TM

Availability Plus
Administration Guide

Release 3.4.0

UNICOM
SYSTEMS, INC.

This manual applies to PIE/CICS release 3.4.0 and to all subsequent releases of the product until otherwise indicated by new editions or updates to this publication.

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About This Manual

Availability Plus is an optional component of PIE/CICS. Availability Plus extends the function of CICS MRO to provide a more precise distribution of transactions across available CICS application owning regions (AORs). The principal benefits of Availability Plus include shorter average transaction response time and minimal user down time due to abended regions.

Audience

This book is intended for system administrators who manage CICS systems. Readers are expected to understand CICS and MVS concepts.

How This Manual is Organized

This manual consists of four chapters, two appendixes, and a glossary. Listed below are the titles and a brief description of each chapter and appendix.

- Chapter 1 Introducing Availability Plus

  Explains the operating concepts of Availability Plus.

- Chapter 2 Planning for Availability Plus

  Describes considerations that must be accounted for in the overall planning of an Availability Plus system.

- Chapter 3 Installation and Implementation

  Consists of a series of ordered procedures to implement Availability Plus.

- Chapter 4 Operating Availability Plus

  Describes how to perform ongoing maintenance and verify the status of Availability Plus load balancing groups.

- Appendix A Customer Service

  Describes procedures to report problems with PIE/CICS to UNICOM Software Customer Service.

- Appendix B PBAL Transaction

  Explains how to use the PBAL transaction to monitor the duration of

  non-conversational transactions running within regions that belong to an Availability Plus load balancing group.

- Glossary

  Lists common terms used in this manual.

Recommended Reading

The title and a brief description of all PIE/CICS manuals are shown in the following lists. Some manuals provide common information that applies to both the common and optional components of PIE/CICS. Other manuals pertain only to optional PIE/CICS components. These manuals need to be read only if these products are part of the PIE/CICS system installed at your site.

Common Manuals

These manuals provide common information that applies to both the shared and optional components of the PIE/CICS family.

- *PIE/CICS Installation Guide*

  Includes a series of procedures to install PIE/CICS.

- *PIE/CICS Release Notes*

  Describes new features or enhancements to PIE/CICS that are part of Release 3.4.0.

- *PIE/CICS Command Reference*

  Describes PIE/CICS Application and Environment commands.

- *PIE/CICS Customization Reference*

  Describes common procedures to adapt PIE/CICS to your site's requirements.

- *PIE/CICS Operation and Administration Guide*

  Describes common features or facilities that are available to all PIE/CICS products. Performance tuning techniques and implementing security also are described.

- *REXX for PIE/CICS User Guide*

  Describes how to write, compile, and execute SAA-compliant REXX programs that operate within a PIE/CICS external environment.

- *PIE/CICS Custom Menus Administration Guide*

  Describes how to create custom MultiCICS and Dynamic Menu screens that provide alternate language support.

Optional Manuals

These manuals describe optional PIE/CICS components.

- *PIE/CICS MultiCICS Administration Guide*

  Provides customization procedures and usage information to support multiple PIE/CICS sessions with MultiCICS.

- *PIE/CICS Dynamic Menus Administration Guide*

  Describes how to create custom PIE/CICS menus that provide extended security and enhanced transaction processing.

- *PIE/CICS NetGate Administration Guide*

  Explains how to access multiple VTAM applications through a PIE/CICS session with NetGate.

- *PIE/CICS NetMizer Administration Guide*

  Describes how to use NetMizer to optimize 3270-based data streams.

- *PIE/CICS Availability Plus Administration Guide*

  Explains how to use Availability Plus to distribute and balance work across multiple CICS regions.

- *PIE/CICS NonStop CICS Administration Guide*

  Describes how to use NonStop CICS to route work across CICS regions to balance the workload and minimize down time in the event of a region failure.

Syntax Conventions

A syntax diagram is included with each PIE/CICS command described in this manual. A syntax diagram shows the possible parameters, values, and variables associated with a command.

Syntax diagrams adhere to common conventions. The physical appearance of a diagram's elements indicates whether a command parameter, variable, or other values are required, optional, or included by default.

- An <u>underlined</u> parameter is the default assigned to the command.
- Command names are presented in MIXed case. The uppercase portion of a command name is the requisite abbreviated form. Lowercase letters represent the optional remainder of the command name that need not be specified to execute the command.
- An *italicized lowercase* parameter represents a value assigned by the user.
- A vertical bar (|) separates two or more mutually exclusive parameter values. Only one value can be specified for each parameter.
- Parameters enclosed within brackets [ ] are optional. Only one value can be specified to a parameter.
- Parameters values enclosed within braces { } are required. If unspecified, the parameter default is assigned to the command.
- `Monospace` type indicates a screen field or an example of a PIE/CICS command entered on the screen.

Chapter 1 Introducing Availability Plus

This chapter explains the benefits and operating concepts of balancing transactions across a CICS MRO system with Availability Plus. By extending the capability of a MRO system, Availability Plus improves CICS performance and reliability by two principal methods:

- Reduced average transaction response time
- Decreased application downtime when a CICS region suffers an abend

Improving CICS Transaction Response Time

An important part of improving response time is reducing the time a task waits in a queue before being dispatched. Typically, as the load increases on a CICS system, more tasks are queued waiting for system resources. At some point, average response time becomes a function of queue length. With a light load (less than 50% CPU usage), queue wait times are usually negligible. However, as the load approaches about 50-70% of CICS capacity, queuing time begins to increase exponentially.

As you can see from the graph below, while you may be using only half or three quarters of your CICS capacity, average response times become unacceptably long before the maximum capacity is reached.
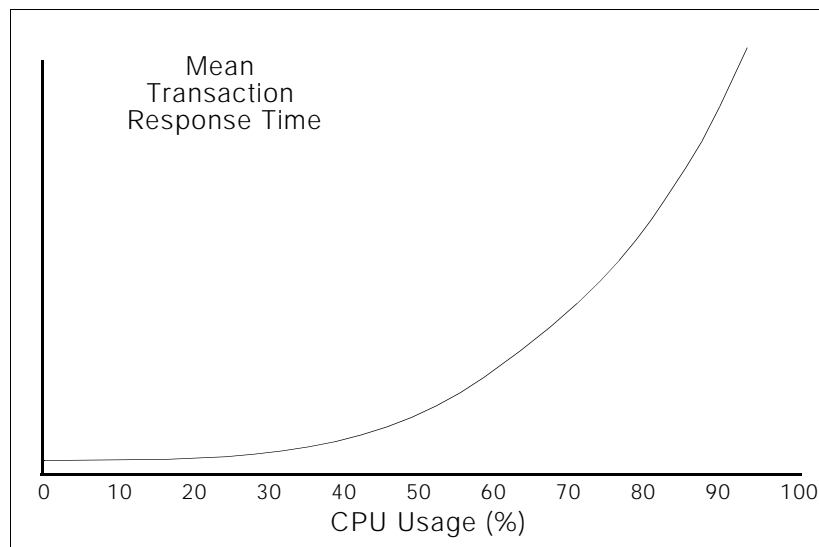
CICS Without Availability Plus

You can alleviate this problem to some extent by using CICS Multiregion Operation (MRO). With MRO, you can create separate CICS regions to handle terminal traffic (terminal owning regions, TORs), applications (application owning regions, AORs), and data (data owning regions, DORs). Different regions run on different CPU processors. Each region becomes a separate server operating an independent task queue. Because your CPU can process multiple CICS queues simultaneously, queues and response times are shorter.

The graph below shows how multi-server processing affects mean response time. As you can see from the response time curves, more servers can handle the same number of transactions per second with much greater speed.

Mean Response Time

Load (transactions per second)

—— 1 server
-- - 2 servers
—— 3 servers
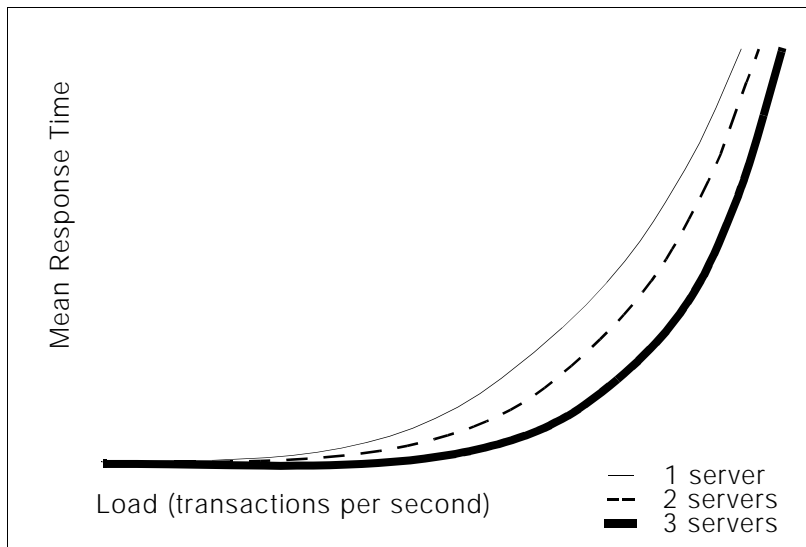
Limitations of MRO

The mean response time curves shown in the figure above are valid only if the load is evenly distributed across CICS regions. If a single region becomes overloaded while others remain relatively idle, response times remain high for the busy region.

You must be able to balance loads evenly across your CICS regions to achieve all the benefits of a multiple-region system. It is difficult to balance loads under MRO. For instance, while you can route separate applications to separate AORs, any single transaction can be serviced by only one AOR. You can place transactions with heavy loads in AORs by themselves, but the load for each individual AOR still varies by the application load.

In addition, certain applications must run together in the same AOR. These applications include transactions that share data stored in temporary storage queues or memory, and any application that runs as one transaction or uses pseudo-conversational transactions that initially receive control with an XCTL command. If you cannot route applications to different AORs, you cannot improve response times for those applications.

Load Balancing with Availability Plus

Availability Plus solves typical load balancing problems by allowing multiple AORs to process similar transactions. This gives you more capability to distribute work evenly across your AORs. For example, when transactions must run together in the same AOR, you can route the whole group to several AORs to evenly distribute the combined load.
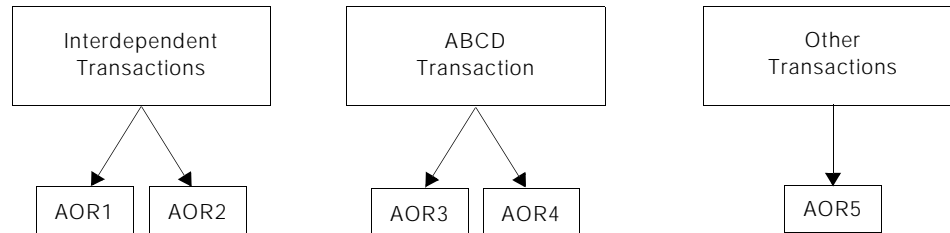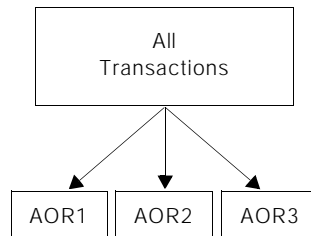
```
  ┌──────────────┐          ┌──────────────┐
  │ Interdependent│          │    Other     │
  │  Transactions │          │ Transactions │
  └──────┬───────┘          └──────┬───────┘
       /    \                      │
      ▼      ▼                     ▼
  ┌─────┐ ┌─────┐              ┌─────┐
  │AOR1 │ │AOR2 │              │AOR3 │
  └─────┘ └─────┘              └─────┘
```
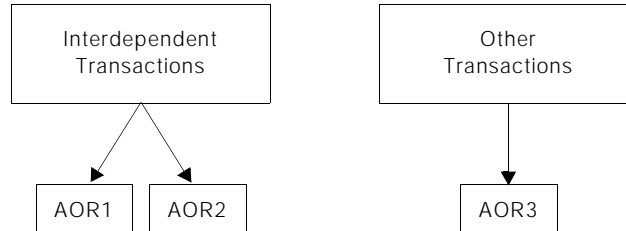
If a single application has an extremely heavy load, you can isolate it and duplicate the work across several AORs.

```
  ┌──────────────┐    ┌──────────────┐    ┌──────────────┐
  │ Interdependent│    │    ABCD      │    │    Other     │
  │  Transactions │    │ Transaction  │    │ Transactions │
  └──────┬───────┘    └──────┬───────┘    └──────┬───────┘
       /    \              /    \                │
      ▼      ▼            ▼      ▼               ▼
  ┌─────┐ ┌─────┐    ┌─────┐ ┌─────┐         ┌─────┐
  │AOR1 │ │AOR2 │    │AOR3 │ │AOR4 │         │AOR5 │
  └─────┘ └─────┘    └─────┘ └─────┘         └─────┘
```

If you want, you can distribute the load evenly by sending all your transactions to two or three AORs. Availability Plus automatically routes transactions to the appropriate AOR using one of several load balancing techniques.

```
           ┌──────────────┐
           │     All      │
           │ Transactions │
           └──────┬───────┘
           /      │      \
          ▼       ▼       ▼
      ┌─────┐ ┌─────┐ ┌─────┐
      │AOR1 │ │AOR2 │ │AOR3 │
      └─────┘ └─────┘ └─────┘
```

Because you have more control over load balancing across regions, you can minimize the occurrences of an AOR reaching its limiting capacity while other regions remain relatively idle.
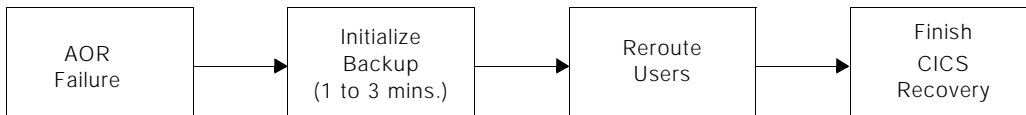
Decreased Paging

Availability Plus often reduces the required number of AORs users create for their systems. Because users under MRO alone often want to avoid the difficulty of calculating a proper load balance, they create separate AORs for every major application; however, too many AORs can increase response time because each region requires a separate MVS address space. With more memory in use, MVS must perform more paging, degrading performance.

With Availability Plus, however, you can combine transactions into a single group and create several AORs to run all of them. The net result is fewer AORs, reducing total paging in your MVS system. Once again, response time is improved.
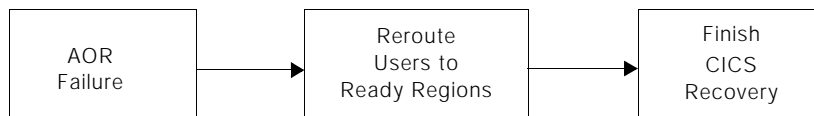
Decreased Down Time

MRO provides a backup facility to minimize the amount of time applications are unavailable after a region failure. You can prepare a backup AOR that can process the same applications as the working AOR. If the working region fails, CICS XRF (Extended Recovery Facility) automatically routes transactions to the backup region.

XRF has a severe limitation: the backup regions are only partially initialized. It can take several minutes for a backup region to completely initialize, which is too long for critical applications.

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│     AOR      │ ──▶ │  Initialize  │ ──▶ │   Reroute    │ ──▶ │    Finish    │
│   Failure    │     │   Backup     │     │    Users     │     │     CICS     │
│              │     │ (1 to 3 mins.)│     │              │     │   Recovery   │
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
```

With Availability Plus, backup AORs are always completely initialized. Users can be switched to a new AOR immediately. (If the crash causes a dump, however, Availability Plus has to wait for CICS to complete the dump before it can reroute the users; usually less than two minutes.)

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│     AOR      │ ──▶ │   Reroute    │ ──▶ │    Finish    │
│   Failure    │     │   Users to   │     │     CICS     │
│              │     │ Ready Regions│     │   Recovery   │
└──────────────┘     └──────────────┘     └──────────────┘
```

☞ As with XRF, users are routed to the same transaction. Users lose any data they have typed on the screen but have not yet entered. If the transaction uses a recoverable resource, the data they entered will be processed as soon as CICS finishes its recovery procedures.

Understanding Availability Plus

This section introduces the operational concepts of Availability Plus. You need to understand these concepts in order to implement Availability Plus effectively.

Load Balancing Groups

With both native MRO and Availability Plus, you assign transactions to AORs in the transactions' remote transaction definitions, using the remote system parameter.

With native MRO, the remote system parameter refers to a single AOR.With Availability Plus, this parameter refers to a single AOR or a group of AORs.

An AOR group can contain from 1 to 100 AORs.Groups of AORs are called load balancing groups. When the transaction's remote system parameter refers to a load balancing group, each AOR in the group becomes a potential server for that transaction. When a user requests the transaction, Availability Plus assigns an AOR from the load balancing group.

ABCD transaction
Remote System = Group

Group =
AOR1, AOR2, AOR3

A+ routes ABCD
to AOR3
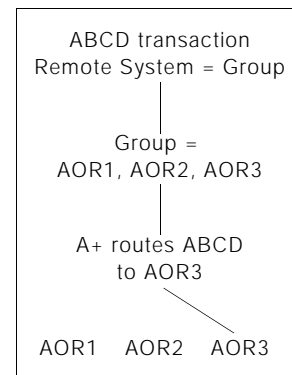
AOR1   AOR2   AOR3

Load balancing groups are flexible. A single AOR can be combined with others in several groups. For example, you can create one group that combines AOR1, AOR2, and AOR3. Then you could create another group that contains AOR2, AOR3, and AOR4.

Each load balancing group has a name (which you specify in the remote system parameter). You can give a balancing group any name up to 4 characters long. Or you can use the name of an existing AOR.

GRP1   AOR1   AOR2   AOR3   GRP2   AOR4
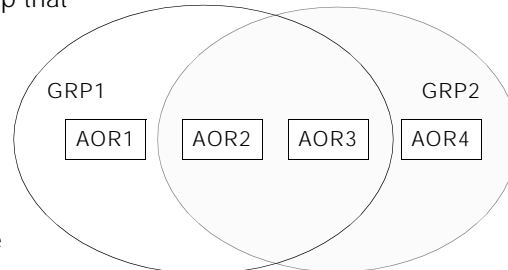
Refer to *"Planning For Availability Plus", beginning on page 13* for instructions about combining your site's AORs into effective load balancing groups. After you have finished the implementation procedures, you can list the AORs that belong to a balancing group with the PIE/CICS Balancing Group List facility. *" Availability Plus List Functions" on page 50*, explains how to display your load balancing groups with the List facility.
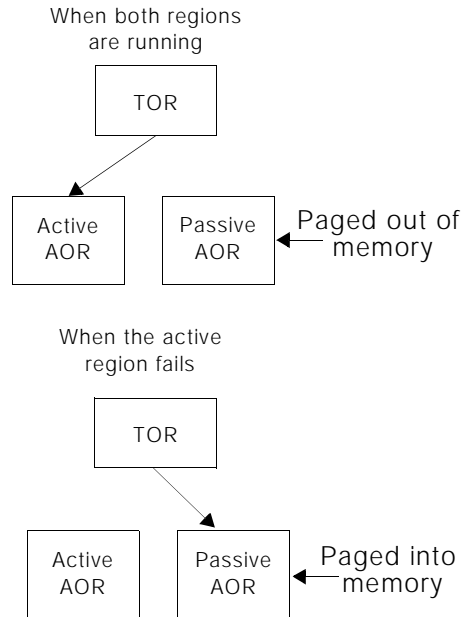
Active and Passive Regions

An active AOR processes transactions on a regular basis. A passive AOR acts as the backup region. It processes transactions only if the active region becomes unavailable.
In each balancing group, you can make all regions active, or you can allocate a single active and passive region

Having multiple active regions in a balancing group provides two primary benefits:

- Multiple active regions can reduce individual region workload by distributing transactions across all available regions within the balancing group
- If a region fails, only a small portion of users are affected. Users in other active regions can still perform their work.

Passive regions are beneficial when you need to conserve system resources. Passive regions remain in a wait state until an active region fails. Passive regions use less CPU, real memory, and DASD storage than active regions.

Using a Passive AOR

When both regions
are running

TOR

Active
AOR

Passive
AOR

Paged out of
memory

When the active
region fails

TOR

Active
AOR

Passive
AOR

Paged into
memory

Load Balancing Methods

Before processing a transaction, Availability Plus assesses the current workload of the active AORs in the load balancing group. Availability Plus decides which AOR in the balancing group has the smallest current workload and is the best candidate to accept the transaction. An AOR's workload can be calculated by three different load balancing methods:

Response Time   This method distributes transactions to achieve balanced response times across all AORs in the group. The transaction is routed to the AOR with the shortest average transaction response time.

CPU Use   This method distributes the workload by the CPU usage of the AORs within the balancing group. This method can be beneficial if your site experiences periodic CPU usage peaks. By distributing work within a group based upon each region's CPU usage, you can distribute work evenly across AORs to minimize transaction delay that occurs when a region does not have access to CPU resources.

User Count	This method balances the number of users between regions. It can be helpful if you have both regular short on storage conditions and users that stay in the same transactions for extended periods.
	By regulating the number of users within a region, you can balance the usage of virtual storage between regions. (If you have this condition, see Maximum Users in "Removing an AOR from Load Balancing" on page 9.)

After your system is set up, you can view which method is in effect for a load balancing group or AOR by running the Balancing Group List or System List. "Availability Plus List Functions" on page 50 explains how to use both facilities.

Balancing By Saturation

In addition to the standard balancing methods, you can use several regions within a load balancing group to balance by *saturation*.

With saturation, all users are routed to a single AOR until it reaches its "saturation point"; the maximum number of users allocated for that region. Any additional users are routed to an alternate AOR. The alternate AOR remains passive until the active AOR reaches its saturation point.

This method is helpful when you want to minimize the number of active AORs to conserve system resources.To balance by saturation, your balancing groups must meet the following conditions:

- Define one active and one passive region in your balancing group. That is, assign one AOR a balancing value greater than zero and one AOR a balancing value of zero.
- Assign a maximum number of users to your active AOR.
- Assign any of the three standard balancing methods to the passive AOR.

Maximum users = 1,000
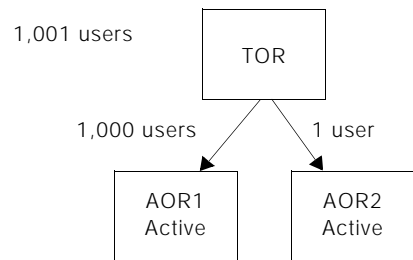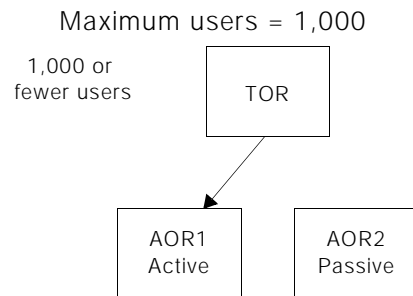
Setting Balancing Values

Availability Plus balances loads by comparing the relative work each region is doing to other regions in the group. Work is distributed to the regions within a load balancing group based upon a balancing value assigned to each region.

Balancing values are simply ratios of a whole. If every region has the same balancing value, work is distributed evenly across all regions within the balancing group. If one region has more parts than another, it can accept more work. For instance, you could set up your system so that AOR1 has 1 part, AOR2 has 2 parts, and AOR3 has 3 parts. Availability Plus would then ensure that AOR1 does one half the processing of AOR2 and one third the processing of AOR3. If you were balancing by response time, then AOR1 would run with half the response time of AOR2 and one third the response time of AOR3.
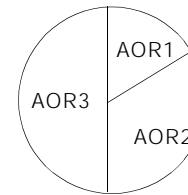
It doesn't matter how large or small the balancing values are within a balancing group. Instead, only the ratio between the numbers in the group matters. Let's go back to our previous example. You want AOR1 to receive 1 part of the processing, AOR2 to receive 2 parts, and AOR3 to receive 3 parts. Because only the ratio between the numbers matters, you could assign numbers, such as:

- 1, 2, and 3
- 10, 20, and 30
- 150, 300, and 450

All three sets of numbers produce the same ratios.

To make an AOR passive, assign it a balancing value of zero. Availability Plus will only route users to that region if another region becomes unavailable.

A SPECIAL CIRCUMSTANCE

Do you meet all of the following conditions?

- You dedicate your regions to particular CPU processors.
- Your CPU processors work at different speeds.
- You load balance by CPU usage or by user count.
- You want to maintain an even amount of processing between regions.

If so, you will only get a true balance between your AORs if you assign balancing values in multiples of processor speed. Suppose your three processors run at speeds in a ratio of 1 to 2 to 3, 3 being the fastest. If you want them to process the same load, you would specify values in multiples of 1, 2, and 3; for example, the values 10, 20, and 30 would adjust the load evenly among the three regions.

Now suppose that you want your fastest processor to handle twice the adjusted load of your other processors. You would then take your ratios (10, 20, 30) and multiply your faster processor value by 2 (2x30=60), and get a final ratio of 10, 20, 60.

Removing an AOR from Load Balancing

Availability Plus makes the best choice from the available AORs when it routes a user. Under certain conditions, you may need to remove an AOR. Availability Plus can remove an AOR from a load balancing group temporarily if it meets either of two maximums you set. Those maximums are:

Maximum Users You can define a maximum number of users that an AOR can support. This option can be helpful when your sites experiences frequent short on storage conditions. Since every user takes up virtual storage space, limiting the number of users allowed on a region can help reduce the incidence of SOS conditions.

Maximum Active Users become active when they hit ENTER, CLEAR, or a function key, causing the transaction to perform some kind of processing. Since transactions process very rapidly, normally only a very few users are active at one time. More than 10 or 20 users active at one time can signal a problem, such as a hung region. By setting a low maximum active ceiling, you can remove a suspicious region early and avoid routing new users into potential trouble.

Availability Plus checks both conditions each time it makes a routing decision. As soon as a region reaches the ceiling you've set, Availability Plus will consider it unavailable. As soon as it drops below that ceiling, Availability Plus will reinstate it.

You may also take an AOR out of the line-up manually with the PNAM CLOSE command. This makes the AOR unavailable for new users, but doesn't affect users already routed to it.

USING PS/2S

With Availability Plus, you can route transactions to PS/2s in addition to your regular AORs. IBM has provided PS-CICS to run CICS on PS/2s. So you can make any PS/2 a CICS region. The problem is, a PS/2 can only serve one user at a time. How do you limit the region to a single user? With Availability Plus' maximum users parameter. Simply set the MAXUSER parameter to 1 when you set up your region.

Remote System Names

With Availability Plus, the remote system parameter of a transaction's remote definition is no longer restricted to a specific AOR. The name you specify with the parameter can identify the following:

- Load balancing group
- AOR name that matches an MRO region definition name
- AOR alias which Availability Plus matches to an actual AOR system ID. Using an AOR alias can prevent potential name conflicts in your system.

The name must be 1 to 4-characters long and meet CICS standards for remote system parameter values.

Availability Plus uses a standard search strategy to match a remote system parameter name to a region or a load balancing group.

It looks for matches in your load balancing commands. First, it looks for a load balancing group with that name. If it finds one, then the remote system name refers to that load balancing group. If it doesn't find one, then it looks at the AOR aliases to match the name. If it doesn't find the name as an alias, then Availability Plus knows that the remote system parameter refers to an actual AOR, and assigns default values to the region during processing.
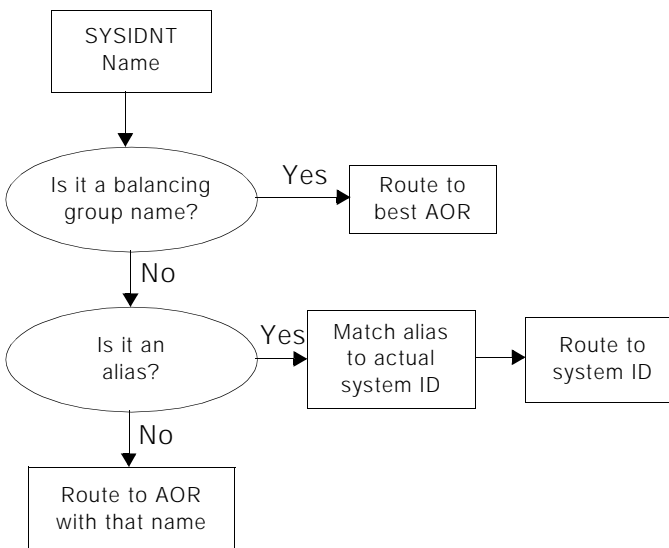
If there is a match in two or more categories, Availability Plus acts on the first match it finds. If you use the name AOR1 for both a balancing group and a region, Availability Plus treats the name as a balancing group because it looks balancing groups first.

Benefits of Load Balancing Commands

With Availability Plus, loads are balanced using simple commands that can be processed online or from a file when Availability Plus or CICS are initialized. Transactions are no longer associated with specific AORs by remote transaction definitions. Instead, transaction routing is controlled by load balancing commands. When you need to move an application from one AOR to another, you need only execute a simple command. You are not required to make extensive changes to your CICS tables or CICS System Definition (CSD).

Dynamically Changing Load Balancing Operation

Work done on your CICS regions varies according to the schedule to process periodic tasks. For example, accounting system regions may need more CPU resources to process end-of-month transactions.

Availability Plus allows you to change load balancing conditions to meet the needs of regularly scheduled work. Using load balancing commands, you can change from the default day-to-day load balance to a special load balance with a minimum of effort. These commands are processed dynamically online; you can respond immediately to unusual load fluctuations.

Automated Operations

Because almost all Availability Plus functions are controlled by commands, you can use your automated operator to control an Availability Plus environment automatically.

See "PNAM Online Functions", beginning on page 105 of the *PIE/CICS Operation and Administration Guide* for more information about load balancing commands.

Network Monitor and the System Directory

During implementation, you define balancing groups and AORs with load balancing commands, called PNAM commands. The Network Monitor, a component of Availability Plus, reads and monitors these commands to create a System Directory, which is simply a current list of your balancing groups and AORs.

You can submit PNAM commands online or through a batch job. If you also run PIE/CICS NonStop CICS or NetGate, these products use the Network Monitor and System Directory, too. As you would expect, different regions run different copies of the Network Monitor and System Directory. Because NetGate and Availability Plus can run from the same region, you may share a Network Monitor and System Directory between them. That means that if you make PNAM command changes from Availability Plus, those changes can affect NetGate operations as well.

On the other hand, Availability Plus and NonStop CICS never operate from the same region. Therefore you will not share the same Network Monitor and System Directory between them, and PNAM commands for either product will not affect the other.
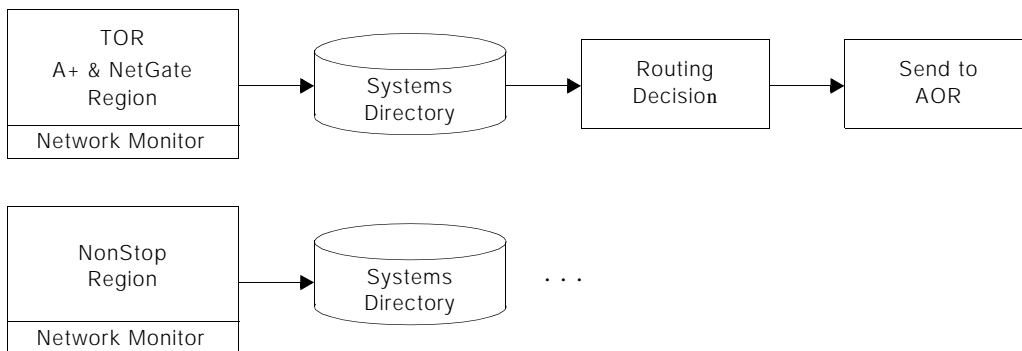
Monitoring Load Balancing Groups

The PIE/CICS List Utility has two functions to monitor load balancing on your system: the Balancing Group List displays information on AORs and balancing groups listed by balancing group name. The System List displays information on each AOR listed by AOR name. *"Availability Plus List Functions" on page 50* explains how to use both functions to monitor the status of your load balancing groups.

Chapter 2 Planning For Availability Plus

This chapter explains important considerations that are part of the overall planning to implement Availability Plus load balancing groups. Major steps are listed with a series of related questions. The answers to these questions should suggest a preliminary load balancing method that should alleviate some of your site's current workload distribution problems. The following chapter provides a series of procedures to actually implement your load balancing decisions.

Step 1: What is your current MRO configuration?

- How many CICS regions are normally active in your organization?

- How many CPU processors do you have?

- Are you currently using them all?

- Do they all have the same processing capability?

- Do you have data owning regions set up?

Step 2: Which AORs are overloaded?

Where are your availability problems?

- Which AORs within your organization run at near or at their capacity much of the time?

- Which AORs within your organization are experiencing stability problems?

Step 3: Look at Transaction Requirements

If you wish, you may load balance all eligible transactions. Or, you may balance only those transactions that run in regions experiencing stability problems. In either case, identify the needs of your regions based upon their transaction load.

1. Identify the transactions that can run on multiple AORs.

    Some transactions can only be serviced by one AOR. See "Single-Server Transactions" on page 16 for information about those transactions.

2. Review your list of transactions and consider their requirements.

    *   Which regions get heavy loads?
    *   Do some loads vary during different hours of the day or during different days or weeks?
    *   Is end-of-month processing heavier on a specific region?
    *   Is constant availability critical for any region?
    *   Does your system experience stability problems?
    *   Do you have any regions with light workloads that may not need load balancing?

3. Group transactions with similar requirements.

    Grouping similar transactions makes it easier to create load balancing groups to meet every type of need. For instance, many payroll transactions will have similar needs. So they can be put in a group. Your groups can be as small or large as you wish. Of course, you can combine all your transactions into one group.

Single-Server Transactions

1. Identify transactions that cannot be serviced by multiple AORs. These transactions are:

    *   Pass temporary storage queues between different transactions
    *   Pass data between different transactions in an unshared data area (like CICS shared storage, MVS/XA private storage above line)
    *   Use files that must be locally attached to the AOR and that cannot function ship (unless they are read only files that can be attached to multiple AORs)

    In addition, your installation may have other types of transactions that cannot be serviced by multiple AORs.

    *   You must be certain these transactions are routed to only one AOR. Determine which of the following methods you will use to accomplish this for each transaction.
    *   Assign a remote system name in the transaction's remote definition that does not match any load balancing group ID.
    *   Assign an alias system ID in the transaction's remote definition.This is required if you use this system ID as a balancing group name. Using Availability Plus' PNAM command, you will tie the alias system ID to a CICS system ID.

    Use the dynamic transaction routing exit. For more information on this exit, refer to "PCMRPCRU—Dynamic Transaction Routing Exit" on page 133 of the *PIE/CICS Customization Guide.*

Plan Your Balancing Groups

After you have determined your transaction needs and have combined similar transactions in groups, you can create load balancing groups. Use the following procedure to plan your load balancing groups.

1. Choose a group of transactions. How many active AORs do these transactions need to be serviced effectively? Usually, two active AORs are enough. However, with larger loads or instability problems, you may find more AORs helpful.

2. Choose a name for the balancing group.

   Remember that a group name can be an actual AOR name. If most of the transactions you want to route to this load balancing group are already routed to one AOR, you might want to use that AOR name for the group. This will minimize the number of changes you have to make to your remote transaction definitions.

3. Decide whether you want the AORs in the group to be identified with aliases.

   This is required when you use the same AOR in several different load balancing groups and you use different balancing methods for each group. It is also helpful when you use an actual AOR name as your balancing group name. If you look up that name on any PIE/CICS utility, you might get any system belonging to the balancing group—not just the AOR with that name. If you assign the AOR an alias, you can look it up by its alias and be sure you are getting the correct information.

   You may have as many aliases as you like for any particular AOR. However, any one AOR may be listed in a particular group only once.

   ☞ AOR aliases are used only by PIE/CICS components.

4. Choose your alias names.

5. Choose the load balancing method for the group.

6. Decide the balancing ratios for each AOR in the group.

7. Select the interval length that Availability Plus should average CPU load or response time to get an accurate picture of the load on each AOR in this load balancing group.

   The interval should be long enough to compensate for short burst peaks, but short enough to measure current conditions accurately. The default is 120 seconds.

8. Go to your next group of transactions and repeat these steps:

   • Reuse a balancing group if it matches the requirements of the new group of transactions. If the requirements are different, create a new balancing group. You can reuse AORs, even AOR aliases, in new balancing groups.

   • When you have gone through your entire list of transactions, you will have defined all the balancing groups and AORs you need.

Step 4: Plan Your DORs

You may need new DORs (data owning regions) because of your changes. If you will process the same transaction in several regions, that transaction will need a DOR to handle its data requests. Of course, many of your transactions will already be using DORs.

Chapter 3 Installation and Implementation

This chapter consists of a series of procedural steps to install and implement Availability Plus. You should implement Availability Plus based upon planning considerations described in the preceding chapter, "Planning For Availability Plus".

References are made throughout this chapter to PIE/CICS or IBM manuals for more information to complete specific steps in the overall procedure to implement Availability Plus.

Step 1: Set Up MRO

More information about preparing a CICS MRO system can be found in the following IBM manuals:

- *CICS/ESA Facilities and Planning Guide*
- *CICS/ESA System Definition Guide (CICS release 3.x)*
- *CICS/ESA Intercommunication Guide*

1. Install MRO if it is not currently installed on your system.

2. Prepare VTAM definitions, CICS tables, and JCL to run all AORs and DORs created for Availability Plus.

3. Where necessary, move files from existing AORs to DORs.

4. Test your new MRO system.

Step 2: Install PIE/CICS

Availability Plus is an optional component within the PIE/CICS family. PIE/CICS must be installed and customized before implementing Availability Plus.

1. Review the *PIE/CICS Release Notes* before installing PIE/CICS.

   PIE/CICS Release Notes describe system requirements and any required customization to support Availability Plus.

2. Refer to the *PIE/CICS Installation Guide* to complete the following steps:

   - If PIE/CICS has never been installed at your site, perform steps 1 through 5 in your TOR. Perform step 6 in every AOR that will be balanced with the CPU use balancing method. Continue with steps 7 through 9.

   - If you are upgrading PIE/CICS from an earlier release, omit step 3. Complete all other steps as if PIE/CICS is being installed for the first time.

   - If you already have this version of PIE/CICS installed in your TOR, you need only perform steps 5, 6, and 8. To change the license control screen in step 8, enter `PINO` from the CICS blank screen. Enter your updated license information and press PF5 to save your changes, then PF3 to exit.

   - If you already have this version of PIE/CICS installed in a different TOR, you may skip steps 1 and 2. Perform all other steps.

Step 5 requires a change to your TOR's start-up JCL. Be sure to reference the PIE/CICS message log and the PNAM dataset. Use ddnames PIELOG and PIENAM. The PNAM file may be a PDS or a sequential dataset. A PDS is recommended for the PNAM file. A sample Availability Plus PNAM dataset is member PNAMEXPL of the CNTL dataset.

```
//PIELOG    DD    SYSOUT=*,DCB=(RECFM=V,BLKSIZE=136)
//PIENAM    DD    DSN=your.pds(member),DISP=SHR
```

If you also run NetGate, concatenate or combine your NetGate and Availability Plus PNAM datasets.

Step 3: Create a PNAM File

The PIE/CICS PNAM file contains default load balancing commands. The Network Monitor reads these commands from the PNAM file to create an Availability Plus load balancing system.

If you run PIE/CICS NetGate or NonStop CICS on your system, you already have one or more PNAM files. Availability Plus and NetGate can share a single PNAM file. However, you *cannot* share a PNAM file between NonStop CICS and Availability Plus.

If you are running NetGate, you do not have to create a new PNAM file. Instead, you can add new PNAM statements to the existing file. Or, you can create a new file and concatenate it to your NetGate PNAM file.

Complete the following steps to prepare a PNAM file:

1. Allocate a sequential dataset or a create a member of a partitioned dataset.

   You can use PNAMEXPL, which is a member of the CNTL dataset containing sample PNAM commands for different Availability Plus configurations.

   If you create your own PNAM file, a PDS is recommended because you can edit the member from ISPF without bringing down CICS. It must be a fixed length dataset with a logical record length of 80 bytes. It can be blocked or unblocked.

   Give your PNAM file the dataset name you referenced in your TOR start-up JCL for ddname PIENAM.

2. Create a PN AM ADD GROUP statement for each balancing group in your Availability Plus system.

   Refer to *" Creating a Balancing Group" on page 24* for a description of both PNAM parameters.

3. Create a PNAM ADD SYSID statement for every AOR in your balancing groups.

   Refer to *" Defining an AOR" on page 25* for a description of how these parameters are used with the PNAM command.

    If an AOR is referenced by more than one name, create a separate statement for each name.

PNAM Command

The PNAM command controls the Availability Plus environment. You can enter PNAM commands by the following methods:

- From a CICS 3270-type terminal.
- From a MVS console using the MODIFY command, `F CICS,PNAM`
- From the PNAM file

For more information about submitting online PNAM commands, see *" Availability Plus List Functions" on page 50*.

PNAM Command Syntax

The syntax of the PNAM command is similar for NonStop CICS, Availability Plus, and NetGate. The command can contain only valid PNAM keywords. PNAM has the following basic format.

```
PNAM [REQUEST=]function [parameters]
```

PNAM must begin in column 1 and is followed by at least one blank. After the PNAM keyword, specify a function keyword (such as ADD or CHANGE). If you specify the function immediately following the PNAM keyword, you may omit the REQUEST keyword. If you put the function later in the statement, you must use the entire REQUEST=function parameter.

Separate parameters from each other with commas or spaces. Separate parameters from values with equal signs (GROUP=BAL1).

You may continue statements in the PNAM file. Do not include the PNAM keyword on continued lines—code only the new parameters. The continuation ends when the next line begins with PNAM, an asterisk (*), or is blank.

You may code comment statements. Begin comments with an asterisk (*) in column 1. You may also leave lines blank to improve readability.

Incorrectly coded statements are skipped when the command is processed. Errors are logged in the PIELOG file, which can be reviewed with your JES output display utility. After start-up is complete, Availability Plus indicates the number of errors in the PNAM file with message PCNM046 (or in a pop-up window on the console, if you started the Network Monitor from the console).

Example

```
PNAM ADD GROUP=BAL1,
        LIST=(AOR1,AOR2,AOR3),
        BALMETH=RESP

PNAM ADD SYSID=AOR1,PHYSID=ABCD,MAXUSER=50,...
* THIS IS A COMMENT STATEMENT.
```

Note: The first PNAM ADD statement is continued. It ends at the blank line.

PNAM Keywords

Most PNAM command functions are for online use. These functions and their related parameters are documented in "Chapter 4 Operating Availability Plus" on page 49

Only the ADD function is applicable to the PNAM file. The following sections show the format of the PNAM ADD command and its parameters.

Creating a Balancing Group

```
PNAM ADD GROUP=groupname,
         LIST=(alias,alias,...,alias),

                  ┌ RESP ┐
         BALMETH={ USER  }
                  └ CPU  ┘
```

Parameter	Valid Values	Default
GROUP	1 to 4-characters	None
LIST	1 to 8-characters for each alias	None
BALMETH	RESP, USER,or CPU	None

Using the following parameters, create one ADD GROUP statement for each balancing group.

REQUEST	Type of function being processed. If ADD is the first parameter, REQUEST is optional. For example,
	PNAM REQUEST=ADD ...
	can be entered as:
	PNAM ADD ..
ADD	Adds the group specified in the following parameters to the Availability Plus environment. If you are changing an existing group within the PNAM file, simply change the parameters in the statement. Likewise, if you are deleting a group within the PNAM file, delete the entire ADD statement.
GROUP	Name of the load balancing group. This name may be the same as an AOR system ID. Using a common system ID as the group name can avoid changes to your CICS tables or CSD.
LIST	Names of the AORs belonging to a load balancing group. Specify the alias names of all AORs in the group. If an AOR does not have an alias, specify its real system ID. You may specify up to 100 AORs in a single group. You may list the AORs in any order.
BALMETH	Balancing method applied to the group.
	RESP Balance by transaction response time.
	USER Balance by user count.
	CPU Balance by CPU use.

Defining an AOR

```
PNAM ADD SYSID=alias,
        [,PHYSYSID=actual-name]

        ⎡,OBJRESP=nnnnnn⎤
        ⎨,OBJUSER=nnnnnn⎬
        ⎣,OBJCPU=nnnnnn⎦

        [,TIMLOAD=nnnnn]
        [,MAXUSER=nnnnnn]
        [,MAXACTV=nnnnnn]
        [,DESC=comment]
```

Parameter	Valid Values	Default
SYSID	1 to 8-characters	None
PHYSYSID	1 to 4-characters	SYSID
OBJLOAD	0 to 999999	0
OBJRESP	0 to 999999	0
OBJUSER	0 to 999999	1
TIMLOAD	30 to 99999	120
MAXUSER	0 to 999999	0
MAXACTV	0 to 999999	0
DESC	1 to 32 characters	None

Using the following parameters, create one ADD SYSID statement for every AOR. If the AOR is identified by more than one name (actual system ID and aliases), create a separate ADD SYSID statement for each name.

REQUEST   Type of function being processed. If ADD is the first parameter, REQUEST is optional. For example,

PNAM REQUEST=ADD ...

can be entered as:

PNAM ADD ...

ADD   Adds the AOR specified in the following parameters to the Availability Plus environment. If you are changing an existing AOR within the PNAM file, simply change the parameters in the statement. Likewise, if you are deleting an AOR within the PNAM file, delete the entire ADD statement.

SYSID   Defines an AOR. Specify the name you used to identify this AOR in the GROUP LIST parameter, either the actual system ID or alias.

PHYSYSID   Associates the AOR alias to its actual system ID. Use this parameter only if the AOR has an alias. Specify the AOR name as defined in its MRO region definition with the CONNECTION parameter.

OBJRESP, OBJUSER, and OBJLOAD specify the balancing values for your AOR. Use the same parameter for every AOR in a balancing group. See " Setting Balancing Values" on page 8, for details about deciding load balancing values.

OBJRESP   Defines what portion of relative response time will go to this AOR. It is required when you have assigned BALMETH=RESP to the balancing group. The value you assign with OBJRESP has significance only in relation to the OBJRESP values you assign to the other AORs in the group. Increasing this value for a region increases its normal response time.

OBJUSER   Defines what portion of users will go to this AOR. Use it when you have assigned BALMETH=USER to the balancing group. The value you assign with OBJUSER has significance only in relation to the OBJUSER values you assign to the other AORs in the group. Increasing this value for a region increases its normal share of users.

OBJLOAD   Defines what portion of CPU use will go to this AOR. It is required when you have assigned BALMETH=CPU to the balancing group. The value you assign with OBJLOAD has significance only in relation to the OBJLOAD values you assign to the other AORs in the group. Increasing this value for a region increases its normal share of the CPU processor.

You can code more than one OBJ parameter per AOR. If you do, you can change your balancing method dynamically with a single command. For instance, if you normally balance by response time, but you sometimes want to balance by CPU use, code both OBJRESP and OBJLOAD in your PNAM SYSID statement. Then, when you want to balance by CPU use, you only have to change your BALMETH parameter. For example:

```
PNAM CHANGE GROUP=AOR1,BALMETH=CPU
```

Also, Availability Plus gathers data on the resources used by the AOR based on the OBJ parameters coded for it. It logs current response time if you code OBJRESP. It logs the percentage of CPU use if you code OBJLOAD. It logs the average number of active transactions per second if you code either OBJRESP or OBJLOAD.

Data gathering imposes a small performance overhead on your system. We suggest you add extra parameters only if you will find this information useful.

TIMLOAD   Length of interval in seconds that Availability Plus averages the CPU use or response time for this AOR. The interval should be long enough to minimize the effect of short, transient peaks, yet short enough to measure current conditions accurately. Specify the same number for every AOR in a balancing group. Code TIMLOAD if you coded either OBJLOAD or OBJRESP.

MAXUSER   Maximum number of users that can be routed to a region at one time. When this limit is reached, Availability Plus removes the region from the routing system. As soon as the region drops below this limit, the region is reinstated. To deactivate MAXUSER, specify 0. For PS/2 AORs, specify 1. See " Removing an AOR from Load Balancing" on page 9, for MAXUSER benefits.

MAXACTV   Maximum number of active users allowable for the region. An active user is one who has pressed ENTER, CLEAR, a PF key, or any key that causes actual processing within the region. Normally, this number should be very low—often under 10. To deactivate MAXACTV, specify 0. See *"Removing an AOR from Load Balancing" on page 9*, for MAXACTV benefits.

DESC   Description of the AOR being defined. You can supply a description or status message. If you code DESC, code it last in the ADD SYSID statement. You may display this description with the PIE/CICS & ZSYS(sysid) variable. (For information on this variable, see the PIE/CICS Command Reference.)

Sample PNAM Commands

Example 1

This example creates a balancing group and its member AORs. First, we define the balancing group, called SYSA. We balance the load between two AORs: AOR1 and SYSB. We define response time as our balancing method.

Next we define the AOR1 system. AOR1 is an alias for the system ID SYSA. We use this alias because the balancing group name is the same as the AOR's actual system ID. Since response time is our balancing method, we use the OBJRESP parameter to define a load balancing value. Notice that the values for OBJRESP are the same for both AOR1 and SYSB. This means we are splitting the load 50/50 between them. The TIMLOAD=60 parameter instructs Availability Plus to use the average CPU usage over the last 60 seconds for AOR1 and SYSB.

Next we define SYSB. It doesn't have an alias, so we don't need a PHYSYSID parameter. Again, we set the OBJRESP for the system. Because the TIMLOAD interval must be the same for every region in a group, we have set TIMLOAD to 60.

```
PNAM ADD GROUP=SYSA,LIST=(AOR1,SYSB),BALMETH=RESP
PNAM ADD SYSID=AOR1,PHYSYSID=SYSA,OBJRESP=1,TIMLOAD=60
PNAM ADD SYSID=SYSB,OBJRESP=1,TIMLOAD=60
```

Example 2

This example is similar to Example 1. In this case we are balancing by user count. The load is not balanced evenly. Instead AOR1 gets three times the load of SYSB. The MAXACTV value is assigned at 10 to prevent having too many active users on AOR1 at one time.

```
PNAM ADD GROUP=SYSA,LIST=(AOR1,SYSB),BALMETH=USER
PNAM ADD SYSID=AOR1,PHYSYSID=SYSA,OBJUSER=75,MAXACTV=10
PNAM ADD SYSID=SYSB,OBJUSER=25
```

Example 3

In this example, we only changed the balancing group name and removed the unnecessary alias.

What does this do? It can be effective if many of your transactions are already routed to SYSA, but you only want some of them to be load balanced. With this set up, you can go to

your CICS tables or CSD and change the remote system parameter to REMOTESystem=BAL1 for only those remote transactions you want to have load balanced. The others remain REMOTESystem=SYSA, and they will continue to be routed to SYSA only.

```
PNAM ADD GROUP=BAL1,LIST=(SYSA,SYSB),BALMETH=USER
PNAM ADD SYSID=SYSA,OBJUSER=75,MAXACTV=10
PNAM ADD SYSID=SYSB,OBJUSER=25
```

Step 4: Modify the ATTACHX Table

The ATTACHX table identifies any transactions that require special processing by Availability Plus. You need to add transactions to the ATTACHX table if you are routing transactions to PS/2s, or if you are not using Dynamic Menus.

In order to do effective transaction routing, Availability Plus must determine when a transaction begins and ends. This is simple for most transactions. However, "non-conversational" transactions use unpredictable termination methods.

Many sites use Availability Plus and Dynamic Menus together. Availability Plus can use information from Dynamic Menus to determine when non-conversational transactions end. However, if you do not use Dynamic Menus, these non-conversational transactions must be added to the ATTACHX table.

The following procedure implements Availability Plus' current method for handling non-conversational transactions. However, if you prefer to use the old method, complete the procedure described in "Using The PBAL Transaction", beginning on page 55.

1. If you are not using Dynamic Menus, identify any transactions that do not pseudo-converse by doing a return with a "next tranid."

    These transactions place the next transaction code on the screen and read the screen to initiate the next transaction.

2. Add an entry for each non-conversational transaction to the PIE/CICS ATTACHX table.

    The ATTACHX table is fully documented in " ATTACHX: Substitute Transaction IDs" on page 182 of the *PIE/CICS Customization Guide*.

    If you already created an ATTACHX table for another PIE/CICS product, add new entries to your existing table. If you do not already have an ATTACHX table, you can modify the source sample found in the ATTACHX member of the MACLIB dataset.

    Use the following format for each entry:

    ```
    PG@RMATT TRANID=tran,INT=NO,SUB=NO,NXTRAN=YES
    ```

3. Add an entry for each transaction you want to route to a PS/2. Use the following format for each entry.

    ```
    PG@RMATT TRANID=tran,INT=NO,SUB=NO,PS2TRAN=YES
    ```

4. Reassemble the ATTACHX table using the sample job found in member PG@RPCSC of the CNTL dataset.

5. Cycle CICS to implement the changes made in this step.

Step 5: Define Availability Plus Options

This step defines Availability Plus options that are set with the PIE/CICS Customization Options screens. This step guides you through the update process only. For more information about the Customization Options screens, see "Chapter 5 Customization Options" on page 65 of the *PIE/CICS Customization Guide*.

Your changes do not become effective until you cycle CICS. You will be cycling CICS later in the implementation process.

The customization screens update an options control dataset called PC@OPTS. Every region running Availability Plus must have access to an options control dataset. You may share the same PC@OPTS dataset between all regions (the default). If you choose to have separate PC@OPTS for different regions, you must set all options, including the TCTTE extension and Load Balancing offsets, to the same value in every region. Creating a single, shared PC@OPTS dataset is the recommended method.

1. If you are not yet logged on to PIE/CICS, enter the PIE transaction from your TOR blank screen. Sign on at the Logon Director panel.

2. Enter `PEXE MENU PIEMADM` from the CICS blank screen.

    You will receive the PIE/CICS System Administration menu.

3. Select Option 10: OPTIONS.

    The Customization Options screen (page 1) will be displayed.

```
PIE Customization Options (page 1 of 2)---------------------- (C) 1995 TSC, Inc
 Command ===>

 Maximum logon attempt count  . . . .    8                 Version 03.03.00
 Avg No. of Concurrent Users  . . .     1                  Date    06/19/99
 TSWITCH Auto-Signon Timeout  . . . .   1 (Minutes)        Jul     99.171
 Avg No. of Sessions per User . . . .   1                  APPLID  CICSPROD
 Temp storage name substitution . . . NO    <----------------------
 MRO/ISC Support  . . . . . . . . . . FUL
 Temp Storage on Auxiliary  . . . . . YES
 Name of Logon Director Help  . . . . HELPHELP
 Transient TCTTE's  . . . . . . . . . YES
 AOR AE/ATI support-1 byte field  . .   4 (decimal offset in the TCT user area)
 Create Tctte Extension . . . . . . . YES  <----------------------
  or Use 4 byte field at  . . . . . .      (decimal offset in the TCT user area)
 Temp Storage Queue Prefixes  . . . . ZZZ
 Load Balancer 16 byte field at . . .   5 (decimal offset in the TCT user area)
 Automatic PIE GMM Tran . . . . . . . YES  <----------------------
 Message Destination Id . . . . . . . PIEL
 Auto-start Network Monitor . . . . . YES  <----------------------

 INSTRUCTIONS: Enter Down command for more options

 PF: 1 Help  3 End  5 Save  6 RETRieve  7 Up  8 DOwn  9 Delete
```

4. Set the following options within the fields of the first Customization Options screen.

    `Temp storage name substitution: NO`

    `Create TCTTE Extension: YES`

    `YES` is appropriate for most sites. But, if you have software that saves a pointer to the

TCTTE user area before PIE/CICS and Availability Plus are initialized, set it to `NO` and specify an offset value. Specify a 4-byte offset not currently in use.

`Load Balancer 16 byte field at:`

Specify a TCTTE offset, if you balance by CPU use. This provides a 16 byte offset field in the TCT user area for Availability Plus use. Otherwise, leave the Load Balancer 16 byte field blank.

`Automatic PIE GMM Tran: YES`

`Auto-start Network Monitor YES`

 if you want PIE/CICS to start the Network Monitor automatically when PIE/CICS is initialized. This is the recommended method.

If you specify `NO`, you must start the Network Monitor by including program PCNMPINI in the PLTPI. You may copy and uncomment the entry from member PIEPLTPI of the CNTL dataset. Insert the entry after your PCSMPINI entry.

5. Press PF8 to scroll to the second menu of the Customization Options facility.

6. Set the following option, `Dynamic Transaction Routing: YES`

```
PIE Customization Options (page 2 of 2)---------------------- (C) 1995 TSC,
Inc
 Command ===>

 Signon Message Display Time  . . . .  2   (Seconds)          Version 03.03.00
 Auto-start Terminal Security Monitor NO                      Date    06/19/99
 Removeable Token Delimiters  . . . . /-_                     Jul     99.171
 Terminal Alarm on Cut/Paste  . . . . YES                     APPLID  CICSPROD
 MVS Loaded Programs DDNAME . . . . . DFHRPL
 Dynamic Transaction Routing  . . . . YES ◄──────────────────
 Menu Security Re-check interval  . .  60  (Minutes)
 Menu Line Security Option  . . . . . OMIT (OMIT|PROT)
 Menu Auto-select Single line . . . . YES
 Limit Transactions to One Session. . YES
 Handle Unavailable Printer in NEP  . NO
 Tranid Validation by Session Mgr . . NO
 Extract VTAM Logonmsg by Logon Dir . YES
 Multi-Language Characters  . . . . .
  -MRO API, use 1 byte field at . . .     (decimal offset in the TCT user
area)
 Generic matching on Menus/Sessions . ALL  (NO/MEN/SES/ALL)
 Action on max sessions . . . . . . . SES  (SES/POP)
 Action on session close  . . . . . . BSM  (BSM|LAS)


 PF: 1 Help  3 End  5 Save  6 RETRieve  7 Up  8 DOwn  9 Delete
```

7. Save your changes and exit from the Customization Options facility.

Step 6: Set Up Pre-defined Sign ons

The Logon Director is a common component of PIE/CICS. If you are not already using PIE/CICS in your TOR, you must set the Logon Director to sign on your users to PIE/CICS and Availability Plus. You can set the Logon Director to accept predefined signons with your current logon screen in the TOR, or standard signons with the Logon Director. Running the Logon Director with predefined signons and your current logon screen is the recommended method.

This step prepares the Logon Director using predefined signons. These instructions contain only the basic requirements. For more information about these procedures, see "Chapter 2 Logon Director" on page 3 of t*he PIE/CICS Customization Guide.* Follow the procedures described in " Pre-defined Sign On Data to Bypass the Logon Director Screen" on page 12, and " Receiving sign on Data From Another Application" on page 8.

Modify the Terminal Directory

1. Access the System Administration menu from your TOR.

   Enter `PEXE MENU PIEMADM` from the CICS blank screen.

2. Select Option 2: TERMINAL - Update Generic Terminal Directory shown in the figure below.

```
PIE Generic Terminal Directory -------------------------------------------------
 Command ===>                                                  Scroll ===> CUR
 ... Terminal Userid.. Password Logon... Logof PIE Dial Opt SLM TRM RST Updated.
 ___ (MODEL)                    PIELMAIN USE  YES NO   NO  NO  FUL NO  10/13/98
 ___ :MC24                      MARK     YES  YES NO   NO  YES SRT NO  10/13/98
 ___ :M4B4                      PIELMAIN YES  YES NO   NO  YES SRT NO  10/13/98
 ___ PIEN2014                   MARK     YES  YES      FUL NO  FUL NO  05/05/99
 ___ PIEN2015                   MARK     YES  YES      FUL NO  FUL NO  05/05/99
 ___ PIEN*                      MARK     YES  YES      FUL NO  FUL NO  05/16/96
 ___ :8E38                      PIELMAIN YES          FUL NO  NON NO  04/18/99
 ___ :8E37                      A        YES  YES      NO  NO  NON NO  11/01/95




 PF: 1 HELp  3 ENd  4 RETUrn  7 UP  8 DOwn
```

3. Move the cursor to the command area of the first line with a Terminal named * (asterisk). Type `R` and press ENTER. You should have two asterisk entries.

4. In the first asterisk entry, change the asterisk to your current real VTAM node name (terminal ID).

   This entry allows you to access Availability Plus as an administrator from this terminal. If you or other system administrators will sign on from other terminals, add entries for those terminals before the following asterisk entry. (Use the R line command to repeat an entry.)

5. In the second asterisk entry, leave the asterisk and add

   ```
   Userid: PIEUSER
   Password: PIEUSER
   Logon: (NONE)
   ```
   (Type `NONE` in parentheses, exactly as shown above.)

If you are **not** running MultiCICS, NetMizer, or Dynamic Menus, you can improve performance by running in non-3270 mode. To do so, type N32 in the OPT column.

The asterisk entry defines all terminals accessing PIE/CICS except those listed before it. With these changes, PIE/CICS now automatically sign on all users on without displaying the Logon Director screen.

6. Press PF3 to exit.

Update Profile

1. If you are not already there, go to your TOR and access the System Administration menu. Enter PEXE MENU PIEMADM from the CICS blank screen.

2. Select Option 8: PROFILE - List/Edit Profiles shown in the figure below.

```
PIE Profile (SYSTEM.TRANSP) ------------------------------- (C) 1995 TSC, Inc
 Option  ===>
 Profile saved as SYSTEM.TRANSP                               Update History:
    1  Terminal - Specify Terminal Characteristics            Name:  USR1
    2  Defaults - Specify defaults for PIE (reserved)         Term:  PIE10004
    3  Keys     - Specify Global PIE keys                     Date:  06/19/99
    4  Sessions - Specify Sessions Configuration              Time:  10:57:58


  PIE profile group   ===> SYSTEM
  PIE profile name    ===> TRANSP
  PIE profile title   ===> Sample user profile


  Default Application ===> menu piemmain
  Initial PIE command ===> sessions
  Final PIE command   ===>

    Administrator ===> ADM1          Terminal  ===> *
    Auditor       ===> *             Terminal  ===> *
    Generic forms, ?, % and * characters are accepted above.




 PF: 1 Help  3 ENd  4 RETUrn  5 SAVe  6 RETRieve  9 DELete
```

3. Place the cursor in the command area of the SYSTEM.USER profile. Type an S and press ENTER.

4. Place the cursor next to the PIE profile name field and change USER to any unique profile name. We suggest TRANSP.

5. Move to the Initial PIE command field and type the name of your good morning transaction.

    This tells PIE/CICS to execute your good morning transaction immediately after its own. For example: SYSTEM CMD CSGM

6. Move to the Final PIE command field and type EXIT LOGOFF.

7. Type 1 in the Option field and press ENTER. The Terminal Characteristics screen will be displayed.

8. Set the following options:

    ```
    Command Delimiters: ;
    Titles display: YES
    Message ID: NO
    Scroll Default: CURSOR
    ```

9. Press PF3 to return to the PIE Profile screen.

10. Type 3 in the `Option` field and press ENTER. The PIE Profile Global Keys screen will be displayed.

11. Verify that all PF and PA keys are blank.

12. Press PF8 to access page 2 of PIE Global Keys screen.

13. Verify that all options are blank.

14. Press PF3 to return to the PIE Profile screen.

15. Type 4 in the `Option` field and press ENTER. The Profile Sessions Configuration screen will be displayed.

16. Verify that the `Name` and `Execute` fields are blank for all sessions.

17. Press PF3 to return to the PIE Profile screen.

18. Press PF5 to save your changes and press PF3 twice to return to the Systems Administration menu.

Modify the User Directory

1. If you are not already there, go to your TOR and access the System Administration menu. Enter `PEXE MENU PIEMADM` from the CICS blank screen.

2. Select Option 3: USER - Update Generic User Directory.

3. Place the cursor in the command area of the first * (asterisk) entry. This is a system administrator entry. Type the system administrator ID in the `Userid` field.

4. If you have another administrator, place the cursor in the command area in front of the administrator entry, type R, and press ENTER. This will create another identical entry. Type the administrator's user ID in the `Userid` field. Repeat this step until you have defined all system administrators at your site.

5. Change the remaining asterisk entry to Userid `PIEU*`.

```
PIE Generic Users Directory---------------------------------(c) TSC, Inc. 1987
Command ===>                                              Scroll ===> CUR
...Userid.. Terminal    Password    Groupid   MenuName   Profile      Updated
___(MODEL)  (MODEL)     (MODEL)               PIEMMAIN   USER
___ADMIN1   *           *                     PIEMADM    ACCOUNT      05/24/92
___PIEU*    *           *                     PIEMADM    ACCOUNT      05/23/92
___*        *           *                     PIEMMAIN   USER         05/23/92
   **END**




PF: 1 HELp    2 SELECT    3 ENd    4 RETUrn    7 UP     8 DOwn
```

6. Type S in the command area of this entry and press ENTER. The User Directory entry is displayed.

7. Set all attributes as illustrated in the following screen. Be sure to specify:

   • Profile: TRANSP (or the name of the profile you created in the previous step)

   • Allow Disc Status: A

```
PIE Generic Users Directory Entry------------------------(c) TSC, Inc. 1987
Command ===>
                                                        Update History
Userid         ===>  PIEU*       System Admin ===>N (Y/N)    Name:  SD080BB
Terminal       ===>   *          Userid Type  ===>S (U/R/S)  Term:  PIE10002
Password       ===>   *          (Unique, Reusable, Shared)  Date:  05/24/99
                                                             Time:  19:53:37
Generic forms, ?, % and * characters are accepted above.

RESOURCES:                       FEATURES:
Groupid        ===>              Group Administrator  ===>   N    (Y/N)
User Data      ===>              Lock Timeout         ===>   0    (Min)
Menu           ===>              Display Signon Msg   ===>   N    (Y/N)
Profile        ===>  TRANSP      Log Signon Msg       ===>   N    (Y/N)
Bulletin       ===>  PIEBMAIN    Allow Disc Status    ===>   A  (Y/N/A)
Help desk ID   ===>              Allow Session Cancel ===>   Y    (Y/N)
                                 Maximum Sessions     ===>   1    (1-99)
Printer Id     ===>              Private Profile      ===>   N  (Y/N/O)
Alt Printer    ===>              Security Classes     ===>        (0-7)
                                 Language             ===>
                                 TSM Timeout          ===>        (Y/N)
                                 Receive SuperMessage ===>        (Y/N)
```

8. Save the changes and exit.

Step 7: Special Implementation Procedures

This step describes special implementation procedures for Availability Plus. These items are prepared to meet the requirements of most installations. However, you should review the defaults to make certain that no changes are necessary for your installation.

- Check the Systems Table

  You need to increase the size of the Network Monitor's systems table if more than 200 regions (Availability Plus and NetGate regions combined) are defined to the Systems Directory. See "Appendix G. PIE/CICS System Tables" on page 179 of the *PIE/CICS Customization Guide.*

- Check Network Monitor Options

  The Network Monitor uses an options table to determine how it performs certain procedures. The default values entered in the table meet the needs of most installations. However, you can review and change these options. See " Changing Network Monitor Conditions with the Options File" on page 123 of the *PIE/CICS Customization Guide.*

- Check the Dynamic Transaction Routing Exit

  The Dynamic Transaction Routing exit overrides Availability Plus routing decisions under specific situations. Use this exit to route a non-conversational transaction, or make programmed routing changes. See " PCMRPCRU—Dynamic Transaction Routing Exit" on page 133 of the *PIE/CICS Customization Guide*.

Step 8: Assigning Transactions to Load Balancing Groups

Now you have all your Availability Plus elements ready. To put Availability Plus into operation, perform the following steps.

1. Access CEDA, the alter function.

2. For each transaction you want balanced, specify the appropriate balancing group name in the remote system parameter.

   If you gave the load balancing group the same name as the current system ID, no changes are necessary.

3. Press PF3 to exit.

4. Reinstall your altered transactions.

5. Recycle your TOR and AORs.

Examples

Our ABCD transaction is currently routed to AOR1.

```
OVERTYPE TO MODIFY
 CEDA  ALter
  TRansaction   : ABCD
  Group         : REMOTE1
  PROGram     ==>
  TWasize     ==> 00000           0-32767
  PROFile     ==> DFHCICST
  PArtitionset ==>
  STatus      ==> Enabled         Enabled | Disabled
  PRIMedsize  ==> 00000           0-65520
 REMOTE ATTRIBUTES
  REMOTESystem ==> AOR1
  REMOTEName  ==> ABCD
  TRProf      ==> DFHCICSS
  Localq      ==> No              No | Yes
 SCHEDULING
  PRIOrity    ==> 001             0-255
  TClass      ==> No              No | 1-10
 ALIASES
  TAskreq     ==>
  Xtranid     ==>
 RECOVERY
  DTimout     ==> No              No | 1-7000
  Indoubt     ==> Backout         Backout | Commit | Wait
  REStart     ==> No              No | Yes
  SPurge      ==> No              No | Yes
+ TPurge      ==> No              No | Yes
PF 1 HELP     3 END              6 CRSR 7 SBH 8 SFH 9 MSG 10 SB 11 SF
```

But now we want ABCD to be balanced in the BAL1 group. So we change the remote system parameter to BAL1.

```
 REMOTESystem ==> BAL1
```

Our WXYZ transaction is routed to AOR2.

```
TRansaction    : WXYZ
...
REMOTESystem ==> AOR2
```

We want WXYZ to be routed to a balancing group, but we named that group AOR2. So no changes are required.

Step 9: Implementation Verification

The procedure included in this step verifies if Availability Plus has been correctly implemented.

1. Check your console log for the PCNM046 Availability Plus start-up message.

   The PCNM046 message lists the number of errors that were encountered as the PNAM file was read.

   If you have errors, check the PIELOG file. It provides more detail about the potential source of errors. You can use your JES output display to view the PIELOG file.

2. Correct any errors.

3. Enter `PNAM STOP` and `PNAM START` from the console to restart the PNAM file after the errors have been corrected.

4. Recheck the PCNM046 message from the console log.

5. Use the Balancing Group List to ensure that your groups and AORs are defined correctly. To do so, from a CICS blank screen enter `PEXE LIST BAL.` For more information on the Balancing Group List, see " Availability Plus List Functions" on page 50.

6. Check that users are logged on to PIE/CICS. To do so, from a CICS blank screen enter `PEXE LIST USER` to view the User List utility. For more information on the User List utility, see "Operations" in the *PIE/CICS Operations and Administration Guide*.

   If there are no users logged on, check your PIE/CICS Customization Options screens and make sure you set up Availability Plus options correctly.

   If you have to make a correction, cycle CICS, and check the User List again.

7. Run several transactions to test load balancing.

   If you are balancing by CPU use or response time, Availability Plus only recalculates CPU load or response time at every TIMLOAD interval. Be sure to start new transactions over the span of several TIMLOAD intervals. Check your Balancing Group List (the `Users` heading) to make sure that transactions are being routed according to your plan.

Case Studies

The remainder of this chapter provides several examples of load balancing that demonstrate how to implement Availability Plus

Example 1

A CICS system is running MRO with a single AOR called AOR1.The overall goal is to improve transaction responses time. A second AOR will be added to the system named AOR2. PIE/CICS Dynamic Menus is not installed at the site.

We aren't using a DOR, so we have to add one.

All transactions are routed to both AORs. Only a single balancing group must be created for all transactions and both AORs. AOR1 is the balancing group name to minimize CICS updates. (All our transactions are already routed to AOR1.) Now we need an alias for AOR1—we decide to call it OLDAOR.

We want the basic, bottom line load balancing method. So we pick balancing by response time.

We want to balance the load evenly. So we give both regions the same balancing load value. (Our CPU processors run at the same speed, so we don't have to worry about our processing speeds when we set load balancing values.
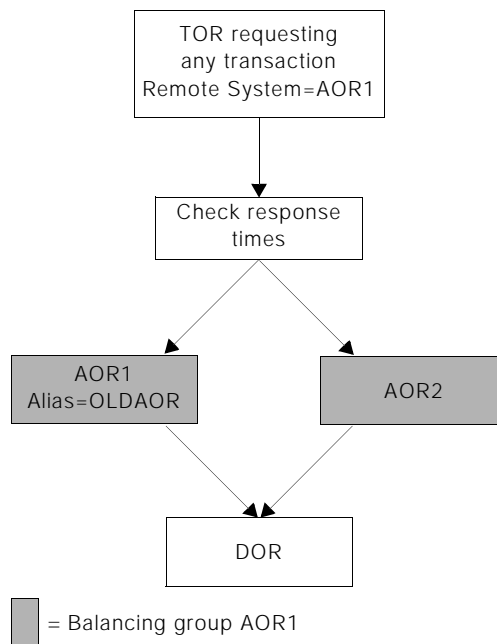
Implementation

The following step numbers correspond to the step numbers for the implementation procedure. The page numbers in parentheses refer to the starting page number for each step.

Detail is given only for those steps whose input is different for each case study. Other steps are only stated briefly.

1. Set up MRO (page 20). Add AOR2 and the new DOR.

2. Install PIE/CICS (page 21).

3. Create the PNAM file and statements (page 22). Our file looks like the following.

```
PNAM ADD GROUP=AOR1,LIST=(OLDAOR,AOR2),BALMETH=RESP
PNAM ADD SYSID=OLDAOR,PHYSYSID=AOR1,OBJRESP=50
PNAM ADD SYSID=AOR2,OBJRESP=50
```

We've used the minimum parameters to define our system. The ADD GROUP statement defines our balancing group. The GROUP LIST parameter lists OLDAOR and AOR2. We have one ADD SYSID statement for each of the AORs. OLDAOR has a PHYSYSID parameter to link its alias to its actual system ID. The OBJRESP values are the same for both AORs—so they will handle equal loads.

4. Modify the ATTACHX table (page 29). Add an entry for each non-conversational transaction.

5. Set up Availability Plus Options in PIE/CICS (page 30).

6. Set up predefined signons (page 32).

7. Check to see if any special implementation procedures are required (page 36).

8. Put it all into play (page 37). We can skip this step, because our transactions are already routed to AOR1, and we have chosen AOR1 as our balancing group name.

9. Check for errors (page 39).

Example 2

This example follows example 1 exactly, except that we only want to balance some of our transactions between AOR1 and AOR2. The rest we want routed to AOR1 only, as they are now.

To best handle this situation, we follow all the steps marked in Example 1. However, we give our balancing group a different name—a name other than AOR1. We call it BAL1.

Currently all our transactions are routed to AOR1. When we have installed and customized Availability Plus, we can

re-route the transactions we want to balance to the BAL1 group.

IMPLEMENTATION

The following step numbers correspond to the step numbers for the implementation procedure. The page numbers in parentheses refer to the starting page number for each step.

Detail is given only for those steps whose input is different for each case study. Other

= Balancing group BAL1
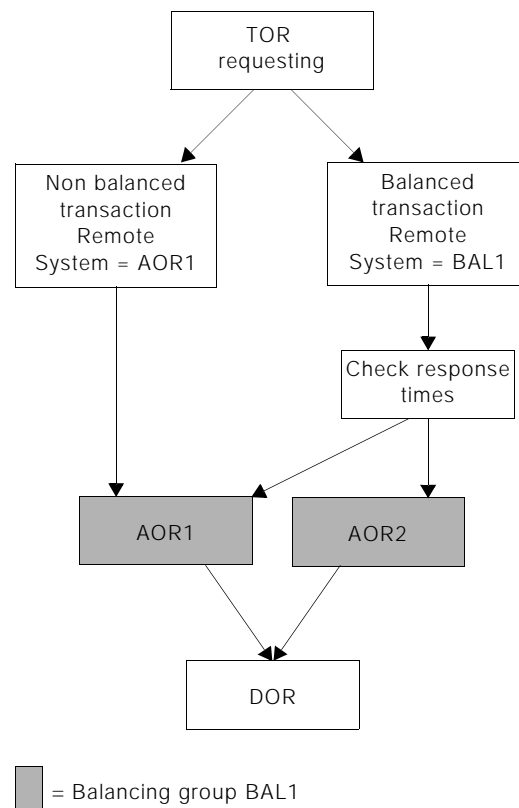
1. Set up MRO. Add AOR2 and the new DOR (page 20).

2. Install PIE/CICS (page 21).

3. Create the PNAM file and statements (page 22). Our file looks like the following.

```
PNAM ADD GROUP=BAL1,LIST=(AOR1,AOR2),BALMETH=RESP
PNAM ADD SYSID=AOR1,OBJRESP=50
PNAM ADD SYSID=AOR2,OBJRESP=50
```

Again, the minimum parameters have been used to define the system. The ADD GROUP statement defines our balancing group, BAL1. The GROUP LIST parameter lists AOR1 and AOR2. We have one ADD SYSID statement for each of the AORs. Since the balancing group name is not the same as any of its AORs and since we only have one balancing group, we don't need any aliases.

4. Modify the ATTACHX table (page 29). Add an entry for each non-conversational transaction.

5. Set up Availability Plus Options in PIE/CICS (page 30).

6. Set up predefined signons (page 32).

7. Check to see if any special implementation procedures are required (f).

8. Put it all into play (page 37). All our transactions are currently routed to AOR1. So for every transaction that we want routed to the BAL1 group, we change the transaction's CEDA remote system parameter to BAL1.

```
OVERTYPE TO MODIFY
 CEDA  ALter
  TRansaction    : ABCD
  Group          : REMOTE1
  PROGram      ==>
  TWasize      ==> 00000              0-32767
  PROFile      ==> DFHCICST
  PArtitionset ==>
  STatus       ==> Enabled           Enabled | Disabled
  PRIMedsize   ==> 00000              0-65520
 REMOTE ATTRIBUTES
  REMOTESystem ==> BAL1
  REMOTEName   ==> ABCD
  TRProf       ==> DFHCICSS
  Localq       ==> No                 No | Yes
 SCHEDULING
  PRIOrity     ==> 001                0-255
  TClass       ==> No                 No | 1-10
 ALIASES
  TAskreq      ==>
  Xtranid      ==>
 RECOVERY
  DTimout      ==> No                 No | 1-7000
  Indoubt      ==> Backout            Backout | Commit | Wait
  REStart      ==> No                 No | Yes
  SPurge       ==> No                 No | Yes
+ TPurge       ==> No                 No | Yes

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

9. Check for errors (page 39).

Example 3

This example is similar to example 1, except you want to save CPU and real memory. So we make one region active and one region passive. We use the saturation balancing method to move users to the passive region when the active region becomes full. We choose the user count balancing method.

We are using PIE/CICS Dynamic Menus.

IMPLEMENTATION

The following step numbers correspond to the step numbers for the implementation procedure. The page numbers in parentheses refer to the starting page number for each step.

Detail is given only for those steps whose input is different for each case study. Other steps are only stated briefly.

```
TOR requesting
any transaction
Remote System=AOR1
```

```
Has AOR1 reached
MAXUSERS?
```

No   Yes

```
AOR1            AOR2
Alias=OLDAOR    (passive)
```

```
DOR
```

▨ = Balancing group AOR1
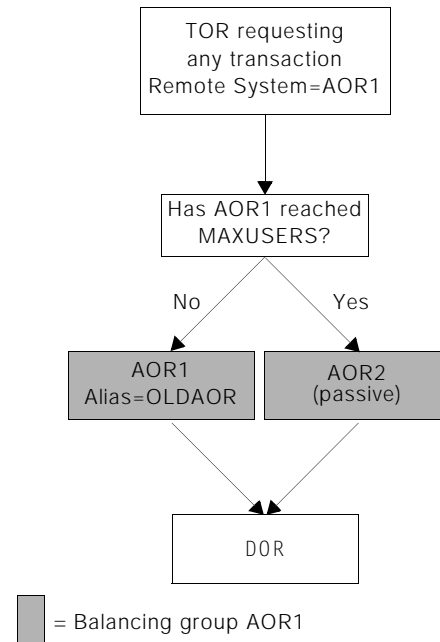
1. Set up MRO (page 20). Add AOR2 and the new DOR.
2. Install PIE/CICS (page 21).
3. Create PNAM file and statements (page 22). Our file looks like the following.

   ```
   PNAM ADD GROUP=AOR1,LIST=(OLDAOR,AOR2),BALMETH=USER
   PNAM ADD SYSID=OLDAOR,PHYSYSID=AOR1,
            MAXUSER=1000,OBJUSER=50
   PNAM ADD SYSID=AOR2,OBJUSER=0
   ```

   Once again, the ADD GROUP statement defines our balancing group. The GROUP LIST parameter lists OLDAOR and AOR2. We have one ADD SYSID statement for each of the AORs. OLDAOR has a PHYSYSID parameter to link its alias to its actual system ID.

   BALMETH=USER and the OBJUSER parameters balance the load by user count. The OBJUSER value for AOR2 is zero—so it is a passive region. OLDAOR (AOR1) will handle all the user traffic, until it reaches the maximum of 1,000 current users. Then AOR2 becomes active.

4. Modify the ATTACHX table (page 29). We skip this step because we have Dynamic Menus, which handles these transactions automatically, and because we aren't routing any transactions to PS/2s.
5. Set up Availability Plus Options in PIE/CICS (page 30).
6. Set up predefined signons (page 32). We skip this step because we are running Dynamic Menus. So we already have PIE/CICS running in our TOR, and we already have a profile.
7. Check to see if any special implementation procedures are required (page 36).
8. Put it all into play (page 37). We can skip this step, because our transactions are already routed to AOR1, and we have chosen AOR1 as our balancing group name.
9. Check for errors (page 39).

Chapter 4 Operating Availability Plus

This chapter describes general maintenance procedures and how to make online changes to the Network Monitor and System Directory. Both of these facilities must be periodically updated after changes have been made to CICS regions that are part of an Availability Plus load balancing group.

General Maintenance

There is little required maintenance after Availability Plus has been installed and implemented. Occasionally, it may be necessary to make changes to the following PIE/CICS facilities that support Availability Plus.

- Terminal Directory
- User Directory
- Profiles
- Logon Director
- Dynamic Transaction Routing exit
- Network Monitor and Systems Directory

For more information about the first four facilities listed above, see "Chapter 3 Installation and Implementation" on page 21" of the *PIE/CICS Customization Guide*. For more information about the Dynamic Transaction Routing exit, see " PCMRPCRU—Dynamic Transaction Routing Exit" on page 133 of the *Customization Guide*. For information about modifying the Network Monitor and Systems Directory, see "Chapter 9 Network Monitor" on page 103 of the *Operation and Administration Guide*, and "PNAM Command", beginning on page 24 of this manual.

Signing on as an Administrator

You must log as an administrator from the TOR to make any changes to Availability Plus. Use one of the following methods to logon as an administrator.

- Specify your userid and password when you log on to the TOR from the VTAM logo. For example:

  ```
  LOGON APPLID=CICS1,DATA=JSMITH/APPLE
  ```

  If you set up your User Directory according to our directions, any user who specifies a userid and password at the VTAM logo is a system administrator. Since the normal procedure is to log on without userid and password, most users will be signed on to Availability Plus as normal users.

- Log on from the terminal ID specified as the system administrator terminal in the Terminal Directory.

Migrating Applications

You can use PNAM commands to move applications from one AOR to another. To do so, perform the following procedure.

1. Identify the balancing group that services the transactions. (See the transactions' remote definitions, the remote system parameter.)

2. Identify the alias (or actual system ID) of the AOR you want to change.

3. Online, use the CHANGE command to add the new AOR to the balancing group's LIST.

4. CLOSE the AOR you are migrating from.

5. Delete the old AOR from the balancing group LIST of the PNAM file to make a permanent change.

Availability Plus List Functions

Two functions of the PIE/CICS List Utility are particularly helpful for Availability Plus. They are the Balancing Group List and the Systems List. The Balancing Group List provides current information about balancing groups and their AORs, listed by balancing group name. The Systems List provides similar information by AOR name.

This section describes how to access both functions, their screen layouts, and their line commands. For more information on the general operation of the List Utility, see "Chapter 5 List Utilities" on page 41 of the *PIE/CICS Operation and Administration Guide.*

List of Balancing Groups

Access the Balancing Group List by any of the following methods:

- Access the PIE/CICS master menu. Select option 2, the System Management Facility menu. Select option 6, Display of Load Balancing Groups.

- From a CICS blank screen, enter: `PEXE LIST BAL` [selection criteria]

- Access the PIEEXEC facility from certain PIE/CICS menus. Enter:
  `LIST BAL` [selection criteria]

  You may add selection criteria to your LIST BAL command, to limit your first display. Otherwise all balancing groups and target regions will be displayed. See " Using the LIST Command" on page 42 of the *PIE/CICS Operation and Administration Guide* for information on specifying selection criteria.

Selecting an AOR

You may select an AOR from either the Balancing Group List or System List to inquire on the AOR's status or to close or open it. To do so, type the letter of the command in the Sel field next to the AOR name. You may select several AORs at once. When you have selected everything you want, press ENTER.

To open a group for transaction routing after it has been closed, type O.

To close a group from transaction routing, type C.

For detail information on a region, type I. The screen layout is shown in " Inquire Screen" on page 48.

Screen Layout

See " Balancing Group List" on page 48 of the *PIE/CICS Operation and Administration Guide*, for details on the screen layout.

☞ You can scroll to the right to see more data. Press PF11.

```
PIE Utility list of BALANCE GROUPS ---------------------------(C) TSC, Inc 1995
Command ===>                     Lines  1 to  4 of  4

Sel. Groupid. LSystem. PSystem. Method Status..... Users.. MaxUsr. ObjUsr. Resp
  *    *    *    *   *    *    *    *    *
__ 170A   CICSTOR1 170A   USER  AVAILABLE    0    0   50
__ 170A   CICSTOR2 170B   USER  AVAILABLE    0    0   50
__ NONSTOP CICT330A CICT330A USER  UNAVAILABLE   0    0   50
__ NONSTOP CICT321A CICT330A USER  UNAVAILABLE   0    0   50
  **END**










F1=Help F3=End F4=RETu F6=REFr F7=Up F8=Down F10=Left F11=Right
```

Inquire Screen

To access the Inquire Screen, enter the I line command next to the system you want more information on. For information on screen fields, see *" Inquire Screen" on page 50* of the *PIE/CICS Operation and Administration Guide.* Press ENTER to exit the screen.

```
SYSTEM:     PHYNAME= 170A       STATUS=AVAILABLE         VTAMRC=000000
AOR1        ACCMETH=            DESC=
            BEHAVIOR=           Type=  SYSID             STUB=
                                                         TIMEOUT=
Load Balancing Data:
            CURUSER=  000000    OBJUSER=  000001    MAXUSER=  000000
            CURLOAD=  000000    OBJLOAD=  000000    CURACTV=  000000
            CURRESP=  000982    OBJRESP=  000001    MAXACTV=  000010
            Tran.Rate=000120    TOT.Trans=000377    TIMLOAD=  000060

 Virtual Terminal Data:
            Pool Name   Logmode Name   Ext Pool Name   Ext Logmode Name
   MOD2
   MOD3
   MOD4
   MOD5
   MOD6
   MOD7
   MOD8
   MOD9

Misc Data: PNAUSERS=            FILLER1=            FILLER2=

 Press enter to continue
```

Systems List

Use the Systems List to look up current AOR information by AOR name. Information provided in the Systems List is similar to that of the Load Balancing List. Access the Systems List by one of the following methods:

- Access the PIE/CICS master menu. Select option 2, the System Management Facility menu. Select option 5, Display of Systems.
- From a CICS blank screen, enter: `PEXE LIST SYSID`[selection criteria]
- Access the PIEEXEC facility from certain PIE/CICS menus. Then enter: `LIST SYSID`[selection criteria]

You may add filters to the LIST SYSID command to select the data shown on the initial screen. Otherwise, data from all regions is displayed. See *" Using the LIST Command" on page 42* of the *PIE/CICS Operation and Administration Guide* for information about setting selection filters.

Selecting an AOR

The line commands of the Balancing Group List and the Systems List are identical. See *" Selecting an AOR" on page 47*, for details.

Screen Layout

See "Applid or Systems List" on page 46 of the *Operation and Administration Guide,* for details on the screen layout.

☞ You can scroll to the right to see more data. Press PF11.

```
PIE Utility list of SYSTEMS ----------------------------------(C) TSC, Inc 1995
Command ===>                    Lines   1 to  7 of  7

Sel. LSystem. PSystem. Type.. Status..... AM. Users.. MaxUsr. ActUsr. MaxAct. T
   *    *    *    *     * *    *    *    *    *
__ (MODEL) (MODEL) APL  AVAILABLE     0    0    0    0
__ CICSTOR1 170A   SYS  AVAILABLE TR   0    0    0    0
__ CICSTOR2 170B   SYS  AVAILABLE TR   0    0    0    0
__ CICT330A CICT330A APL  UNAVAILABLE  0    0    0    0
__ CICT321A CICT330A APL  UNAVAILABLE  0    0    0    0
   **END**

















F1=Help F3=End F4=RETu F6=REFr F7=Up F8=Down F10=Left F11=Right
```

Appendix A Customer Support

This appendix describes how to get help from Customer Service when you experience a problem with a UNICOM Software product. This appendix includes separate sections that describe several diagnostic suggestions to rule out user errors and the information you should have ready before reporting the problem.

Contacting Customer Service

UNICOM Systems, Inc. Software Customer Service can be reached by the following methods:

Voice	818-838-0606
Fax	818-838-0776
E-mail	support@unicomsi.com

A Support and Services web page provides Customer Service information about all of UNICOM Systems, Inc. Software's products. Use the following URL to browse the Support and Services web page:

http://www.unicomsi.com/support/index.html

The Support and Services web page provides an online form to report a problem with a UNICOM Software product. Use the following URL to complete and submit a Technical Support Request form:

http://www.unicomsi.com/support/index.html

Normal business hours are from 6:00 a.m. to 5:00 p.m. Pacific Standard Time, Monday through Friday. Emergency customer service is available 24 hours a day, 7 days a week.

An answering service receives customer service calls beyond normal business hours. You may leave a message if it is not an urgent problem. A customer service representative will return your call at the start of the next business day.

Requests for urgent support outside of normal business hours are answered immediately. A customer service representative will be summoned to return your call. Leave a phone number where you can be reached. If you have not received a return call from a Customer Service representative within an hour of reporting the problem, please call back. Our customer service representative may be experiencing difficulties returning your call.

International customers should contact their local distributor to report any problems with a UNICOM Software product.

Troubleshooting Suggestions

This section describes several troubleshooting suggestions to diagnose common errors that can cause PIE/CICS problems. Before calling Customer Service, follow these suggestions to rule out the possibility these errors are causing your PIE/CICS problem:

- Run the Installation Verification Program with the **P#IV** transaction. Browse the PIECIVP temporary storage queue to see if it contains error messages that suggest problems with the allocation of CICS programs, transactions, maps, or files.

- Verify any recent changes to your site's operating system, CICS, or other products are fully compatible with PIE/CICS.

- Verify all load modules are at the same release level if a new release of PIE/CICS was installed over a previous release.

- Check that all modules were reassembled after upgrading PIE/CICS or applying maintenance to CICS.

- Verify all PIE/CICS system tables were reassembled after applying maintenance to CICS or upgrading to another release.

- Verify all users have current PIE/CICS passwords and entered them correctly.

- Examine your CICS logs, MVS console, and PIE/CICS logs for error messages from not only PIE/CICS, but any other product that runs concurrently with PIE/CICS.

Describing the Problem

Gather the following information about your system environment before reporting a problem to UNICOM Software Customer Service:

Operating system release and PUT Level _____

VTAM system release and PUT Level _____

PIE/CICS release_____

Date of PIE/CICS distribution tape _____

Gather the following information about your CICS system before reporting a problem to UNICOM Software Customer Service:

CICS release and PUT Level _____

CICS configuration MRO/ISC etc._____

Real or virtual terminal   _____

Before calling UNICOM Systems, Inc. Software Customer Service, get answers to the following questions:

What PIE/CICS products were active when the problem occurred?

> Availability Plus
> Dynamic Menus
> MultiCICS
> NetGate
> NetMizer
> NonStop CICS

Is the problem occurring in the TOR or AOR? _____

Is the problem occurring in a production or test region? _____

What is the severity of the problem? _____

What are the major symptoms of the problem? _____

 _____

Is the problem re-creatable under specific conditions?_____

Has the problem occurred more than once? _____

Were changes made to CICS or PIE/CICS immediately prior to the occurrence of the problem? _____

What other software products were running when the problem occurred? _____

 _____

Is a diagnostic message produced when the problem occurs? If so, what is the ID and text of the messages? _____

Does an abend occur? If so, what are the abend and return codes? _____

Is a dump produced when the problem occurs? If so, what kind of dump is it? __

 _____

Please try to be as accurate and complete as possible in answering these questions. Your problem can be resolved more quickly if a customer service representative has all of the pertinent information needed to find a solution.

Appendix B Using The PBAL Transaction

This release of Availability Plus automatically calculates the duration of non-conversational transactions (see "Step 4: Modify the ATTACHX Table," on page 32, for details). However, some current Availability Plus users may prefer to calculate the transaction load of non-conversational tasks with the traditional method using the PBAL transaction.

If the PBAL transaction is used to calculate the load balance across regions, users must press the CLEAR key after they exit from every transaction. Pressing CLEAR to exit the transaction is not sufficient. They must press CLEAR **after** they exit from the transaction.

Perform the following procedure to install the PBAL transaction:

1. Add the following statement to the PNAM file:

   `PNAM SET CONVEND=NOREBAL`

2. Set the System End key to CLEAR on the Profile Terminal Characteristics screen of the PIE Profile facility.

   `SYSTEM END Key     ===> CLEAR (PF01-PF24, PA01-PA03, CLEAR)`

3. Place the PBAL transaction immediately following your good morning transaction in the `Execute` field of session 1 on the Profile Sessions Configuration screen of the PIE Profile facility.

   `1 Name ===> APPLMENU - Applications Menu        &ZLname  -`
   `Execute ===> CMD gmm;CMD PBAL`

4. Make session 1 the first open session by completing the `Initial PIE command` field of the PIE Profile screen.

   `Default Application ===> menu piemmain`
   `Initial PIE command ===> OPEN 1`
   `Final PIE command   ===>`

   You may have some transactions that you want rebalanced automatically without requiring the user to press the CLEAR key. An entry must be added to the ATTACHX table for each of these transactions. The ATTACHX table is described in the *PIE/CICS Customization Reference*, " ATTACHX: Substitute Transaction IDs" on page 182.

5. Add an entry to the existing ATTACHX table for each transaction that you want to rebalance automatically.

   `PG@RMATT TRANID=tran,INT=NO,SUB=NO,AEREBAL=YES`

   `If you do not have an ATTACHX table, you must create one using the sample found in member ATTACHX of the MACLIB dataset.`

6. Reassemble the ATTACHX table using the sample job found in member PG@RPCSC of the CNTL dataset.

7. Cycle CICS to implement your changes.

Glossary

This glossary defines CICS and PIE/CICS terms used in this manual.

Active transaction   A processing transaction. That is, a user has hit ENTER, CLEAR, or a PF key and the transaction is still processing the request.

Alias   The Availability Plus name for an AOR. Sometimes this name is the same as the AOR's actual system ID.

Alternate parameterd   Parameters that are mutually exclusive. You may code only one of the parameters in a single command.

Available   An AOR status indicating the region is available for transaction routing.

Balancing group   See load balancing group.

Balancing method   See load balancing method.

Character   Any alpha-numeric character: A-Z, 0-9.

Closed   An AOR status indicating that the region has been taken out of the routing system by the user.

CPU use   A balancing method based on the portion of CPU use by the AORs in the load balancing group.

Enter   Type the boldfaced characters and press ENTER.

Group   See load balancing group.

Load balancing group   Multiple AORs that can serve the same transaction. Load balancing groups are defined by PNAM ADD GROUP commands.

Load balancing method   The type of measurement Availability Plus uses to balance loads between AORs in a balancing group.

Method   See load balancing method.

Network Monitor   A PIE/CICS component that reads and services the System Directory.

Region   An AOR, TOR, or DOR. Usually it indicates an AOR.

Response time   A balancing method based on AOR response time.

System Directory   The list of balancing groups and AORs defined in your Availability Plus system.

System ID   The actual name of an AOR defined to MRO.

Type   Type the boldfaced characters without pressing ENTER.

Unavailable   An AOR status indicating that a region is unavailable because of CICS malfunctioning.

User count   A balancing method based on the number of users routed to the AORs in a balancing group.

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