTS  ROUTER=IMS1, SERVCMD=LIST
c      IWXSYS  ID=IMS1
d      LOCAL  IWXPATH  GOAL=60
e      IWXAFIN MASK=TRAN1
f      IWXSYS  ID=IMS2
g      IWXAFIN CLASS=(8,9)
h      MSNAME1 IWXPATH  GOAL=20
i      IWXAFIN CLASS=(1,7)
j      MSNAME2 IWXPATH  GOAL=10
k      MSNAME3 IWXPATH  GOAL=10
l      IWXAFIN MASK=(TRAN2, TRAN3, TRAN4)
m      IWXAFIN CLASS=(8,9)
n      IWXSYS  ID=IMSL
o      IWXAFIN SYSID=12
p      LPNAME1 IWXLPATH  RPATH=MSNAME1
q      LPNAME2 IWXLPATH  RPATH=MSNAME2, BACKUP=YES
r      LPNAME3 IWXLPATH  RPATH=MSNAME3, BACKUP=YES
s      IWXAFIN MASK=TRAN5, PATH=REMOTE
t      IWXAFIN MASK=TRAN6, PATH=LOCAL
u      IWXAFIN MASK=TRAN7, PATH=MSNAME1
v      IWXAFIN MASK=TRAN8, SYSTEM=IMSL
w      MSNAME1 IWXROUTR  SERVCMD=ON
x      MSNAME4 IWXROUTR  SERVCMD=ALL
z      IWXPARMS  END

```

Figure 7. Sample IMS Workload Router configuration

The following description refers to the IMS Workload Router configuration defined in [Figure 7 on page 37](#):

IWXPARMS and IWXOPTS statements

The IWXPARMS statement (at label **a**) defines the beginning of the IMS Workload Router macro set.

The following IWXOPTS statement (**b**) specifies a router identification of IMS1.

This configuration is used by an IMS system with the subsystem name of IMS1 to do IMS Workload Router routing.

SERVCMD indicates that IMS Workload Router mixed-mode operation is used for this router/server system.

The IWXROUTR statements (**w** and **x**) further define the mixed-mode environment.

All omitted IWXOPTS statement parameters assume the IMS Workload Router default values (not necessarily advisable).

First IWXSYS, IWXPATH, and IWXAFIN statements

The first IWXSYS statement (**c**) defines the router system.

The IWXPATH statement (**d**) whose label field is LOCAL defines the router system local path and allocates 60% of the inbound workload to the router system.

The IWXAFIN statement (**e**) directly following the local path specifies a transaction code of TRAN1.

The transaction code TRAN1 is said to have a path affinity or path targeted affinity to the local path. Whenever TRAN1 is entered in the router system, TRAN1 will be retained and executed there.

Second IWXSYS, IWXPATH, and IWXAFIN statements

The second IWXSYS statement (f) defines an IMS Workload Router system with the identification of IMS2.

The IWXAFIN statement (g) immediately following specifies two IMS scheduler classes that have a system affinity or system targeted affinity to IMS2.

Whenever any IMS transactions with classes 8 or 9 are input to the router system, IMS Workload Router will route them to any of the paths assigned to the IMS2 system (h, j, and k).

Notice the difference between path affinities and system affinities.

Path affinity definitions immediately follow the associated path definition. System affinity definitions immediately follow the associated system definition. Also, path affinity destinations can only be routed to an individual path. System affinity destinations can be routed to one of several possible paths.

The IWXPATH statement (h) represents the first path definition for the IMS2 system. This path has an allocation of 20% of the router inbound workload, and has been given the name MSNAME1.

The name MSNAME1 must match an MSC MSNAME defined within the IMS1 system.

The pairing of the path name and the MSC MSNAME is how IMS Workload Router correlates its path definition with the MSC link.

The IWXAFIN statement (i) specifies that IMS scheduler classes 1 and 7 have a path affinity to the path MSNAME1. The IWXPATH statements (j and k) represent the last two paths associated with the IMS2 system and will each receive 10% of the inbound router workload.

Final IWXSYS statement

The last IWXSYS statement (n) represents a logical IMS Workload Router system, because all of its paths (p, q, and r) are designated as logical paths.

The logical system/paths defined in this figure are used only during the affinity routing of transactions or MSNAMES associated with the MSC SYSID 12 defined on the IWXAFIN statement (o).

Similarly, TRAN8 defined on the IWXAFIN statement (v) is also associated with the logical IMSL system/paths.

The IWXAFIN statement that identifies the TRAN8 destination is said to have an explicit association with its system because it contains the SYSTEM= parameter. The IWXAFIN statement (o) identifying the MSC SYSID 12 is said to have an implicit relationship with its system. Implicit relationships are created by omitting the SYSTEM= or PATH= keyword parameter from the affinity definition.

The IMS Workload Router customization process will associate the affinity definition with the most recently defined IWXSYS, IWXPATH, or IWXLPATH statement.

Logical paths

Logical systems/paths are ignored during the routing of destinations without an affinity definition. The path names for the logical paths defined by the IWXLPATH statements (p, q, and r) need not match any MSC MSNAMES defined in the router system.

Logical paths are associated with MSC links (or the local path) through their relationship with the IWXPATH statement that they refer to on the RPATH= keyword.

In this example, logical path LPNAME1 is associated with path MSNAME1 (h), which is defined as part of the IMS2 system.

Logical paths have no goal values of their own; their goal value is assumed from their related IWXPATH statement. The IWXLPATH statements for LPNAME2 and LPNAME3 (**q** and **r**) specify the BACKUP=YES parameter.

This parameter tells IMS Workload Router that the logical path is to be used only when the primary path associated with the IMSL system is not available.

Example

Consider this example using an input message destined for transaction TRAN8 with an IMS Workload Router-defined affinity on the IWXAFFIN statement (**v**).

TRAN8 has a system targeted affinity associated with the IMS Workload Router system IMSL defined on the IWXSYS statement (**n**).

The IMSL system has three logical paths defined as LPNAME1, LPNAME2, and LPNAME3 on the IWXLPATH statements (**p**, **q**, and **r**).

LPNAME1 is the primary path; LPNAME2 and LPNAME3 are defined as backup paths.

When a message for transaction TRAN8 arrives, if the primary logical path LPNAME1 and its associated path MSNAME1 (**h**) are active, then IMS Workload Router routes the message to the MSC link associated with LPNAME1/MSNAME1.

However, if either the primary logical path or physical path was not active, then IMS Workload Router would consider the backup paths LPNAME2 and LPNAME3 as candidates for routing the TRAN8 message.

IMS Workload Router would decide between these logical paths:

- Based on whether they were active
- Subject to the goal values established for their related paths defined on the IWXPATH statements (**j** and **k**).

Remaining IWXAFFIN statements

The remaining IWXAFFIN statements (**s** through **v**) in [Figure 7 on page 37](#) demonstrate the use of an explicit association between affinities and systems/paths.

The IWXROUTR statements (**w** and **x**) define a mixed-mode server environment.

SERVCOMD=LIST on the IWXOPTS (**b**) macro must also be specified for the IWXROUTR definitions to be effective.

The IWXROUTR definitions are used by the IMS Workload Router server to determine the disposition of alternate PCB output messages generated by IMS application programs.

IWXROUTR definitions let you specify different SERVCMD server options for each defined MSC link MSNAME.

In this example, MSNAME1 is defined with SERVCMD=ON. Therefore, an input message originating from the MSC link associated with MSNAME1 that subsequently generates alternate PCB output will have the SERVCMD=ON option applied to it. Likewise, MSNAME4 originated messages will have the SERVCMD=ALL option applied.

The last IWXPARGS statement (**z**) defines the end of the IMS Workload Router macro set.

Macro reference

The following topics describe the parameters and syntax rules for coding IMS Workload Router customization macros.

The complete macro syntax, enclosed in a syntax box, is followed by a description of each parameter and the supported parameter values.

The parameter value defaults, where applicable, are included in the syntax box in lowercase letters.

IWXPARMS

The following describes parameters and syntax rules for the IWXPARMS customization macro.

```
IWXPARMS BEGIN or END
```

BEGIN

The positional parameter that defines the beginning of the customization macro statements.

END

The positional parameter that defines the end of the customization macro statements.

IWXOPTS

The following describes parameters and syntax rules for the IWXOPTS customization macro.

```
IWXOPTS  ROUTER=  
          SURGE=10,  
          PGMNOQUE=queue,  
          AUDTLTRM=master,  
          AUTOCKPT=on,  
          SERVALID=off,  
          SERVCMD=off,  
          AFFNROUT=enabled,  
          PROGRROUT=enabled,  
          TERMROUT=enabled,  
          SERIALRT=off,  
          STOPEDRT=off,  
          CONVERRT=on,  
          BMPTRNRT=on,  
          FPOTRNRT=off,  
          OTMATRRRT=on,  
          UMSCEBRC=no,  
          CHKGOAL=on
```

ROUTER=

The 1- to 4-position alphanumeric identifier for the router IMS system, as defined in the IMS SYSGEN IMSCTRL macro.

The first three characters of the identifier cannot be IWX or WLR.

This parameter is used in generating the load module name for the IMS Workload Router customization parameter block.

The specified value is used as a suffix to the load module name for the IMS Workload Router customization parameter block (for example, IWX\$IMS1).

There is no default value for this parameter.

SURGE=

A numeric value between 0 and 100 to be used as the surge suppression threshold.

This value triggers automatic surge suppression when the following calculation is true for a path:

```
goal% - actual% > surge threshold
```

A value of 0 triggers surge suppression if there is any difference between a path's goal and actual weight; a value of 100 disables automatic surge suppression.

The default is 10.

Note: If CHKGOAL=OFF is specified, a path's GOAL% is determined by calculating the percentage of the path's goal weight to the sum of all path goals.

PGMNOQUE=

Specifies a value that determines what the IMS Workload Router router does under these circumstances: a DL/I CHNG call is issued by an application program targeting a transaction destination with a matching hard affinity entry, and the associated path is inactive, disabled, or inoperative.

Any one of the following three values is acceptable:

QUEUE

The CHNG call is permitted to continue; any messages inserted to that destination are queued for later transmission when the path becomes available. Note that when a path is disabled and its associated MSC link is active, the queued message is sent immediately.

A1

The CHNG call fails. IMS Workload Router returns an A1 PCB status code to the application program. The application must be sensitive to this status code, and is responsible for any recovery actions.

U3303

The CHNG call fails. IMS pseudo abends the application program with a U3303 abend code. IMS does dynamic backout for the application. IMS either places the input message in progress on the IMS suspend queue or marks the processing transaction as USTOP.

The default is QUEUE.

AUDTLTRM=

A 1- to 8-character LTERM name used by the IMS Workload Router administrative interface to send audit messages when the IMS Workload Router configuration is altered.

The name must follow the conventions established for IMS LTERM names.

The administrative interface does not check the existence or validity of this name; it only attempts to issue messages to the name through the DL/I interface.

The default is MASTER.

AUTOCKPT=

Specifies whether the IMS Workload Router administrative interface should automatically generate an IMS Workload Router configuration checkpoint whenever the IMS Workload Router configuration is modified through the administrative interface.

The default is ON.

ON

The administrative interface does automatic checkpoints.

OFF

The administrative interface does not do automatic checkpoints.

SERVALID=

Specifies whether the IMS Workload Router server destination validation option should be activated in the router/server system.

The default is OFF.

ON

IMS Workload Router does server destination validation.

OFF

IMS Workload Router does not do server destination validation.

SERVCOMD=

Specifies whether the IMS Workload Router server direct communications option should be activated in the router/server system.

The default is OFF.

ON

IMS Workload Router does server direct communications for MSC, ISC, APPC, OTMA, and remote terminal devices.

ALL

IMS Workload Router does server direct communications for all communications devices.

OFF

IMS Workload Router does not do server direct communications.

LIST

IMS Workload Router uses the external router list to determine what SERVCMD option is in effect for the message.

AFFNROUT=

Specifies whether IMS Workload Router should do affinity routing.

The default is ENABLED.

ENABLED

IMS Workload Router does affinity routing.

DISABLED

IMS Workload Router does not do affinity routing.

PROGROUT=

Specifies whether IMS Workload Router should do program routing.

The default is ENABLED.

ENABLED

IMS Workload Router does program routing.

DISABLED

IMS Workload Router does not do program routing.

TERMROUT=

Specifies whether IMS Workload Router should do terminal routing.

The default is ENABLED.

ENABLED

IMS Workload Router does terminal routing.

DISABLED

IMS Workload Router does not do terminal routing.

SERIALRT=

Specifies whether IMS Workload Router should do routing for transactions defined as serial (SERIAL=YES on the IMS TRANSACT macro).

The default is OFF.

ON

IMS Workload Router does routing of serial transactions.

OFF

IMS Workload Router does not do routing of serial transactions.

STOPEVRT=

Specifies whether IMS Workload Router should do routing for transactions that are marked stopped by IMS.

The default is OFF.

ON

IMS Workload Router does routing of stopped transactions.

OFF

IMS Workload Router does not do routing of stopped transactions.

CONVERTT=

Specifies whether IMS Workload Router should do routing for transactions defined as conversational to IMS.

The default is ON.

ON

IMS Workload Router does routing of conversational transactions.

OFF

IMS Workload Router does not do routing of conversational transactions.

BMPTRNRT=

Specifies whether IMS Workload Router should do routing for transactions defined as BATCH (BMP) to IMS.

The default is ON.

ON

IMS Workload Router does routing of BMP transactions.

OFF

IMS Workload Router does not do routing of BMP transactions.

FPOTRNRRT=

Specifies whether IMS Workload Router should do routing for transactions defined as Fast Path potential to IMS.

Note that the routing of Fast Path potential transactions circumvents execution of the Fast Path Input Edit/Routing exit routine.

The default is OFF.

ON

IMS Workload Router does routing of Fast Path potential transactions.

OFF

IMS Workload Router does not do routing of Fast Path potential transactions.

OTMATRRT=

Specifies whether IMS Workload Router should do routing for transactions either originating from an OTMA client or spawned from a transaction originating from an OTMA client.

The default is ON.

ON

IMS Workload Router does routing of transactions originating from an OTMA client.

OFF

IMS Workload Router does not do routing of transactions originating from an OTMA client. IMS Workload Router forces transactions to execute on the local system.

UMSCEBRC

Optional keyword that specifies whether Workload Router makes routing decisions based on the R15 value or the value of the MSCEBRC half-word field of the DFSMSCB control block.

This keyword can be set to YES or NO.

The values of this keyword are not modifiable using the IWXADM SET function.

NO

This value specifies that Workload Router makes routing decisions based on the value that is found in the R15 upon return from the entry point.

NO is the default value for the UMSCEBRC keyword.

If this keyword is not set, a value of NO is assumed.

YES

This value specifies Workload Router makes routing decisions based on the value that is found in the MSCEBRC half-word field of the DFSMSCB control block.

CHKGOAL=

Specifies whether IMS Workload Router should do checking of the cumulative goal.

The default is ON.

ON

IMS Workload Router does verification of the cumulative goal.

It verifies that the cumulative goal is equal to 100.

Goal weights are interpreted as percentages.

OFF

IMS Workload Router does not do verification of the cumulative goal.

It will ensure that the cumulative goal is greater than zero.

Goal weights are interpreted as simple weighted values.

IWXSYS

The following describes parameters and syntax rules for the IWXSYS customization macro.

```
IWXSYS ID=,
        DISABLE=no
```

ID=

The 1- to 4-position alphanumeric identifier for the IMS Workload Router system that uniquely identifies the following path group.

The identifier you choose must be unique among other system identifiers and path names defined in the same IMS Workload Router configuration.

The first three characters of the identifier must not be IWX or WLR.

DISABLE=

Specifies whether the system should be disabled for routing.

The default is NO.

YES

The system is disabled for routing.

NO

The system is not disabled for routing.

IWXPATH

The following describes parameters and syntax rules for the IWXPATH customization macro.

```
LABEL IWXPATH GOAL=,
        DISABLE=no
```

LABEL

The 1- to 8-character path name of the macro statement.

The name must begin in column 1 (the LABEL field).

The path name must match an MSC MSNAME defined in the router system and is, therefore, subject to the same naming convention restrictions used for IMS/MS MSNAMEs.

The path name you choose must be unique among other path names and system identifiers (IWXSYS ID=) defined in the same IMS Workload Router configuration.

The first three characters of the path name must not be IWX or WLR, and the path name cannot be REMOTE.

The path name for the router system must be LOCAL and must be the first path defined in the customization macros.

GOAL=

Defines the path goal. The path goal can be expressed in one of two ways:

1. As a simple weighted value.

For instance, if one path has a weight of 1 and a second path has a weight of 5, the second path is 5 times as likely to be used as the first path.

Any numeric value between 0 and 100 can be used.

Note that the aggregate of all defined path goals must be greater than zero.

2. As a percent of the router-inbound workload that IMS Workload Router routes to a path.

For instance, a path with a weight of 20 should receive 20% of the router-inbound workload.

Any numeric value between 0 and 100 can be specified.

Note that the aggregate of all defined path goals must be equal to 100.

The CHKGOAL configuration parameter determines how these values are interpreted.

- If CHKGOAL=OFF is specified, the weights are treated as simple weighted values.
- If CHKGOAL=ON is specified, the weights are treated as percentages of the router-inbound workload.

DISABLE=

Specifies whether the path should be disabled for routing.

The default is NO.

Note that the local path cannot specify DISABLE=YES.

YES

The path is disabled for routing.

NO

The path is not disabled for routing.

IWXLPATH

The following describes parameters and syntax rules for the IWXLPATH customization macro.

```
LABEL  IWXLPATH  RPATH=,  
                BACKUP=no,  
                DISABLE=no
```

LABEL

The 1- to 8-character logical path name of the macro statement.

The name must begin in column 1 (the LABEL field).

The path name you choose must be unique among other path names and system identifiers (IWXSYS ID=) defined in the same IMS Workload Router configuration.

The first three characters of the path name must not be IWX or WLR, and the path name cannot be REMOTE.

RPATH=

Specifies the path name of the related physical path (IWXPATH label).

The related physical path must be defined before defining any logical path that references it.

BACKUP=

Specifies whether the logical path is to be used exclusively for backup purposes.

Multiple logical paths related to an IMS Workload Router system can be designated as backup paths.

However, at least one path or logical path associated with an IMS Workload Router system must be the primary path and specify (or default to) BACKUP=NO.

The default is NO.

YES

The path is to be used exclusively for backup processing.

NO

The path is a primary logical path and can be used for any affinity routing purposes.

DISABLE=

Specifies whether the path should be disabled for routing.

The default is NO.

YES

The path is disabled for routing.

NO

The path is not disabled for routing.

IWXAFIN

The following describes parameters and syntax rules for the IWXAFIN customization macro.

```
IWXAFIN  PATH=, or SYSTEM=,
          MASK=, or CLASS=, or SYSID=,
          QUEUE=on,
          DISABLE=no
```

PATH= or SYSTEM=

Mutually exclusive parameters that create an explicit relationship between the affinity destination(s) and either an IMS Workload Router path or system.

When both parameters are omitted, the affinity has an implicit relationship to a path, logical path, or system, depending on which was defined more recently (IWXPATH, IWXLPATH, or IWXSYS respectively).

PATH=

An optional parameter.

When used, it creates an explicit relationship between the affinity destination(s) and a previously-defined target path.

To designate an affinity as remote, specify PATH=REMOTE.

SYSTEM=

An optional parameter.

When used, it creates an explicit relationship between the affinity destination(s) and a previously-defined system.

MASK= or CLASS= or SYSID=

Mutually exclusive parameters. These parameters create the criteria for IMS Workload Router to identify an affinity destination (such as a transaction code, IMS transaction class, or IMS remote system identification) that is to be associated with the affinity entry.

MASK=

Specifies one or more transaction code masks or IMS MSNAMES.

If more than one mask value is specified, the set must be enclosed in parenthesis and separated by commas.

A transaction code or MSNAME mask consists of 1 through 8 alphanumeric positions.

The mask can match a specific transaction code or MSNAME exactly; or it can be made generic using wildcard symbols (in which case the mask can match more than one transaction code or MSNAME).

Wildcard symbols include the percent sign (%), which represents exactly one wildcard position and can appear up to 8 times anywhere in the mask. The asterisk (*) symbol represents a variable-length wildcard mask terminator and can only appear in the last position of the mask.

An example of a *specific* affinity is MASK=IVTNO, which exactly matches transaction code IVTNO. MASK=IV%N* is a *generic* affinity; it matches not only the transaction code IVTNO but other transaction codes at least 4 positions in length with:

- IV in the first two positions
- Any character in the third position
- N in the fourth position
- Anything in the remaining positions

CLASS=

Specifies one or more IMS transaction classes.

If more than one class value is specified, the set must be enclosed in parenthesis and separated by commas.

The use of a class affinity facilitates the wholesale routing of all transactions assigned to a specific class to a target path.

An example of a class affinity is CLASS=27, which applies to all IMS transactions assigned to IMS scheduler class 27.

SYSID=

Specifies one or more IMS/MS remote system identifiers.

If more than one SYSID value is specified, the set must be enclosed in parenthesis and separated by commas.

The use of a SYSID affinity allows the wholesale routing of all transactions and MSNAMES assigned to a specific remote system identifier.

An example of a sysid affinity is SYSID=38, which applies to all IMS transactions and MSNAMES assigned to IMS with the remote system identifier 38.

QUEUE=

Specifies the action taken by IMS Workload Router when an affinity entry's associated path or entire system (for system targeted affinities only) is inactive, disabled, or inoperative.

The default is ON.

ON

The input message is queued to the path (or the current highest-priority path for a system targeted affinity) for transmission when the path or system becomes available.

This is the only valid option for affinities that either explicitly or implicitly reference path names of REMOTE or LOCAL, or indirectly reference the local path through an affinity to a logical path.

Note that the queued message is sent immediately when:

- QUEUE=ON is specified on an affinity definition,
- The target path or system is disabled, and
- The path's related MSC link is active.

OFF

If the input message originates from a terminal, IMS Workload Router sends an informational message to the terminal indicating the path is unavailable.

If the input message originates from a program, the action taken by IMS Workload Router is based on the value specified on the PGMNOQUE option coded on the IWXOPTS macro.

LOCAL

Specifies that the input message is to be routed to the local path for processing in the router system.

DISABLE=

Specifies whether the affinity entry should be disabled.

The default is NO.

YES

The affinity entry is disabled.

NO

The affinity entry is not disabled.

IWXROUTR

The following describes parameters and syntax rules for the IWXROUTR customization macro.

LABEL	IWXROUTR	SERVCOMD=, DISABLE= <i>no</i>
-------	----------	----------------------------------

LABEL

The 1- to 8-character RLIST entry name is specified in column 1 (the label field) of the macro statement.

The name must match an MSC MSNAME defined to the IMS system, and is therefore subject to the same naming convention restrictions used for IMS/MS MSNAMES.

The first three characters of the name must not be IWX or WLR.

The name must be unique among other RLIST entry names.

SERVCOMD=

The SERVCMD option to be associated with the RLIST entry (and MSC link).

The default value is OFF.

ON

IMS Workload Router will do server direct communications for MSC, ISC, APPC, OTMA, and remote terminal devices.

ALL

IMS Workload Router will do server direct communications for all communications devices.

OFF

IMS Workload Router will not do server direct communications.

DISABLE=

Specifies whether the RLIST entry should be disabled.

The default is NO.

YES

The RLIST entry is disabled.

NO

The RLIST entry is not disabled.

Chapter 5. Monitoring and modifying IMS Workload Router

IMS Workload Router can be monitored and dynamically modified using a group of functions called the IMS Workload Router administrative interface.

The administrative interface executes as a standard IMS transaction and uses IMS Message Format Services (MFS) to interact with you.

Any changes made to an IMS Workload Router configuration through the administrative interface persist until they are altered through the administrative interface or until the IMS control region terminates.

To make permanent changes to an IMS Workload Router configuration, re-customize IMS Workload Router and restart the IMS system.

The IMS Workload Router checkpoint function can automatically regenerate IMS Workload Router configuration macros, including any changes implemented through the administrative interface.

Topics:

- [“Securing the administrative interface” on page 50](#)
- [“Accessing the administrative interface” on page 50](#)
- [“Administrative interface functions” on page 50](#)
- [“ADD \(dynamically add affinity entry\)” on page 51](#)
- [“AFFIN \(display mask/class/sysid affinities\)” on page 52](#)
- [“CHKPT \(manually invoke checkpoint\)” on page 53](#)
- [“DISAB \(disable various IMS Workload Router resources\)” on page 53](#)
- [“ENABL \(enable various IMS Workload Router resources\)” on page 55](#)
- [“FIND \(find IMS destination characteristics\)” on page 57](#)
- [“GOALS \(alter path goals or weights\)” on page 59](#)
- [“GRUSM \(obtain graphic view\)” on page 60](#)
- [“LEVEL \(manually reset routing statistics\)” on page 61](#)
- [“MENU \(display menu\)” on page 62](#)
- [“PARMS \(display general parameters\)” on page 62](#)
- [“PFKS \(display program function keys\)” on page 64](#)
- [“QLCL \(change affinity queueing to local\)” on page 64](#)
- [“QOFF \(deactivate affinity queueing\)” on page 65](#)
- [“QON \(activate affinity queueing\)” on page 67](#)
- [“RLADD \(add external router list entry\)” on page 68](#)
- [“RLIST \(display external router list Information\)” on page 69](#)
- [“RLSET \(modify external router list entry\)” on page 70](#)
- [“ROUTE \(alter affinity routing\)” on page 70](#)
- [“RROUT \(reset affinity routing\)” on page 72](#)
- [“SET \(alter general parameters\)” on page 73](#)
- [“SHOW \(display detailed system/path information\)” on page 75](#)
- [“STATS \(display system/path status\)” on page 77](#)

Securing the administrative interface

The IMS Workload Router administrative transaction (IWXADMIN) should be secured using either IMS Security Maintenance utility (SMU) security or IMS RACF (or equivalent) transaction security.

Only those with a direct need to monitor or modify the IMS Workload Router configuration should be authorized to use the transaction.

Accessing the administrative interface

To access the IMS Workload Router administrative interface, issue the /FORMAT IWXADM IMS command.

When you issue the /FORMAT IWXADM command, the following screen opens:

```
      +- WORKLOAD ROUTER ADMINISTRATOR INTERFACE +-  
REQUEST:  QUAL1:           QUAL2:           QUAL3:           PAGE:           LAST
```

REQUEST:

The administrative interface function you want to use.

QUAL1:, QUAL2:, QUAL3:

The various input parameters for administrative functions.

PAGE:

The current page number; used only for output. IMS Workload Router administrative functions can produce single or multiple pages of output.

Adjacent to the page number is the last page indicator, which contains LAST when the last page of output is displayed on the screen.

The rest of the screen is used primarily for the output generated by each administrative function.

Administrative interface functions

The IMS Workload Router administrative interface has a number of functions to help you monitor and dynamically modify an IMS Workload Router configuration.

A description of how these functions are used follows:

- You can get a list of the administrative functions using the MENU function.
The PFKS function displays a list of the administrative interface program function key settings.
- For monitoring overall system status and the IMS Workload Router configuration, the administrative interface provides the STATS, GRUSM, and SHOW functions.
- The IMS Workload Router general parameters, including global routing inhibitor controls, can be viewed with the PARMs function and altered with the SET function.
- Information about the IMS Workload Router perspective on a particular IMS destination can be obtained using the FIND function.
- IMS Workload Router systems and paths can be manipulated with the ENABL, DISAB, and GOALS functions.
Manual surge suppression can be invoked with the LEVEL function.
- Affinity entries can be viewed, manipulated, or dynamically created with the AFFIN, ENABL, DISAB, ROUTE, RROUT, QON, QOFF, QLCL, and ADD functions.
- External router list (RLIST) entries can be viewed, manipulated, or dynamically created with the RLIST, ENABL, DISABL, RLSET, and RLADD functions.
- An IMS Workload Router configuration checkpoint can be manually initiated using the CHKPT function.

A detailed description of each of these functions follows. The descriptions are in alphabetical order.

For each function, there is a general description, a syntax box, a description of each input parameter, and then a description of output from the function.

Also included are any special considerations for using the function.

ADD (dynamically add affinity entry)

The ADD function dynamically adds an affinity entry to the IMS Workload Router configuration in an active IMS system.

The input parameters specified in the ADD function are explained in more detail in [“IWXAFIN” on page 46](#).

```
REQUEST: ADD      QUAL1: msk/cls/sid  QUAL2: pathname      QUAL3: QUEUE
                  OR
                  sysid      OR
                              NOQUEUE
                              OR
                              LOCAL
```

Input

REQUEST:

The function to be used (ADD in this case).

QUAL1:

The mask, class, or sysid literal for the affinity match criteria.

Specify a class value to the ADD function using the class prefix literal CLS# (for example, to add an affinity entry for IMS scheduler class 27, specify CLS#27).

Specify a sysid value for the ADD function using the sysid prefix literal SID# (for example, to add an affinity entry for remote sysid 38, specify SID#38).

QUAL2:

The destination path name or system ID for the affinity entry.

To create a remote affinity entry, specify REMOTE.

Note: When using the system ID as the affinity entry, do not preface the system ID number with the SID# literal.

QUAL3:

Either QUEUE, NOQUEUE, or LOCAL. QUEUE is the default.

Output

An IMS Workload Router system message is issued indicating whether the ADD function completed successfully.

Considerations

The ADD function does not allow duplicate mask/class/sysid affinity entries to be added.

AFFIN (display mask/class/sysid affinities)

The AFFIN function displays the entire list of mask/class/sysid affinities defined to IMS Workload Router for a given router system.

```
REQUEST: AFFIN    QUAL1:    QUAL2:    QUAL3:
```

Input

REQUEST:

The function to be used (AFFIN in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

A single line of output is generated for each affinity entry. The output line will be in one of the following formats:

```
MASK=mask  SYSTEM=imsa PATH=pathname CNT=match QUE=on/off/local -status-  
           or  
CLASS=class SYSTEM=imsa PATH=pathname CNT=match QUE=on/off/local -status-  
           or  
SYSID=sysid SYSTEM=imsa PATH=pathname CNT=match QUE=on/off/local -status-  
           or  
           SYSTEM=imsa PATH=pathname CNT=match QUE=on/off/local -status-
```

MASK= and CLASS= and SYSID=

When present, the MASK= literal indicates this is a mask affinity entry; CLASS= indicates an IMS scheduler class affinity entry; and SYSID indicates a remote SYSID affinity entry.

Blanks in this literal position indicates this is a stacked history element for the previous affinity entry.

SYSTEM= and PATH=

The names of the IMS Workload Router destination system and path to which the affinity is assigned.

Note that when PATH=REMOTE, the value for SYSTEM= is always N/A because remote affinities are not assigned to a particular system.

When the affinity is assigned to a system instead of a particular path, PATH is always N/A.

CNT=

The number of times the affinity criteria was matched by the IMS Workload Router router, indicating use of the affinity entry in the IMS system.

QUE=

The option selected for the affinity entry when the associated destination path is unavailable.

-status-

The current status of the affinity entry.

Possible values are HSTRY, DISAB, or blanks.

CHKPT (manually invoke checkpoint)

The CHKPT function manually invokes an IMS Workload Router configuration checkpoint.

```
REQUEST: CHKPT    QUAL1:    QUAL2:    QUAL3:
```

Input

REQUEST:

The function to be used (CHKPT in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued containing the unique IMS Workload Router 16-byte checkpoint ID.

This checkpoint message is sent to the LTERM that issued the checkpoint, the IMS master terminal, and the MVS console.

DISAB (disable various IMS Workload Router resources)

The DISAB function dynamically disables systems, paths, affinities, RLIST entries, or routing levels.

```
REQUEST: DISAB:    QUAL1: SYSTEM    QUAL2: sysname    QUAL3:
                   or
                   PATH        pathname
                   or
                   RLIST       rlistname
                   or
                   AFFIN       msk/cls/sid
                   or
                   AFSYS       sysname
                   or
                   AFPATH      pathname
                   or
                   ALLROUT
                   or
                   TERMROUT
                   or
                   PROGRROUT
                   or
                   AFFNRROUT
```

Input

REQUEST:

The function to be used (DISAB in this case).

QUAL1:/QUAL2:

The resource type and resource name, where applicable.

Resource types include SYSTEM, PATH, RLIST, AFFIN, AFSYS, AFPATH, ALLROUT, TERMROUT, PROGRROUT, and AFFNROUT.

- When QUAL1 is SYSTEM, QUAL2 is the IMS Workload Router system ID.

This specification flags an IMS Workload Router system as disabled, and all of the paths associated with the system are flagged as inactive.

The paths associated with the system are logically removed from use by the IMS Workload Router router. (The only transactions/MSNAME-destined messages that the IMS Workload Router router routes to any of the paths for the disabled system are the ones with matching affinity entries that specify QUEUE=ON.)
- When QUAL1 is PATH, QUAL2 is the IMS Workload Router path name.

This specification flags a path as disabled and inactive.

The path is logically removed from use by the IMS Workload Router router. (The only transactions/MSNAME-destined messages that the IMS Workload Router router routes to a disabled path are the ones with matching affinity entries that specify QUEUE=ON.)
- When QUAL1: is RLIST, QUAL2: is the RLIST entry MSNAME.

Disabling an RLIST entry flags the entry as disabled.

The RLIST entry is logically removed from use by the IMS Workload Router server.
- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the DISAB function using the class prefix literal CLS# (for example, to disable an affinity entry for IMS scheduler class 27, specify CLS#27).

Specify a sysid value to the DISAB function using the sysid prefix literal SID# (for example, to disable an affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the DISAB function, see [“IWXAFIN” on page 46](#).

Disabling an affinity logically removes it from use by the IMS Workload Router router.
- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID.

This specification flags all the affinities associated with the system as disabled.

This includes all affinities directly associated with the system itself, as well as those associated with the paths belonging to the system.

The affinities are logically removed from use by the IMS Workload Router router.
- When QUAL1 is AFPATH, QUAL2 is the IMS Workload Router path name or REMOTE for remote affinities.

This specification flags all affinities associated with the path as disabled.

The affinities are logically removed from use by the IMS Workload Router router.
- When QUAL1 is ALLROUT, QUAL2 is not used.

When ALLROUT is specified, the IMS Workload Router router is completely disabled.

No routing, including affinity routing, takes place.
- When QUAL1 is TERMROUT, QUAL2 is not used.

When TERMROUT is specified, the IMS Workload Router router does not do routing for input transactions originating from any network devices, including APPC and OTMA clients.

All other routing levels are left in their current state.
- When QUAL1 is PROGRROUT, QUAL2 is not used.

When PROGRROUT is specified, the IMS Workload Router router does not do routing for input transactions/MSNAME destinations originating from IMS application programs.

All other routing levels are left in their current state.

- When QUAL1 is AFFNR0UT, QUAL2 is not used.

When AFFNR0UT is specified, the IMS Workload Router router does not access any of the defined affinity entries when doing routing.

The workload is strictly balanced according to path weights and available resources.

All other routing levels are left in their current state.

QUAL3:

Not used with the DISAB function.

Output

An IMS Workload Router system message is issued indicating whether the DISAB function completed successfully.

Considerations

- The DISAB function does no checks for the current status of the resource (enabled/disabled) before doing its processing.
- The local system/path or any logical paths that reference the local path cannot be disabled.
- An inoperative system or path cannot be disabled.
- Care should be exercised when disabling routing levels, especially affinity routing.

If there are transactions with affinity entries that have functional dependencies on a particular system, disabling affinity routing could compromise the integrity of the application and its data.

ENABL (enable various IMS Workload Router resources)

The ENABL function dynamically enables systems, paths, affinities, RLISTs, or routing levels.

```

REQUEST: ENABL   QUAL1: SYSTEM
                  OR
                  PATH           pathname
                  OR
                  RLIST          rlistname
                  OR
                  AFFIN          msk/cls/sid
                  OR
                  AFSYS          sysid
                  OR
                  AFPATH         pathname
                  OR
                  ALLROUT
                  OR
                  TERMROUT
                  OR
                  PROGR0UT
                  OR
                  AFFNR0UT

```

Input

REQUEST:

The function to be used (ENABL in this case).

QUAL1:/QUAL2:

The resource type and resource name, where applicable.

Resource types include SYSTEM, PATH, RLIST, AFFIN, AFSYS, AFPATH, ALLROUT, TERMROUT, PROGR0UT, and AFFNR0UT.

- When QUAL1 is SYSTEM, QUAL2 is the IMS Workload Router system ID.

This specification resets the system's disabled flag.

All of the system's path flags are left as they were before enabling the system.

The paths associated with the system are made available for subsequent use by the IMS Workload Router router.

- When QUAL1 is PATH, QUAL2 is the IMS Workload Router path name.

This specification resets the path's disabled flag.

All other path flags are left as they were before enabling the path.

The path is made available for subsequent use by the IMS Workload Router router.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the ENABL function using the class prefix literal CLS# (for example, to enable an affinity entry for IMS scheduler class 27, specify CLS#27).

Specify a sysid value to the ENABL function using the sysid prefix literal SID#; (for example, to enable an affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the ENABL function, see [“IWXAFIN” on page 46](#).

This specification resets the affinity entry's disabled flag.

The affinity entry is made available for subsequent use by the IMS Workload Router router, assuming affinity routing itself is enabled.

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID.

This specification resets the affinity entry's disabled flag for all affinities associated with the system.

This includes all affinities directly associated with the system itself, as well as those associated with the paths belonging to the system.

The affinity entries are made available for subsequent use by the IMS Workload Router router, assuming affinity routing is enabled.

- When QUAL1 is AFPATH, QUAL2 is the IMS Workload Router path name or REMOTE for soft affinities.

This specification resets the affinity entry's disabled flag for all affinities associated with the path.

The affinity entries are made available for subsequent use by the IMS Workload Router router, assuming affinity routing is enabled.

- When QUAL1: is RLIST, QUAL2: is the RLIST entry MSNAME. Enabling an RLIST resets the entry's disabled flag.

The IMS Workload Router server can subsequently use the RLIST entry.

- When QUAL1 is ALLROUT, QUAL2 is not used. When ALLROUT is enabled, all IMS Workload Router routing levels are enabled.

Terminal, program, and affinity routing are made active.

- When QUAL1 is TERMROUT, QUAL2 is not used. When TERMROUT is specified, the IMS Workload Router router can route input transactions originating from any network device, including APPC and OTMA clients.

All other routing levels are left in their current state.

- When QUAL1 is PROGROUT, QUAL2 is not used. When PROGROUT is specified, the IMS Workload Router router can route input transactions originating from IMS application programs.

All other routing levels are left in their current state.

- When QUAL1 is AFFNROUT, QUAL2 is not used. When AFFNROUT is specified, the IMS Workload Router router accesses the defined affinity entries when doing routing.

All other routing levels are left in their current state.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the ENABL function completed successfully.

Considerations

- The ENABL function does not check the current status of the resource (enabled/disabled) before doing its processing.
- The local system/path or any logical paths that reference the local path cannot be enabled under any circumstance, as they are always in an enabled state.
- An inoperative system or path cannot be enabled.
- When any routing level (ALLROUT, TERMROUT, PROGRROUT, or AFFNRROUT) is enabled, automatic surge suppression is activated (if selected) and checks for the possibility of a routing surge on any available (defined as not inoperative and not inactive) path.

FIND (find IMS destination characteristics)

The FIND function gathers information about the characteristics of an IMS-defined destination. The information that is gathered pertains to characteristics that could impact the ability of IMS Workload Router to route messages to the specified destination.

```
REQUEST: FIND    QUAL1: destname  QUAL2:   QUAL3:
```

Input**REQUEST:**

The function to be used (FIND in this case).

QUAL1:

The destination name.

The name can be any valid IMS transaction or LTERM name.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

Output varies depending on whether the destination is defined to IMS as a transaction code or LTERM.

For LTERM destinations, the output is in the following format:

```
DESTINATION:  MASTER
AFFINITY:    MASK=NONE
DEST-TYPE:   LTERM
```

For transaction destinations, the output is in the following format:

```

DESTINATION:   IVTNO
AFFINITY:      MASK= IVTNO
DEST-TYPE:     TRANSACT
SERIAL:        NO
STOPPED:       NO
CONVERSATION: NO
BMP:          NO
FASTPATH:     NO
CLASS:        17
REMOTE/SIDR:  NO

```

The meaning of the output fields follows:

DESTINATION

The destination name specified in the QUAL1 input field.

AFFINITY

The FIND function attempts to match the destination name with an IMS Workload Router-defined affinity.

If a match is found, this field displays either MASK=, CLASS=, or SYSID= and the matching affinity mask/class/sysid, respectively.

Otherwise, it displays NONE.

DEST-TYPE

The IMS destination type, which is either TRANSACT or LTERM. For LTERMs, a subtype can be included to provide information about:

- IMS Workload Router RDR routing
- SERVCMD=YES response-message routing in IMS Workload Router router/server systems

LTERM (LU6.1)

The destination is an LTERM associated with an LU6.1 (ISC) terminal device.

LTERM (LU6.2)

The destination is an APPC/IMS descriptor name.

LTERM (REMOTE)

The destination is an MSC remote LTERM.

LTERM (MSNAME)

The destination is an MSC MSNAME.

SERIAL

For a transaction destination, represents the value specified in the SERIAL= parameter on the IMS transaction definition.

You should review this value with respect to the value specified in the IWXOPTS SERIALRT parameter during IMS Workload Router customization.

SERIALRT affects the ability of IMS Workload Router to route transactions defined as SERIAL=YES.

STOPPED

For a transaction destination, shows whether the transaction is currently stopped.

You should review this value with respect to the value specified in the IWXOPTS STOPEDRT parameter during IMS Workload Router customization.

STOPEDRT affects the ability of IMS Workload Router to route transactions that are stopped.

CONVERSATION

For a transaction destination, represents whether the transaction was defined as IMS conversational during IMS Workload Router customization.

You should review this value with respect to the value specified in the IWXOPTS CONVERRT parameter during IMS Workload Router customization.

CONVERRT affects the ability of IMS Workload Router to route transactions defined to IMS as conversational.

BMP

For a transaction destination, represents whether the transaction was defined to IMS as batch (BMP). You should review this value with respect to the value specified in the IWXOPTS BMPTRNRT parameter during IMS Workload Router customization.

BMPTRNRT affects the ability of IMS Workload Router to route transactions that are defined to IMS as batch.

FASTPATH

For a transaction destination, represents whether the transaction was defined to IMS as a Fast Path exclusive or Fast Path potential transaction.

You should review this value with respect to the value specified in the IWXOPTS FPOTRNRT parameter during IMS Workload Router customization.

FPOTRNRT affects the ability of IMS Workload Router to route transactions that are defined to IMS as Fast Path potential. IMS Workload Router cannot route transactions defined as Fast Path exclusive.

CLASS

For a transaction destination, represents the IMS scheduler class specification for the transaction.

This value is supplied to help you create and manage IMS Workload Router affinity definitions.

REMOTE/SIDR

For a transaction destination, represents the IMS remote system identification associated with the transaction.

This value is supplied to help you create and manage IMS Workload Router affinity definitions.

Considerations

The FIND function can locate LTERM destinations that are dynamically created using known dynamic terminal products.

GOALS (alter path goals or weights)

The GOALS function dynamically alters the path goals established through IMS Workload Router customization or prior use of the GOALS function. When used, GOALS first displays the currently defined path names and associated path goals.

You can then modify the current values with replacement goal values.

```
REQUEST: GOALS   QUAL1: pathname   QUAL2:   QUAL3:
```

Input**REQUEST:**

The function to be used (GOALS in this case).

QUAL1:

The starting path name.

The starting path name is optional and used only when the number of defined paths exceeds the capacity of the one display screen (76 paths).

If no path name is specified, the display begins with the first defined path.

If the number of defined paths fits on one display screen, the content of the QUAL1 field is ignored.

After you update the path goals for the current page and press the enter key, the content of the QUAL1 field is automatically updated to reflect the name of the path that directly follows the last path displayed (if any remain).

When the last remaining set of paths is displayed, the QUAL1 field is set to LASTPATH, indicating that there are no paths left to be processed. At this point, updating the path goals and pressing enter completes the GOALS function.

The format of the path name/path goal input field is as follows:

```
LOCAL      : 050          MSC910 : 050
```

Up to four path name/goal pairs can be displayed on a given line of output. Only values between 0 and 100 can be specified for any given path goal. Leading zeros can be omitted on goal values.

If CHKGOAL=ON is specified, the aggregate of all path values must be 100; otherwise, the aggregate must be greater than zero.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the GOALS function completed successfully.

Considerations

- Logical path names are not displayed, as logical paths have no goal values of their own.
- When CHKGOAL=ON is specified and ...
 - When all paths can be displayed on a single output page, GOALS does no updates if the aggregate of the path goals is not equal to 100.
 - When multiple output pages are necessary, GOALS only checks the aggregate on the last page of output, and issues a warning message if the aggregate is not equal to 100.

In this case, you are responsible for making sure the aggregate is accurate.
- When CHKGOAL=OFF is specified, GOALS only checks the aggregate to determine if the cumulative goal is greater than zero.
- On each page of input, automatic surge suppression is activated (if selected) and checks for the possibility of a routing surge on any available (defined as not inoperative and not inactive) path.

GRUSM (obtain graphic view)

The GRUSM function obtains an overall graphic view of IMS Workload Router-defined systems and their associated goals and routing statistics.

```
REQUEST: GRUSM   QUAL1:   QUAL2:   QUAL3:
```

Input

REQUEST:

The function to be used (GRUSM in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

MENU (display menu)

The MENU function presents a menu of all IMS Workload Router administrative functions.

```
REQUEST: MENU    QUAL1:    QUAL2:    QUAL3:
```

Input

REQUEST:

The function to be used (MENU in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

A line of output is generated for each administrative function.

Each output line contains the function identification and a brief description of the function's purpose.

An example follows:

```
GOALS ..... ALTER PATH GOALS
```

PARMS (display general parameters)

The PARMS function displays a list of IMS Workload Router parameter settings, as well as other IMS Workload Router general information.

```
REQUEST: PARMS   QUAL1:    QUAL2:    QUAL3:
```

Input

REQUEST:

The function to be used (PARMS in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

Multiple lines of output are generated. Each line contains multiple parameter/value pairs.

The meaning of each parameter follows:

Parameter	Definition
ROUTER-SYS :	IMS system ID of the router system
CONFIG-TIME :	Assembly date/timestamp of the IMS Workload Router configuration parameters
PARM AREA :	Virtual storage address of the IMS Workload Router configuration parameter area image
ADMIN-TRAN :	Transaction code for the IMS Workload Router administrative transaction
NOQUE-TRAN :	Transaction code for the IMS Workload Router NOQUEUE transaction
AUDTLTRM :	The LTERM name used as the IMS Workload Router audit terminal.
WLR RELEASE :	The IMS Workload Router version and release level of the supplied parameter block.
USER TREXIT	The DFSMSCEO TRXXX exit that is in use.
USER PREXIT	The DFSMSCEO PRCHNG exit that is in use.
TRACE :	Internal diagnostic trace status
AUTOCKPT :	Automatic checkpointing for changed configuration
CHKGOAL :	Cumulative goal checking status
AFFNROUT :	Affinity routing status
TERMROUT :	Terminal routing status
PROGROUT :	Program routing status
SURGE :	Automatic surge suppression threshold
PGMNOQUE :	Unavailable path/program queuing option
BMPTRNRT :	Batch (BMP) transaction routing status
SERIALRT :	Serial transaction routing status
STOPEDRT :	Stopped transaction routing status
SERVALID :	Server destination validation status
SERVCOMD :	Server direct communications status
CONVERRT :	Conversational transaction routing status
FPOTRNRT :	Fast Path potential transaction routing status
OTMATRRT :	OTMA transaction routing status
# TRANS TOTL :	Total number of transactions passed through the IMS Workload Router router
# TRANS LOCAL :	Total number of transactions routed locally
# SYSTEMS :	Number of systems defined to IMS Workload Router
# PATHS :	Number of paths defined to IMS Workload Router
# SPEC.AFFIN :	Number of specific affinities (non-class and non-generic)
# GEN.AFFIN :	Number of generic affinities (wildcard)
# CLASS AFFIN :	Number of class affinities
# SYSID AFFIN :	Number of sysid affinities

Parameter	Definition
#EXT.ROUTER :	Number of RLIST entries
USE MSCEBRC :	Indicates whether or not the MSCEBRC field will be used.

PFKS (display program function keys)

The PFKS function displays a list of program function key (PFK) definitions for the IMS Workload Router administrative interface.

```
REQUEST: PFKS    QUAL1:    QUAL2:    QUAL3:
```

Input

REQUEST:

The function to be used (PFKS in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

Multiple lines of output are generated. Each line contains the description of a given PFK.

An example follows:

```
PFK4 = FIRST PAGE OF MULTI-PAGE OUTPUT
PFK5 = LAST PAGE OF MULTI-PAGE OUTPUT
PFK7 = PRIOR PAGE OF MULTI-PAGE OUTPUT
PFK8 = NEXT PAGE OF MULTI-PAGE OUTPUT
PFK9 = /RCL - DISCONNECT FROM IMS
```

QLCL (change affinity queueing to local)

The QLCL function modifies the affinity queue setting to QUEUE=LOCAL on affinity entries.

An affinity entry with the QUEUE=LOCAL flag set is considered a firm affinity and is used by the IMS Workload Router router when:

- A message is received that matches the affinity entry
- The target path (or target system for system-targeted affinities) is not available (that is, the target path is inactive, disabled, or inoperative)

When these conditions are met, the IMS Workload Router router redirects the input message to the local path.

The QLCL function operates on:

- A specific affinity entry
- All affinity entries currently associated with a particular path

- All affinity entries currently associated with a particular IMS Workload Router system

QLCL is not valid for affinity entries with a destination of REMOTE, the local path, or a logical path associated with the local path.

```
REQUEST: QLCL    QUAL1: AFFIN    QUAL2: msk/cls/sid    QUAL3:
                OR
                AFSYS        sysid
                OR
                AFPATH        pathname
```

Input

REQUEST:

The function to be used (QLCL in this case).

QUAL1:/QUAL2:

The resource type and resource name.

Resource types include AFFIN, AFSYS, and AFPATH.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the QLCL function using the class prefix literal CLS# (for example, to use this function for an affinity entry for IMS scheduler class 27, specify CLS#27).

Specify a sysid value to the QLCL function using the sysid prefix literal SID# (for example, to change the affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the QLCL function, see [“IWXAFIN” on page 46](#).

The affinity entry queue flag is set to QUEUE=LCL.

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID that the target affinity entries are currently assigned to.

All affinities associated with the specified system ID (including affinities associated with any of the system's paths) have their queue flag set to QUEUE=LCL. QUAL2: cannot reference the local system.

- When QUAL1 is AFPATH, QUAL2 is the IMS Workload Router path name that the target affinity entries are currently assigned to.

All affinities associated with the specified path name have their queue flag set to QUEUE=LCL. QUAL2: cannot reference the local path or a logical path associated with the local path.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the QLCL function completed successfully.

QOFF (deactivate affinity queueing)

The QOFF function modifies the affinity queue setting to QUEUE=OFF on affinity entries.

An affinity entry with the QUEUE=OFF flag set is considered a hard affinity and is used by the IMS Workload Router router when:

- A message is received that matches the affinity entry
- The target path (or target system for system-targeted affinities) is not available (that is, the target path is inactive, disabled, or inoperative)

When these conditions are met, the IMS Workload Router router does one of the following:

- If the input message originated from the IMS terminal network, APPC, or an OTMA client, the message destination is set to the IWXNOQUE transaction destination.

IWXNOQUE sends the following message back to the originator:

```
IWX500I TARGET SYSTEM IS UNAVAILABLE AT THIS TIME
```

- If the input message originated from an IMS application program that issued a DL/I CHNG/ISRT call sequence, the PGMNOQUE option is specified to determine the disposition of the input message.

The QOFF function operates on:

- A specific affinity entry
- All affinity entries currently associated with a particular path
- All affinity entries currently associated with a particular IMS Workload Router system

QOFF is not valid for affinity entries that specify REMOTE, the local path, or any logical path associated with the local path.

```
REQUEST: QOFF      QUAL1: AFFIN      QUAL2: msk/cls/sid  QUAL3:
                   OR
                   AFSYS          sysid
                   OR
                   AFPATH        pathname
```

Input

REQUEST:

The function to be used (QOFF in this case).

QUAL1:/QUAL2:

The resource type and resource name. Resource types include AFFIN, AFSYS, and AFPATH.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the QOFF function using the class prefix literal CLS# (for example, to use this function for an affinity entry for IMS scheduler class 27, specify CLS#27).

Specifying a sysid value is done using the sysid prefix literal SID# (for example, to change the affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the QOFF function, see [“IWXAFIN” on page 46](#).

The affinity entry queue flag is set to QUEUE=OFF.

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID that the target affinity entries are currently assigned to.

All affinities associated with the specified system ID (including affinities associated with any of the system's paths) have their queue flag set to QUEUE=OFF. QUAL2: cannot reference the local system.

All affinities associated with the specified system ID (including affinities associated with any of the system's paths) have their queue flag set to QUEUE=OFF.

QUAL2: cannot reference the local system.

- When QUAL1 is AFPATH, QUAL2 is the IMS Workload Router path name that the target affinity entries are currently assigned to.

All affinities associated with the specified path name have their queue flag set to QUEUE=OFF. QUAL2: cannot reference the local path or a logical path associated with the local path.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the QOFF function completed successfully.

QON (activate affinity queueing)

The QON function modifies the affinity queue setting to QUEUE=ON on affinity entries.

An affinity entry with the QUEUE=ON flag set is considered a hard affinity and is used by the IMS Workload Router router when:

- A message is received that matches the affinity entry
- The target path (or system for system-targeted affinities) is not available (that is, the target path is inactive, disabled, or inoperative)

When these conditions are met, the IMS Workload Router router ignores the path status and queues the message to the path.

The QON function operates on:

- A specific affinity entry
- All affinity entries currently associated with a particular path
- All affinity entries currently associated with a particular IMS Workload Router system

QON is not valid for affinity entries that specify REMOTE, the local path, or a logical path associated with the local path.

```
REQUEST: QON      QUAL1: AFFIN      QUAL2: msk/cl/sid  QUAL3:
                   OR
                   AFSYS      sysid
                   OR
                   AFPATH     pathname
```

Input**REQUEST:**

The function to be used (QON in this case).

QUAL1:/QUAL2:

The resource type and resource name.

Resource types include AFFIN, AFSYS, and AFPATH.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the QON function using the class prefix literal CLS# (for example, to use this function for an affinity entry for IMS scheduler class 27, specify CLS#27).

Specify a sysid value to the QON function using the sysid prefix literal SID# (for example, to change the affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the QON function, see [“IWXAFFIN” on page 46](#).

The affinity entry queue flag is set to QUEUE=ON.

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID that the target affinity entries are currently assigned to.

All affinities associated with the specified system ID, including affinities associated with any of the system's paths, have their queue flag set to QUEUE=ON.

QUAL2: cannot reference the local system.

- When QUAL1 is ASPATH, QUAL2 is the IMS Workload Router path name the target affinity entries are currently assigned to.

All affinities associated with the specified path name have their queue flag set to QUEUE=ON.

QUAL2: cannot reference the local path or a logical path associated with the local path.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the QON function completed successfully.

RLADD (add external router list entry)

The RLADD function dynamically adds an RLIST entry to the IMS Workload Router configuration in an active IMS system.

The input parameters for the RLADD function are explained in more detail in [“IWXROUTR” on page 48](#).

```
REQUEST: RLADD   QUAL1: rlistname   QUAL2: servcomopt   QUAL3:
```

Input

REQUEST:

The function to be used (RLADD in this case).

QUAL1:

The RLIST entry name to be added.

The name must match an MSC MSNAME defined to the IMS system.

QUAL2:

The SERVCMD option to be associated with the new RLIST entry (and MSC link).

The values that can be specified follow; the default is OFF.

ON

IMS Workload Router will do server direct communications for MSC, ISC, APPC, OTMA, and remote terminal devices.

ALL

IMS Workload Router will do server direct communications for all communications devices.

OFF

IMS Workload Router will not do server direct communications.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the RLADD function completed successfully.

Considerations

- The RLADD function does not allow duplicate RLIST entries to be added.
- RLIST entries are only effective when the global SERVCMD=LIST is specified on the IWXOPTS macro or dynamically specified through the administrative interface SET function.

RLIST (display external router list Information)

The RLIST function displays the RLIST entry resources and status.

```
REQUEST: RLIST   QUAL1:   QUAL2:   QUAL3:
```

Input

REQUEST:

The function to be used (RLIST in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

The following single line of output is generated for each RLIST entry:

```
MSNAME: msname      SERVCMD: option  COUNT: count      -status-
```

MSNAME:

The RLIST/MSNAME for the RLIST entry.

SERVCMD:

The SERVCMD option selected for the RLIST entry.

COUNT:

The number of times the RLIST entry was used to determine the disposition of an output message.

In general, the count is the total number of DL/I CHNG calls issued by IMS application programs whose input message originated from another IMS system.

More specifically, the input message originated from the IMS system whose MSC SYSID matched that of the MSNAME defined for the RLIST entry.

-status-

Current status of the RLIST entry.

Possible values are INOP, DISAB, or blanks.

Considerations

RLIST entries are only effective when the global SERVCMD=LIST is specified on the IWXOPTS macro or is dynamically specified through the administrative interface SET function.

RLSET (modify external router list entry)

The RLSET function modifies an RLIST entry in an active IMS system.

The input parameters specified with RLSET are explained in more detail in [“IWXROUTR” on page 48](#).

```
REQUEST: RLSET   QUAL1: rlistname  QUAL2: SERVCMD  QUAL3: servcomopt
```

Input

REQUEST:

The function to be used (RLSET in this case).

QUAL1:

The RLIST/MSNAME entry name to be modified.

QUAL2:

The SERVCMD keyword.

This is the only option that can be modified using RLSET.

QUAL3:

The SERVCMD option to be associated with the RLIST entry (and MSC link).

The default value is OFF.

ON

IMS Workload Router will do server direct communications for MSC, ISC, APPC, OTMA, and remote terminal devices.

ALL

IMS Workload Router will do server direct communications for all communications devices.

OFF

IMS Workload Router will not do server direct communications.

Output

An IMS Workload Router system message is issued indicating whether the RLSET function completed successfully.

Considerations

- RLIST entries are only effective when the global SERVCMD=LIST is specified on the IWXOPTS macro or is dynamically specified using the administrative interface SET function.

ROUTE (alter affinity routing)

The ROUTE function dynamically routes affinity entries to alternate destinations.

The ROUTE function lets you route:

- A specific affinity entry
- All affinity entries associated with a particular path
- All affinity entries associated with a particular IMS Workload Router system

In addition to altering the affinity destination, ROUTE also retains the affinity's previous destination in a history stack element associated with the affinity entry.

The history stack element is used if the affinity entry is subsequently reassigned to its prior destination using the RROUT function.

REQUEST: ROUTE	QUAL1: AFFIN OR AFSYS OR AFSPATH	QUAL2: msk/cls/sid sysid pathname	QUAL3: destpath/ destpath/ destpath/	destsys destsys destsys
----------------	--	---	--	---------------------------------------

Input

REQUEST:

The function to be used (ROUTE in this case).

QUAL1:/QUAL2:/QUAL3:

The resource type, resource name, and destination path name or destination system ID.

Resource types include AFFIN, AFSYS, and AFPATH.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid, and QUAL3: is the new destination path name, system ID, or REMOTE to assign a soft affinity.

Specify a class value to the ROUTE function using the class prefix literal CLS# (for example, to route an affinity entry for IMS scheduler class 26, specify CLS#26).

Specify a sysid value using the sysid prefix literal SID# (for example, to route an affinity entry for remote sysid 38, specify SID#38).

For information on how to specify a mask value to the ROUTE function, see [“IWxAFIN” on page 46](#).

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID, and QUAL3: is the new destination path name, system ID, or REMOTE to assign a soft affinity.

All affinities currently associated with the specified system ID (including those associated with any of the system's paths) are then reassigned to the new destination path name or system ID.

- When QUAL1: is AFPATH, QUAL2: is the IMS Workload Router path name or REMOTE for a remote affinity destination, and QUAL3: is the new destination path name, system ID, or REMOTE for a remote affinity assignment.

All affinities currently associated with the specified path are then reassigned to the new destination path name or system ID.

Output

An IMS Workload Router system message is issued indicating whether the ROUTE function completed successfully.

Considerations

- When a history stack element is created, information from the affinity entry, such as flag information and the match count (number of times the affinity was used by the router), is copied to the new history stack element.

If the RROUT function is subsequently used on the affinity entry, all information from the history stack element is copied back to the affinity entry.

This restores the affinity entry to its prior state and prior destination.

- There is no limit to the number of times an affinity entry can be redirected using the ROUTE function.

Consequently, there is no limit to the number of history stack elements that can be created for a given affinity entry.

- The current content of an affinity's history stack can be displayed using the IMS Workload Router AFFIN or SHOW functions.

RROUT (reset affinity routing)

The RROUT function dynamically reroutes affinity entries to their prior destination (which was altered using the ROUTE function).

RROUT lets you reroute:

- A specific affinity entry
- All affinity entries currently associated with a particular path
- All affinity entries currently associated with a particular IMS Workload Router system

RROUT restores affinity information contained in the most recently created history stack element (top of the stack) and then disposes of that stack element.

The RROUT function can be executed as many times as necessary to restore the proper information for the affinity entry or entries.

```
REQUEST: RROUT    QUAL1: AFFIN    QUAL2: msk/cls/sid    QUAL3:
                   OR
                   AFSYS        sysid
                   OR
                   AFPATH        pathname
```

Input

REQUEST:

The function to be used (RROUT in this case).

QUAL1:/QUAL2:

The resource type and resource name.

Resource types include AFFIN, AFSYS, and AFPATH.

- When QUAL1 is AFFIN, QUAL2 is the affinity mask, class, or sysid.

Specify a class value to the RROUT function using the class prefix literal CLS# (for example, to reroute an affinity entry for IMS scheduler class 26, specify CLS#26).

Specify a sysid value using the sysid prefix literal SID# (for example, to route an affinity entry for IMS remote sysid 38, specify SID#38).

For information on how to specify a mask value to the RROUT function, see [“IWXAFFIN” on page 46](#).

The affinity entry is reassigned to the destination path or system recorded in the history stack element.

- When QUAL1 is AFSYS, QUAL2 is the IMS Workload Router system ID to which the target affinity entries are currently assigned.

All affinities currently associated with the specified system ID (including those associated with any of the system's paths) are then reassigned to the destination path name or system ID recorded in the history stack element.

- When QUAL1 is AFPATH, QUAL2 is the IMS Workload Router path name (or REMOTE for a soft affinity) to which the target affinity entries are currently assigned.

All affinities currently associated with the specified path name are then reassigned to the destination path name or system ID recorded in the history stack element.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the RROUT function completed successfully.

Considerations

When a history stack element is created, information from the affinity entry (like flag information and the match count) is copied to the new history stack element.

When RROUT is used on the affinity entry, all information from the history stack element is copied back to the affinity entry, restoring the affinity to its prior state and destination.

SET (alter general parameters)

The SET function modifies the general IMS Workload Router parameters established by the IWXOPTS macro during IMS Workload Router customization.

```
REQUEST: SET      QUAL1: SURGE      QUAL2: threshold  QUAL3:
                or
                AUDLTRM      audlterm
                or
                TRACE        traceopt
                or
                AUTOCKPT     chkptopt
                or
                PGMNOQUE     noqueopt
                or
                BMPTRNRT     bmptrnopt
                or
                SERIALRT     serialopt
                or
                STOPEDRT     stopedopt
                or
                SERVALID     servalopt
                or
                SERVCOMD     servcmopt
                or
                CONVERRT     converopt
                or
                FPOTRNRT     fpotrnopt
                or
                OTMATRRT     otmatrnopt
```

Input

REQUEST:

The function to be used (SET in this case).

QUAL1:/QUAL2:

The parameter type and parameter value.

Parameter types include SURGE, AUDLTRM, TRACE, AUTOCKPT, PGMNOQUE, BMPTRNRT, SERIALRT, STOPEDRT, SERVALID, SERVCOMD, CONVERRT, FPOTRNRT, and OTMATRRT.

- When QUAL1 is SURGE, QUAL2 is the surge threshold.

Any value between 0 and 100, inclusive, is valid.

Note that the specification of 100 disables automatic surge suppression.

- When QUAL1 is AUDLTRM, QUAL2 is the name of the IMS LTERM used by IMS Workload Router for audit messages.

Any IMS LTERM name is valid.

- When QUAL1 is TRACE, QUAL2 is either ON or OFF.

The IMS Workload Router internal diagnostic trace is either activated or deactivated, respectively.

- When QUAL1 is AUTOCKPT, QUAL2 is either ON or OFF.
The IMS Workload Router automatic configuration checkpoint facility is either activated or deactivated, respectively.
- When QUAL1 is PGMNOQUE, QUAL2 is the program noqueue option.
The program noqueue option is used by the IMS Workload Router router to determine what action to take when all of the following conditions are met:
 - A message is received that matches the affinity entry with QUEUE=OFF
 - The target path or system is not available (that is, the target path or system is inactive, disabled, or inoperative)
 - The message is a result of a DL/I CHNG call from an IMS application program
 The valid values for PGMNOQUE are:
 - QUEUE (messages destined for unavailable paths are queued to the path for transmission)
 - A1 (the program CHNG call is rejected with an A1 PCB status code)
 - U3303 (the program is pseudo-abended with a U3303)
- When QUAL1 is BMPTRNRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions defined as BMP (batch) will be routed.
- When QUAL1 is SERIALRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions defined as SERIAL (SERIAL=YES on the IMS TRANSACT macro) will be routed.
- When QUAL1 is STOPEDRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions flagged as stopped by IMS will be routed.
- When QUAL1 is SERVALID, QUAL2 is either ON or OFF.
This specification is used to determine whether server destination validation will be active in the server system.
- When QUAL1 is SERVCMD, QUAL2 is either ALL, ON, OFF, or LIST.
This specification is used to determine whether server direct communications will be active, and to what extent, in the server system.
- When QUAL1 is CONVERRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions defined as IMS conversational will be routed.
- When QUAL1 is FPOTRNRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions defined as Fast Path potential will be routed.
- When QUAL1 is OTMATRRT, QUAL2 is either ON or OFF.
This specification is used to determine whether transactions originating from OTMA clients or spawned from transactions originating from OTMA clients will be routed.

QUAL3:

Not used with this function.

Output

An IMS Workload Router system message is issued indicating whether the SET function completed successfully.

Considerations

The current values for parameters altered by the SET function can be viewed with the PARMS function.

SHOW (display detailed system/path information)

The SHOW function displays the resources and status associated with either a particular IMS Workload Router system or path.

```
REQUEST: SHOW      QUAL1: SYSTEM      QUAL2: sysid      QUAL3:
                   OR
                   PATH          pathname
```

Input

REQUEST:

The function to be used (SHOW in this case).

QUAL1:/QUAL2:

The resource type and resource name. Resource types include SYSTEM and PATH.

- When QUAL1 is SYSTEM, QUAL2 is the IMS Workload Router system ID.

The information displayed is for the system, all of its paths, and all related affinity entries.

- When QUAL1 is PATH, QUAL2 is the path name.

The information displayed is for the path and all related affinity entries.

QUAL3:

Not used with this function.

Output

A single line of output is generated for each system, path, or affinity entry.

Output for system

Output for a system is as follows:

```
SYSTEM: sysid  TRANSACTIONS: count  GOAL%: goal  ACTUAL%: actual  -status-
```

SYSTEM:

The IMS Workload Router system ID.

TRANSACTIONS:

The total number of transactions or MSNAME-destined messages routed to all paths related to the system.

GOAL%: and ACTUAL%:

The cumulative goal percent established for all paths related to the system, and the cumulative actual percent routed to those same paths.

-status-

The current status of the system.

Possible values are INOP, DISAB, or blanks.

Output for path

Output for a path is as follows:

```
PATH: pathname  TRANSACTIONS: count  GOAL%: goal  ACTUAL%: actual  -status-
```

or

```
LPATH: pathname  SYSTEM: sysid  PATH: pathname  BACKUP: yes/no  -status-
```

PATH:

The name of the path.

TRANSACTIONS:

The total number of transactions or MSNAME-destined messages routed to the path.

GOAL%: and ACTUAL%:

The goal percent established for the path and the actual percent routed to that path, respectively.

LPATH:

Indicates that the path is actually a logical path.

The PATH: literal on the same line as LPATH: indicates the associated path name for the logical path.

SYSTEM

The IMS Workload Router system ID with which the logical path is associated.

BACKUP

Indicates whether (YES) or not (NO) the logical path was defined as a backup path.

-status-

The current status of the path.

Possible values are INACT, INOP, DISAB, or blanks.

Output for affinity entry

Output for an affinity entry is in one of four formats:

```
MASK=mask  SYSTEM=imsa  PATH=pathname  CNT=match  QUE=on/off/local  -status-
```

or

```
CLASS=class  SYSTEM=imsa  PATH=pathname  CNT=match  QUE=on/off/local  -status-
```

or

```
SYSID=sysid  SYSTEM=imsa  PATH=pathname  CNT=match  QUE=on/off/local  -status-
```

or

```
SYSTEM=imsa  PATH=pathname  CNT=match  QUE=on/off/local  -status-
```

MASK= and CLASS= and SYSID=

The presence of the MASK= literal indicates this is a mask affinity entry. CLASS= indicates this is an IMS scheduler class affinity entry.

SYSID= indicates this is an MSC remote SYSID affinity entry.

No literal in this position indicates this is a stacked history element for the previous affinity entry.

SYSTEM= and PATH=

The IMS Workload Router destination system ID and path name to which the affinity is assigned.

CNT=

The number of times the affinity criteria was matched by the IMS Workload Router router, indicating use of the affinity entry in the IMS system.

QUE=

The option selected for the affinity entry when the associated destination path is unavailable.

-status-

The current status of the affinity entry.

Possible values are HSTRY, DISABL, or blanks.

STATS (display system/path status)

The STATS function displays a list of the IMS Workload Router systems and their related paths.

```
REQUEST: STATS   QUAL1:   QUAL2:   QUAL3:
```

Input

REQUEST:

The function to be used (STATS in this case).

QUAL1:

Not used with this function.

QUAL2:

Not used with this function.

QUAL3:

Not used with this function.

Output

Output for system

Output for a system is as follows:

```
SYSTEM: sysid  TRANSACTIONS: count  GOAL%: goal  ACTUAL%: actual  -status-
```

SYSTEM:

The IMS Workload Router system ID.

TRANSACTIONS:

The total number of transactions routed to all paths related to the system.

GOAL%: and ACTUAL%:

The cumulative goal percent established for all paths related to the system, and the cumulative actual percent routed to those same paths.

-status-

The current status of the system.

Possible values are INOP, DISAB, or blanks.

Output for path

Output for a path is as follows:

```
PATH: pathname  TRANSACTIONS: count  GOAL%: goal  ACTUAL%: actual  -status-
```

or

```
LPATH: pathname  SYSTEM: sysname  PATH: pathname  BACKUP: yes/no  -status-
```

PATH:

The name of the path.

TRANSACTIONS:

The total number of transactions or MSNAME-destined messages routed to the path.

GOAL%: and ACTUAL%:

The goal percent established for the path and the actual percent routed to that path.

LPATH:

Indicates that the path is actually a logical path.

The PATH: literal on the same line as LPATH: indicates the associated path name for the logical path.

SYSTEM

The IMS Workload Router system ID with which the logical path is associated.

BACKUP

Indicates whether (YES) or not (NO) the logical path was defined as a backup path.

-status-

The current status of the path.

Possible values are INACT, INOP, DISAB, or blanks.

Chapter 6. Troubleshooting

Use these topics to diagnose and correct problems that you experience with IMS Workload Router.

Topics:

- “Runtime messages (IWX)” on page 79
- “Abend codes” on page 95
- “Gathering diagnostic information” on page 97

Runtime messages (IWX)

This reference section provides detailed information about IMS Workload Router runtime messages.

Message format

IMS Workload Router runtime messages adhere to the following format:

```
IWXnnnæ
```

where:

IWX

Indicates that the message was issued by IMS Workload Router.

nnn

Indicates the message identification number.

x

Indicates the severity of the message:

A

Indicates that operator intervention is required before processing can continue.

E

Indicates that an error occurred, which might or might not require operator intervention.

I

Indicates that the message is informational only.

W

Indicates that the message is a warning to alert you to a possible error condition.

Each message also includes the following information:

Explanation:

The Explanation section explains what the message text means, why it occurred, and what its variables represent.

System action:

The System action section explains what the system will do in response to the event that triggered this message.

Programmer response:

The Programmer response section describes whether a response is necessary, what the appropriate response is, and how the response will affect the system or program.

Message destination:

The Message destination section describes the output destination of the message.

Message groupings

IMS Workload Router messages are grouped as follows:

- IWX100 series messages (issued during IMS/IMS Workload Router initialization)
- IWX200-300 series messages (issued by the IMS Workload Router administrative interface)
- IWX400-600 series messages (issued by the IMS Workload Router router)
- IWX900 series messages (issued by the IMS Workload Router Post-Processing utility)

IWX100 series messages

These messages are issued during IMS/IMS Workload Router initialization.

IWX100E **xxxxxxx LOAD FAILED**

Explanation

During IMS initialization, IMS Workload Router load modules are brought into control region virtual memory. The module named in the message (xxxxxxx) could not be loaded into memory. This message is issued for one of the following modules: IWXCTRX0, IWXMSCPR, and IWXMSCTR.

System action

Message IWX170E is subsequently issued, indicating that IMS Workload Router is inoperative.

Programmer response

Check IMS RESLIB for the missing module. This error might be caused by an installation error.

Message destination

MVS console, control region job log

IWX102W **ROUTER/SERVER NOT CONFIGURED**

Explanation

An attempt was made to enter the IWXADMN on an IMS system that did not have an IWXOPTION block (IWX\$ssid) available.

System action

The IWXADMN transaction fails.

Programmer response

If this IMS system is to be configured as a Router/Server, follow the instructions in “[Customizing router/server systems](#)” on [page 35](#). If this IMS system is to be configured as a Server-only system, consider disabling or removing the IWXADMN transaction from the system.

IWX105E **PARAMETER BLOCK LOAD FAILED**

Explanation

During IMS initialization, the IMS Workload Router parameter block is brought into control region virtual memory. The parameter block is created during the IMS Workload Router customization process and is named IWX\$xxxx, where xxxx is the IMS system ID.

System action

Message IWX170E is subsequently issued, indicating that IMS Workload Router is inoperative.

Programmer response

Check IMS RESLIB for the missing module. This error might be caused by an installation error.

Message destination

MVS console, control region job log

IWX110E **IWXPARMS SIZE MISMATCH**

Explanation

During IMS initialization, the IMS Workload Router parameter block is brought into control region virtual memory and checked to make sure the internally generated module size matches the external module size. In this case, the sizes were different.

System action

Message IWX170E is subsequently issued, indicating that IMS Workload Router is inoperative.

Programmer response

Check IMS RESLIB for the erroneous module. The parameter block is created during the IMS Workload Router customization process and is named IWX\$xxxx, where xxxx is the IMS system ID.

Message destination

MVS console, control region job log

IWX115E **IWXPARMS ROUTER ID IDENTIFICATION MISMATCH**

Explanation

During IMS initialization, the IMS Workload Router parameter block is brought into control region virtual memory and checked to make sure the internally generated module ID matches the external module ID and IMS system ID. In this case, the IDs are not the same.

System action

Message IWX170E is subsequently issued, indicating that IMS Workload Router is inoperative.

Programmer response

Check IMS RESLIB for the erroneous module. The parameter block is created during the IMS Workload Router customization process and is named IWX\$xxxx, where xxxx is the IMS system ID.

Message destination

MVS console, control region job log

IWX120E	NAME/TOKEN CREATE FAILED RC= xxx
----------------	---

Explanation

During IMS initialization, IMS Workload Router makes use of the MVS Name/Token Services create function. An attempt to create a new name/token pair failed. The xxx return code is from the MVS Name/Token Services IEANTCR create function.

System action

IMS Workload Router initialization continues. However, the administrative interface is not usable.

Programmer response

Refer to the appropriate IMS documentation for the meaning of the return code.

Message destination

MVS console, control region job log

IWX125W	PATH xxxxxxxx INOPERATIVE - CALLABLE SERVICES RC= yyy, REASN= zzz
----------------	--

Explanation

During IMS initialization, IMS Workload Router unsuccessfully tried to locate the IMS internal control

blocks representing an MSC MSNAME also defined as an IMS Workload Router path.

System action

IMS Workload Router initialization continues. The path is flagged as inoperative until the next IMS restart.

Programmer response

The xxxxxxxx is the IMS Workload Router path name; yyy and zzz are the decimal equivalent IMS callable services return code and reason code, respectively.

Message destination

MVS console, control region job log

IWX130W	NO OPERABLE PATHS FOR SYSTEM xxxx - SYSTEM INOPERATIVE
----------------	---

Explanation

During IMS initialization, IMS Workload Router found that all paths for system xxxx were inoperative, making the entire system inoperative.

System action

IMS Workload Router initialization continues. The system is flagged as inoperative until the next IMS restart.

Message destination

MVS console, control region job log

IWX135E	PATH NAME xxxxxxxx DOES NOT REPRESENT AN MSNAME
----------------	--

Explanation

During IMS initialization, IMS Workload Router found that path name xxxxxxxx represented a destination other than an MSC MSNAME.

System action

IMS Workload Router initialization continues. The system is flagged as inoperative until the next IMS restart.

Message destination

MVS console, control region job log

IWX140W	NOQUEUE TRANSACTION xxxxxxx NOT DEFINED
----------------	--

Explanation

During IMS initialization, IMS Workload Router found that the IMS Workload Router NOQUEUE transaction xxxxxxxx was not defined to the IMS system.

System action

IMS Workload Router initialization continues. Use of the IMS Workload Router NOQUEUE transaction is not possible. If a situation arises where the IMS Workload Router NOQUEUE transaction is used, terminal users might see the message:

```
DFS064 hh.mm.ss DESTINATION CAN  
NOT BE FOUND OR CREATED
```

If the installation uses a dynamic terminal product that permits queuing of messages for nonexistent destinations, the message might be queued to the xxxxxxxx LTERM destination.

Message destination

MVS console, control region job log

IWX145W	ADMINISTRATOR TRANSACTION xxxxxxx NOT DEFINED
----------------	--

Explanation

During IMS initialization, IMS Workload Router found that the IMS Workload Router administrative transaction xxxxxxxx was not defined to the IMS system.

System action

IMS Workload Router initialization continues. Use of the IMS Workload Router administrative transaction is not possible.

Message destination

MVS console, control region job log

IWX150I	WLR VER(<i>nnnn</i>) INITIALIZATION COMPLETE - CONFIGURED <i>mm/dd/yy-hh.mm</i>
----------------	--

Explanation

IMS Workload Router completed initialization processing. The *nnnn* is the IMS Workload Router version and release ID. The *mm/dd/yy-hh.mm* is the assembly date and timestamp for the IMS Workload Router configuration parameters used by this system.

Programmer response

None. This message is informational.

Message destination

MVS console, control region job log

IWX155I	AFFNRROUT: <i>status</i> TERMROUT: <i>status</i> PROGROUT: <i>status</i>
----------------	---

Explanation

IMS Workload Router completed initialization processing. The message indicates the IMS Workload Router routing levels in effect for the system. The *status* indicates whether the specified routing level is *ENABLED* or *DISABLED*.

Programmer response

None. This message is informational.

Message destination

MVS console, control region job log

IWX160I	BMPTRNRT: <i>status</i> SERIALRT: <i>status</i> STOPEDRT: <i>status</i> CONVERTT: <i>status</i>
----------------	--

Explanation

IMS Workload Router completed initialization processing. The message indicates the setting for the global routing inhibitor controls. The *status* indicates the setting for the global routing inhibitor control.

Programmer response

None. This message is informational.

Message destination

MVS console, control region job log

IWX163I	FPOTRNRT: <i>status</i> OTMATRRT: <i>status</i> SERVALID: <i>status</i> SERVCOMD: <i>status</i>
----------------	--

Explanation

IMS Workload Router completed initialization processing. The message indicates the setting (or *status*) for the global routing inhibitor controls (FPOTRNRT and OTMATRRT) and the IMS Workload Router server options.

Programmer response

None. This message is informational.

Message destination

MVS console, control region job log

IWX165I **SYSTEMS: count PATHS: count**
SURGE: value

Explanation

IMS Workload Router completed initialization processing. The message indicates the number of IMS Workload Router systems and paths defined. The automatic surge threshold value is also given.

Programmer response

None. This message is informational.

Message destination

MVS console, control region job log

IWX166I **UMSCEBRC: yes/no**

Explanation

Workload Router has completed initialization processing. This message indicates whether the IWXOPTS keyword UMSCEBRC is set to yes or no.

Programmer response

None. This message is informational.

IWX170E **WLR INOPERATIVE DUE TO**
CRITICAL ERRORS

Explanation

IMS Workload Router initialization failed. The reason for the failure is explained in a preceding message.

System action

IMS initialization continues without IMS Workload Router. IMS Workload Router is completely disabled until the next IMS restart.

Message destination

MVS console, control region job log

IWX180W **EXTERNAL ROUTER MSNAME**
xxxxxxx INOPERATIVE -
CALLABLE SERVICES RC= yyy,
REASN= zzz

Explanation

During IMS initialization, IMS Workload Router tried unsuccessfully to locate the IMS internal control blocks representing an MSC MSNAME that is also defined as an RLIST entry. xxxxxxxx is the MSNAME, and yyy and zzz represent the decimal equivalent IMS callable services return code and reason code, respectively.

System action

IMS Workload Router initialization continues. The RLIST is flagged as inoperative until the next IMS restart.

Message destination

MVS console, control region job log

IWX185E **EXTERNAL ROUTER NAME**
xxxxxxx DOES NOT REPRESENT
AN MSNAME

Explanation

During IMS initialization, IMS Workload Router found that RLIST entry name xxxxxxxx represents a destination other than an MSC MSNAME.

System action

IMS Workload Router initialization continues. The RLIST entry is flagged as inoperative until the next IMS restart.

Message destination

MVS console, control region job log

IWX195I **USING xxxxxxxx yyyy ENTRY**
POINTS

Explanation

IMS Workload Router initialization processing determines whether IMS is using the TM and MSC Message Routing and Control exit routine (DFSMSCE0) entry points. IMS Workload Router issues this message twice during initialization: once for transaction routing, where yyyy is **TRAN**, and once for program routing, where yyyy is **PGM**.

System action

IMS Workload Router initialization continues.

Programmer response

None. This message is informational.

Message destination

MVS console, IMS control region job log

IWX197W **AUDIT LTERM xxxxxxxx NOT
VALID– AUDITING IS DISABLED**

Explanation

During IMS initialization, IMS Workload Router attempted to validate the Audit LTERM name specified in the IMS Workload Router configuration. The name specified was not a valid LTERM name.

System action

IMS Workload Router issues message IWX197W and disables IMS Workload Router auditing.

Programmer response

The IMS Workload Router administrator can use the IMS Workload Router SET AUDTLTRM function to specify a valid LTERM name. Once a valid LTERM name is supplied, IMS Workload Router resumes auditing.

Message destination

MVS console, control region job log

IWX198I **DFSMSCEO EPA : xxxxxxxx**

Explanation

The existence of the TM and MSC Message Routing and Control user exit routine (DFSMSCEO) has been confirmed. The message indicates the Entry Point Address of this program.

IWX200 series messages

These messages are issued by the IMS Workload Router administrative interface.

IWX200E **GETSTOR FOR W/A FAILED**

Explanation

An attempt to acquire work area storage was made by the IWXEDIT administrative interface edit routine. The attempt was unsuccessful.

System action

The administrative interface function fails. This can be the result of a virtual storage constraint in the IMS control region.

System action

Processing continues.

Programmer response

None. This message is informational.

Message destination

█ MVS console, control region job log

IWX199I **DFSMSCEO EYEC : csect_name-
ims_vrl-assemble_date/time**

Explanation

This message indicates the CSECT name, the IMS macro library (SDFSMAC) version the program was assembled with, and the date and time the program was assembled. These fields are presented in the order and format produced by IMS macro DFSMSCSV (starting at offset x'10" from the EPA, for a length of x'1C').

System action

█ Processing continues.

Programmer response

This message can be used to confirm that the copy of DFSMSCEO that is desired is actually being used.

Message destination

█ MVS console, control region job log

Programmer response

Consider increasing the size of MVS extended CSA.

Message destination

Administrator LTERM

IWX205E **WLR INITIALIZATION ERROR**

Explanation

The IWXEDIT administrative interface edit routine could not locate the IMS Workload Router configuration parameter area.

System action

The administrative interface function fails. This might be the result of a failure in the IMS Workload Router initialization module.

Programmer response

Check to see if DFSMSCE1 is installed properly. Also check for any IMS Workload Router initialization message in the IMS control region job log.

Message destination

Administrator LTERM

IWX210E INPUT PATH UNKNOWN

Explanation

An invalid input path name for the GOALS function was encountered by the IWXEDIT administrative interface edit routine. The path name is unknown to IMS Workload Router.

System action

The administrative interface function fails.

Programmer response

Check the input message content for valid path names.

Message destination

Administrator LTERM

**IWX215I xxxxx REQUEST COMPLETE
 (TOKEN = *checkpoint token*)**

Explanation

The requested function xxxxx completed. The TOKEN = *checkpoint token* text is only displayed when the administrative CHKPT function is used. The token is the unique token assigned to the IMS Workload Router checkpoint.

Programmer response

None. This message is informational.

Message destination

Administrator LTERM

IWX235E INVALID GOAL VALUE

Explanation

One of the goal values for the GOALS function was invalid. Goals must be numeric values between 0 and 100.

System action

The administrative interface function fails.

Programmer response

Correct the goal value.

Message destination

Administrator LTERM

IWX240E DUPLICATE AFFINITY FOUND

Explanation

The request to add a new affinity entry through the ADD function failed because the affinity mask or class is already defined in an existing affinity entry.

System action

The administrative interface function fails.

Programmer response

Correct the affinity mask or class.

Message destination

Administrator LTERM

IWX245E IMODULE GETSTOR FAILED

Explanation

An attempt to acquire storage to create an affinity entry or history stack element failed.

System action

The administrative interface function fails. This might be the result of a virtual storage constraint in the MVS system extended CSA.

Message destination

Administrator LTERM

IWX250E FREESTOR FOR W/A FAILED

Explanation

An attempt to release storage for the administrative interface edit routine work area failed.

System action

The administrative interface function completes processing.

Message destination

Administrator LTERM

**IWX255I CURRENT # OF TRANSACTIONS
FOR SYSTEM *iiii* = *count***

Explanation

This message is issued to provide message routing information for system *iiii* before resetting the IMS Workload Router routing statistics. The statistics are reset in response to a surge suppression request. The *count* is the cumulative number of transactions routed to all paths related to the system since:

- The IMS Workload Router router was activated, or
- The last manual or automatic surge suppression.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

IWX260E NO PRIOR RE-ASSIGNMENT

Explanation

The RROUT function was used on an affinity entry not previously processed by the ROUTE function. The history stack for the affinity has no elements, and reassignment is not possible.

Programmer response

Correct the target affinity mask/class/sysid, system, or path name if specified.

Message destination

Administrator LTERM

IWX265E IMODULE FREESTOR FAILED

Explanation

An attempt to release storage for a history stack element failed.

System action

The administrative interface function completes processing. This is an unexpected error that should not occur.

Message destination

Administrator LTERM

IWX270I SURGE SUPPRESSION ACTIVE

Explanation

Manual surge suppression was activated through the administrative interface.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

**IWX275I WLR CHECKPOINT - TOKEN =
*checkpoint token***

Explanation

An IMS Workload Router checkpoint was taken. The message provides the token assigned to the checkpoint.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

**IWX280E INVALID PARAMETER FOUND -
*detailed explanation***

Explanation

This is a generic error message for several input parameter errors. Any of the following detailed explanations can be contained in the message:

Q1 AFFIN

The QUAL1 input field contained an invalid affinity entry mask/class/sysid value. Correct the parameter.

Q1 DEST BLNK

The QUAL1 input field contained blanks where a valid destination name is expected. Correct the parameter.

Q1 IMBEDDED *

The QUAL1 input field contained an affinity mask with an imbedded asterisk (*) wildcard symbol. When used, the asterisk wildcard symbol must be in the last position of an affinity mask.

Q1 > MAX

The QUAL1 input field value contained a numeric value greater than the allowable maximum. Correct the parameter.

Q1 RLST NAME

The QUAL1 input field contained an invalid RLST entry name. Correct the parameter.

Q1 NON-NUM

The QUAL1 input field was nonnumeric. The function requires a numeric value. Correct the parameter.

Q1 TYPE

The QUAL1 input field contained an invalid *type* parameter. Correct the parameter.

Q2 AFFIN NAME

The QUAL2 input field value should contain the affinity mask/class/sysid value, but the mask/class/sysid is unknown. Correct the parameter.

Q2 DEST LOCAL

The QUAL2 input field specified a system or path that is directly or indirectly associated with the local path. The specified local path is invalid for the input function. Correct the parameter.

Q2 INOP

The QUAL2 input field specified an RLST entry name that has been flagged as inoperative. Correct the parameter.

Q2 LCL/INOP

The QUAL2 input field specified a path or system that is either defined as local or flagged as inoperative. Correct the parameter.

Q2 > MAX

The QUAL2 input field value contained a numeric value greater than the allowable maximum. Correct the parameter.

Q2 NAME

The QUAL2 input field value contained an invalid name value. Correct the parameter.

Q2 NON-NUM

The QUAL2 input field was nonnumeric. The function requires a numeric value. Correct the parameter.

Q2 OPTION

The QUAL2 input field contained an invalid *option* parameter. Correct the parameter.

Q2 PATH NAME

The QUAL2 input field contained an invalid path name. Correct the parameter.

Q2 PATH RMT

The QUAL2 input field contained the affinity mask/class/sysid of an affinity entry whose destination is REMOTE. Correct the parameter.

Q2 PATH/SYS

The QUAL2 input field contained an invalid path or system ID. Correct the parameter.

Q2 RLST NAME

The QUAL2 input field contained an invalid RLST entry name. Correct the parameter.

Q2 SYS ID

The QUAL2 input field contained an invalid system ID. Correct the parameter.

Q3 NO/QUEUE

The QUAL3 input field must contain a value of QUEUE, NOQUEUE, or LOCAL.

Q3 OPTION

The QUAL3 input field contained an invalid option parameter. Correct the parameter.

Q3 PATH NAME

The QUAL3 input field contained an invalid path name. Correct the parameter.

Q3 PATH/SYS

The QUAL3 input field contained an invalid path or system ID. Correct the parameter.

Q3 SAME PATH

The QUAL2 and QUAL3 input fields contained the same path name. Correct the parameter.

Q3 SAME SYS

The QUAL2 and QUAL3 input fields contained the same system ID. Correct the parameter.

Message destination

Administrator LTERM

IWX285I

GOAL PROCESSING COMPLETE

Explanation

The GOALS function completed successfully.

Programmer response

None. This message is informational.

Message destination

Administrator LTERM

IWX290E NO PATHS ON INPUT

Explanation

An input for the GOALS function was received by the administrative interface edit routine. The input was expected to contain path/goal pairs, but contained none.

System action

The administrative interface function fails.

Programmer response

Check the input message content for path/goal values.

Message destination

Administrator LTERM

IWX294E AGGREGATE MUST BE GREATER THAN ZERO

Explanation

The aggregate of the input goal values for the GOALS function was not greater than zero. This message should be issued only when CHKGOL=OFF is specified.

System action

The administrative interface function fails.

Programmer response

Correct the goal values. At least one goal must be nonzero.

Message destination

Administrator LTERM

IWX295E AGGREGATE MUST = 100%

IWX300 series messages

These messages are issued by the IMS Workload Router administrative interface.

Explanation

The aggregate of the input goal values for the GOALS function did not equal 100%. This message should be issued only when CHKGOL=ON is specified.

System action

The administrative interface function fails.

Programmer response

Correct the goal values.

Message destination

Administrator LTERM

IWX297E DUPLICATE RLIST FOUND

Explanation

The request to add a new RLIST entry failed. This is because the RLIST name is already defined in an existing RLIST entry.

System action

The administrative interface function fails.

Programmer response

Correct the RLIST name.

Message destination

Administrator LTERM

IWX298E INVALID RLIST MSNAME

Explanation

The request to add a new RLIST entry failed. This is because the RLIST name is not defined to IMS as a valid MSC MSNAME.

System action

The administrative interface function fails. Correct the RLIST name.

Message destination

Administrator LTERM

IWX300E INVALID AUDIT LTERM

Explanation

The administrative interface tried to send an audit message to the LTERM name specified as the IMS Workload Router audit LTERM; the administrative interface received an A1 PCB status code, indicating an invalid destination.

System action

The administrative interface function completes, but the audit message is lost.

Programmer response

Check and correct the audit LTERM destination name.

Message destination

Administrator LTERM

IWX305E WLR INSTALLATION ERROR

Explanation

An administrative function that should be processed by the administrative transaction input edit routine was not.

System action

The administrative interface function fails.

Programmer response

Verify that the IWXEDIT transaction edit routine was installed properly and that the IMS Workload Router administrative transaction definition references it.

Message destination

Administrator LTERM

IWX310E REQUEST TYPE UNKNOWN

Explanation

An input to the administrative interface contains a function ID that is unknown to IMS Workload Router.

Programmer response

Correct the function ID.

Message destination

Administrator LTERM

IWX315I REQUEST COMPLETE

Explanation

The administrative interface function completed successfully.

Programmer response

None. This message is informational.

Message destination

Administrator LTERM

IWX320E INVALID PATH NAME

Explanation

An administrative interface function that requires a path name was invoked. The supplied path name is invalid.

Programmer response

Correct the path name.

Message destination

Administrator LTERM

IWX325I FINAL PATH LISTED

Explanation

The GOALS administrative function was invoked. The last defined path is displayed for update.

Programmer response

None. This message is informational.

Message destination

Administrator LTERM

IWX330I MORE PATHS TO PROCESS

Explanation

The GOALS administrative function was invoked. There are additional paths to be processed beyond the current page of output.

Programmer response

None. This message is informational.

IWX605I **CURRENT # OF TRANSACTS FOR SYSTEM *iiii* = *count***

Explanation

This message is issued to provide message routing information for system *iiii* before resetting IMS Workload Router routing statistics. The statistics are reset in response to an automatic surge suppression situation. The *count* is the cumulative number of transactions routed to all paths related to the system since:

- The IMS Workload Router router was activated, or
- The last manual or automatic surge suppression.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

IWX607I **CURRENT # OF MESSAGES FOR SYSTEM *system_id* = *counter***

Explanation

The transaction counter for the System ID named is being reset to 0. The counter value contains the number of transactions that were routed to the name System ID.

System action

The transaction counters are reset to 0 for the System ID.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

IWX900 series messages

These messages are issued by the IMS Workload Router Post-Processing utility.

IWX901E **OPEN FAILED FOR SYSPRINT**

IWX610W **PATH *pppppppp* IS NOT ACTIVE**

Explanation

This message is issued the first time the inactive path is detected. The IMS Workload Router router encountered an inactive path while selecting a path on which to route an input message. A path is typically inactive when one or more of the MSC link components (MSNAME, MSLINK, or MSPLINK) has not been restarted, has been manually stopped, or has some type of error associated with it.

Programmer response

Check the IMS MSC link components to determine the nature of the problem. Under these circumstances, the router's actions depend on whether the input message destination has an affinity entry defined. If not, IMS Workload Router tries to find another available path to route the message.

Message destination

IMS master terminal, MVS console, control region job log

IWX615I **PATH *pppppppp* IS NOW ACTIVE**

Explanation

This message is issued the first time the IMS Workload Router router detects that a previously inactive path has become active.

Programmer response

None. This message is informational.

Message destination

IMS master terminal, MVS console, control region job log

Explanation

The Post-Processing utility tried to open the output print data set with the ddname SYSPRINT. The open failed.

System action

The utility terminates prematurely.

Programmer response

Add the required SYSPRINT DD statement to the Post-Processing utility job step.

Message destination

IMS Workload Router Post-Processing utility job log

IWX902W	SYSIN ERROR - NO CHECKPOINT WILL BE SELECTED FOR PARAMETER GENERATION
----------------	--

Explanation

The Post-Processing utility tried to open and read the control statement input data set with the ddname SYSIN. Either the open/read attempt failed, or the input control statement contained a syntax error.

System action

No parameter generation occurs during execution of the utility. Instead, the utility continues processing in default LIST=ALL mode, providing a list of valid IMS Workload Router checkpoint-related information found on the input log data set(s).

Programmer response

If parameter generation is required, add a SYSIN DD statement and a valid utility control statement.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX903E	OPEN FAILED FOR DDNAME CHKPT
----------------	---

Explanation

The Post-Processing utility tried to open the IMS Workload Router input checkpoint data set with the ddname CHKPT. The open attempt failed.

System action

The utility terminates prematurely.

Programmer response

Add the required CHKPT DD statement to the Post-Processing utility job step.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX904I	EOF REACHED ON CHKPT FILE
----------------	----------------------------------

Explanation

The Post-Processing utility finished reading the IMS Workload Router input checkpoint file.

Programmer response

None. This message is informational.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX905E	INVALID OR NON-EXISTENT CHECKPOINT SPECIFIED
----------------	---

Explanation

The Post-Processing utility tried to find the IMS Workload Router checkpoint on the input checkpoint data set using the token specified on the input control statement. The specified checkpoint token was not located and is either invalid or nonexistent. When CHKPT=LAST is specified as the token, this message indicates that no valid checkpoints were found on the input checkpoint data set.

System action

The utility terminates prematurely.

Programmer response

Correct the checkpoint token specified on the input control statement. You can get a list of valid checkpoint tokens by executing the utility in LIST=ALL mode.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX906E	SPECIFIED CHECKPOINT IS INCOMPLETE IN CONTENT
----------------	--

Explanation

The Post-Processing utility located the specified IMS Workload Router checkpoint on the input checkpoint data set. However, the checkpoint data was not

completely contained within the input checkpoint data set (the trailing end of the checkpoint was truncated).

System action

The utility terminates prematurely.

Programmer response

Make sure that the IMS Workload Router checkpoint data from the IMS system log(s) is included in the checkpoint input data set.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX907E **SPECIFIED CHECKPOINT HAS A SEQUENCE ERROR / GAP**

Explanation

The Post-Processing utility located the specified IMS Workload Router checkpoint on the input checkpoint data set. However, the checkpoint data was not input to the utility in proper sequence, or there were missing checkpoint records on the input checkpoint data set.

System action

The utility terminates prematurely.

Programmer response

Make sure that the IMS Workload Router checkpoint data from the IMS system log(s) is included in the checkpoint data set in proper sequence.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX908E **PREMATURE EOF WHILE READING CHECKPOINT DATA**

Explanation

While reading the input checkpoint data set, the Post-Processing utility unexpectedly encountered an end-of-file condition.

System action

The utility terminates prematurely.

Programmer response

Make sure that the IMS Workload Router checkpoint data from the IMS system log(s) is included in the checkpoint input data set.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX909E **OPEN FAILED FOR DDNAME PARMS**

Explanation

The Post-Processing utility tried to open the IMS Workload Router output parameter data set with the ddname PARMS. The open attempt failed.

System action

The utility terminates prematurely.

Programmer response

Add the required PARMS DD statement to the utility job step.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX910I **USING CHECKPOINT *checkpoint* token FOR PARAMETER GENERATION**

Programmer response

None. This message is informational.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set.

IWX911I **PARMS GENERATION COMPLETE**

Explanation

The Post-Processing utility finished generating the IMS Workload Router configuration macros/parameters.

Programmer response

None. This message is informational.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

IWX912I **REPORT COMPLETE**

Explanation

The Post-Processing utility completed the SYSPRINT output report.

Programmer response

None. This message is informational.

Message destination

IMS Workload Router Post-Processing utility
SYSPRINT output data set

Abend codes

These messages are the abend codes that can be issued by IMS Workload Router.

For each abend code, the following information is provided where applicable:

Explanation:

The Explanation section explains what the abend code means, why it occurred, and what its variable entry fields are (if any).

System action:

The System Action section explains what the system will do next.

Programmer response:

The Programmer response section describes whether a response is necessary, what the appropriate response is, and how the response will effect the system or program.

Module:

The Module section indicates which module or modules are affected.

U3907

Explanation

This abend is issued by module IWXPGEN0 when data previously located by the IMS Workload Router Post-Processing utility cannot be located a second time.

Programmer response

Verify that the input checkpoint data set was not modified during execution of the Post-Processing utility.

Module

IWXPGEN0

U4007

Explanation

This abend is issued by the IWXADMIN transaction when a nonzero return code is returned from an Inquiry (INQY) DL/I call.

System action

The dependent region memory is dumped. Register 15 at the time of the error contains the AIB return code.

Module

IWXADMIN

U4017

Explanation

This abend is issued by the IWXADMIN transaction when a call to the MVS Name/Token Services interface fails. This can occur when the IWXADMIN transaction is defined to a SERVER ONLY system and the transaction is executed.

System action

The dependent region memory is dumped. Register 15 at the time of the error contains a Name/Token Services return code.

Module

IWXADMIN

U4027

Explanation

This abend is issued by the IWXADMIN transaction when it receives a bad PCB status on a Get Unique (GU) DL/I call.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXADMIN

U4037

Explanation

This abend is issued by the IWXADMIN transaction when it receives a bad PCB status on a Change (CHNG) DL/I call for the IMS Workload Router audit LTERM.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXADMIN

U4047

Explanation

This abend is issued by the IWXADMIN transaction when it receives a bad PCB status on an Insert (ISRT) DL/I call for the IMS Workload Router audit LTERM.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXADMIN

U4057

Explanation

This abend is issued by the IWXADMIN transaction when it receives a nonzero return code while trying to establish an ESTAE recovery environment.

System action

The dependent region memory is dumped. Register 15 at the time of the error contains the return code.

Module

IWXADMIN

U4067

Explanation

This abend is issued by the IWXADMIN transaction when it receives a bad PCB status on an Insert (ISRT) DL/I call.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXADMIN

U4077

Explanation

This abend is issued by the IWXNOQUE transaction when it receives a bad PCB status on a Get Unique (GU) DL/I call.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXNOQUE

U4087

Explanation

This abend is issued by the IWXNOQUE transaction when it receives a bad PCB status on an Insert (ISRT) DL/I call.

System action

The dependent region memory is dumped. The rightmost two bytes of register 15 at the time of the error contain the PCB status code.

Module

IWXNOQUE

Gathering diagnostic information

Before you report a problem with IMS Workload Router to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all IMS Workload Router problems:

- A clear description of the problem and the steps that are required to re-create the problem
- All messages that were issued as a result of the problem
- Product release number and the number of the last program temporary fix (PTF) that was installed
- The version of IMS that you are using and the type and version of the operating system that you are using

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