Oracle® Tuxedo® Mainframe Adapter for TCP

IMS User Guide

12*c* Release 2 (12.2.2)

August 2016

ORACLE®

Contents

Configuring Oracle Tuxedo Mainframe Adapter for TCP Security

Configuring Oracle TMA TCP for IMS

Monitoring Oracle TMA TCP for IMS

Programming Oracle TMA TCP for IMS

System Services Descriptions

Error and Informational Messages

Example Configuration Files

Sample JCL and User Exits

Sample IMS Client and Server Transactions

Error and Reason Codes

Glossary

Introducing Oracle Tuxedo Mainframe Adapter for TCP (IMS)

Oracle Tuxedo Mainframe Adapter products offer a set of communication gateways between Oracle Tuxedo systems and other online transaction processing environments, including IBM's CICS and IMS. They allow applications to scale in size by providing interoperability between systems. The Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) product is a gateway connectivity feature that provides transparent communications between client and server transactions in an IMS system and a Oracle Tuxedo domain, a CICS system, or another IMS system. (A Oracle Tuxedo domain is a single computer [or network of computers] that shares a single Oracle Tuxedo configuration.)

The following information introduces the TMA TCP for IMS product:

- What You Need to Know

- Features/Benefits

- Oracle TMA TCP for IMS Architecture

- Oracle Tuxedo Mainframe Adapter for TCP Functionality

- Required System Components

What You Need to Know

This document is intended for system administrators who configure and administer the Tuxedo Mainframe Adapter for TCP system. In addition, programmers can find useful information for developing client programs and service routines that exchange data with the remote Tuxedo Mainframe Adapter for TCP gateways.

Programmers who work with Tuxedo Mainframe Adapter for TCP (IMS) should be familiar with the IMS applications development.

System administrators who work with Tuxedo Mainframe Adapter for TCP (IMS) should be familiar with the following concepts, tools, and procedures:

- IBM IMS Sockets

- Defining new resources to IMS

- IMS supplied procedure

Features/Benefits

The features and benefits provided by Oracle Tuxedo Mainframe Adapter for TCP (IMS) are:

- Ensured online integration of business operations through transparent client/server communications among heterogeneous systems

- Truly open distributed applications

- High throughput through TCP/IP for online request/response messaging

- Ease of integration; modular architecture for flexible on-schedule migration

- High performance open solution

Oracle TMA TCP for IMS Architecture

IMS Open Transaction Manager Access (OTMA) is a transaction-based, connectionless client/server protocol. By using OTMA, each client (z/OS application) can submit transactions to IMS or issue IMS commands and receive output from IMS application programs and from IMS itself.

An OTMA client is a z/OS application program that sends transactions to an IMS server and receives output. The application program must be a member of an XCF group and uses the OTMA protocol.

The TMA TCP for IMS product executes as an OTMA client running under z/OS. It uses the z/OS TCP/IP Sockets API to communicate with a TMA TCP Gateway on a remote Oracle Tuxedo system, and the IMS message queue (directly or indirectly through OTMA) to communicate with IMS transactions. This product supports connectivity with remote TMA TCP Gateways, TMA

TCP for CICS gateways, or other TMA TCP for IMS gateways. Figure 1-1 illustrates connection with a remote TMA TCP Gateway.

Figure 1-1 The Oracle TMA TCP for IMS Interoperability Solution
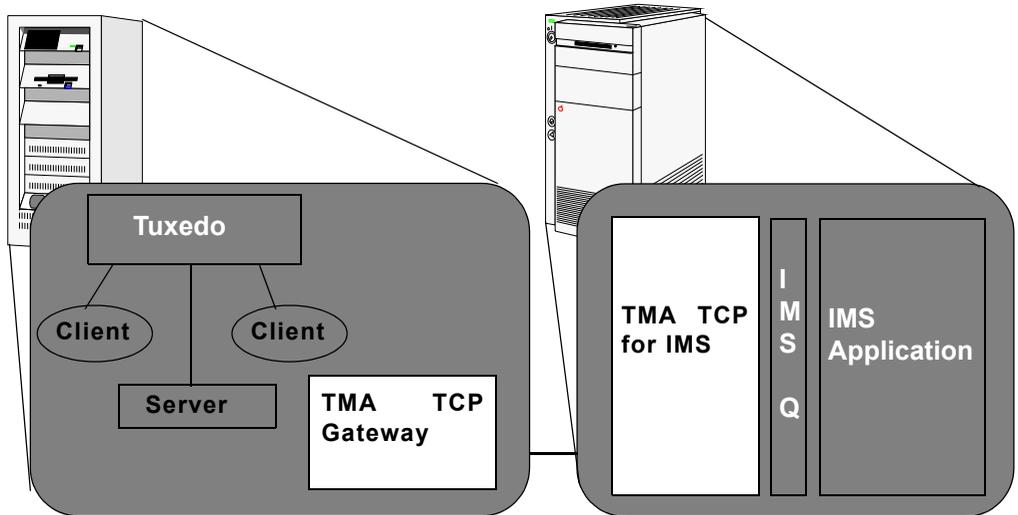
The configuration definition of the TMA TCP Gateway in the remote Oracle Tuxedo system maps Oracle Tuxedo local services to remote services provided by the IMS gateway. Each remote service corresponds to an IMS server transaction. Service requests issued by clients in the Oracle Tuxedo system are routed through the TMA TCP Gateway to the TMA TCP for IMS gateway for processing by the appropriate IMS server transaction.

Similarly, the configuration definition in the TMA TCP for IMS gateway maps local service names to remote services provided by the Oracle Tuxedo system. Service requests issued by IMS client transactions are routed to the TMA TCP Gateway for processing by the appropriate Oracle Tuxedo service.

In both cases, access to a remote service is transparent to the client requesting the service.

Oracle Tuxedo Mainframe Adapter for TCP Functionality

The following functionality is available in the TMA TCP product.

Domains-based Gateway Connectivity

The TMA TCP product has a domains-based architecture supporting bidirectional communications, request/response support, and support for an IMS OTMA interface.

Security

The TMA TCP product grants access to Tuxedo services based on a user name that the remote gateway supplies.

The TMA TCP for IMS product has an OTMA interface that supports enhanced security. This interface allows a requester from Tuxedo to pass a user ID through the OTMA server interface for authorization through a third party security package.

For more information about configuring security, refer to the "Monitoring Oracle TMA TCP for IMS" section.

Domain Name Server Support

The TMA TCP product supports domain name server (DNS) resolution of IP addresses. This support allows you to change the IP address at the domain name server to implement address changes without reconfiguring the TMA TCP gateway.

Dynamic Configuration

The TMA TCP product supports dynamic configuration updates of the TMA TCP configuration parameters. You can modify the configuration without shutting down and restarting the TMA TCP product.

Required System Components

The TMA TCP for IMS product requires the following components for transaction processing.

Oracle TMA Gateway Program

The TMA TCP for IMS product executes as an OTMA client running under z/OS. It uses the z/OS TCP/IP sockets API to communicate with remote Oracle Tuxedo Mainframe Adapter gateways and the IMS message queue (directly or indirectly through OTMA in the case of the OTMA client) to communicate with IMS application transactions.

IBM LE/370

IBM LE/370 provides a common runtime environment for a number of IBM high-level languages, including C/C++. The TMA TCP for IMS gateway is written in the C programming language and requires the LE/370 runtime environment.

IBM TCP/IP for z/OS

IBM TCP/IP for z/OS provides TCP/IP communications support for programs executing in an z/OS environment by means of a standard, UNIX-style socket API. The TMA TCP for IMS product uses TCP/IP to communicate with remote Oracle TMA gateways.

Note: This guide assumes you are using the IBM TCP/IP for z/OS product. If you are using another supported TCP/IP product, such as Interlink TCPaccess, consult the product documentation for equivalent components.

IMS Server Transactions

IMS server transactions are user-written programs that process service requests issued by a remote system. Server transactions are ordinary IMS transactions and can be written in any language supported by IMS. For supported languages, refer to the IBM IMS manuals.

IMS Client Transactions

IMS client transactions are user-written programs that issue requests for services offered by a remote system. Client transactions are ordinary IMS message processing program (MPP) transactions and can be written in any language supported by IMS.

Understanding How Oracle TMA TCP for IMS Works

The following information helps you understand how Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) works:

- Inbound Processing

- Outbound Processing

- How Oracle TMA TCP for IMS Is Initialized

- Processing IMS Server Requests

- Processing IMS Client Requests

- How Oracle TMA TCP for IMS Shuts Down

As shown in Figure 2-1, the TMA TCP for IMS gateway serves as the interface between IMS and remote Oracle Tuxedo Mainframe Adapter gateways via TCP/IP.

Figure 2-1 IMS Processing
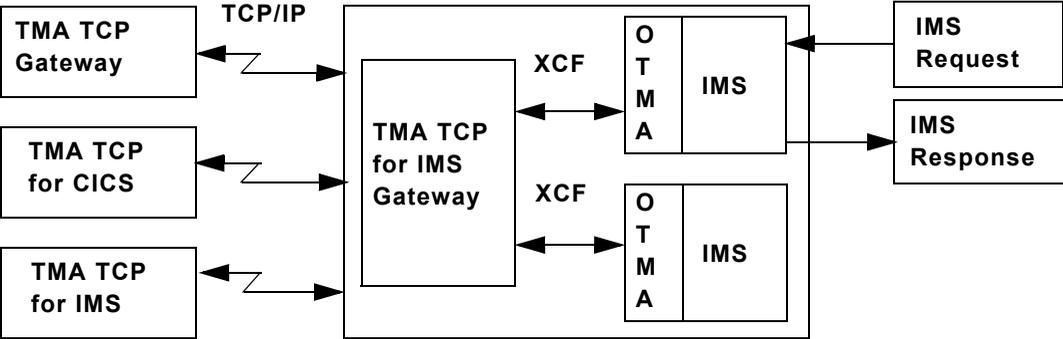
Inbound Processing

The gateway "listens" for incoming TCP/IP connection requests from remote gateways. When a request is received, an *inbound session* is established over which the remote gateway can present requests for service.

As shown in Figure 2-2, when a request is received from a remote system, it is relayed to IMS which schedules the appropriate server transaction to process the request. If a response is required, the server transaction places the response in the IMS message queue. If the TMA TCP gateway is running as an OTMA client, the response is queued to the transaction pipe and delivered to the client through the cross-system coupling facility (XCF). The response is returned to the remote system over the TCP/IP connection.

Figure 2-2 IMS Inbound Processing
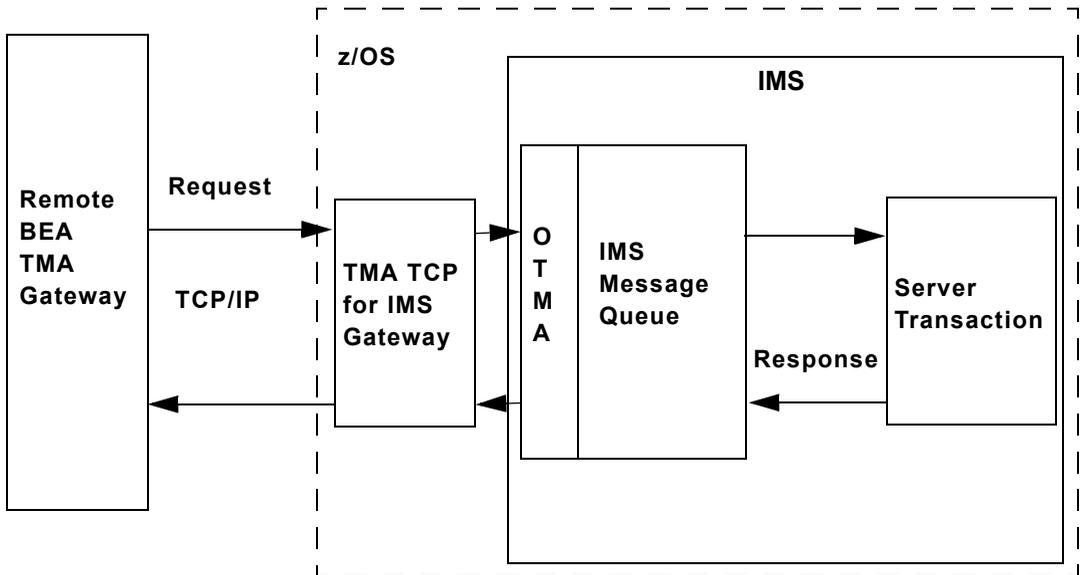
Outbound Processing

The TMA TCP for IMS product can also initiate TCP/IP connections with remote systems. These *outbound sessions* are used to send IMS client requests to remote systems for processing.

As shown in Figure 2-3, an IMS client transaction initiates a request by placing a properly formatted message into the IMS message queue. When running the gateway, two IMS user exits must be installed to route messages to the OTMA client. (For more information about request/response processing, refer to the "Programming Oracle TMA TCP for IMS" section, and for sample user exits, refer to the "Sample JCL and User Exits" section.) The gateway retrieves the request and forwards it to the appropriate remote system for processing. When the response (if required) is received from the remote system, it is returned to IMS for delivery to a transaction that processes the response.

Figure 2-3 IMS Outbound Processing
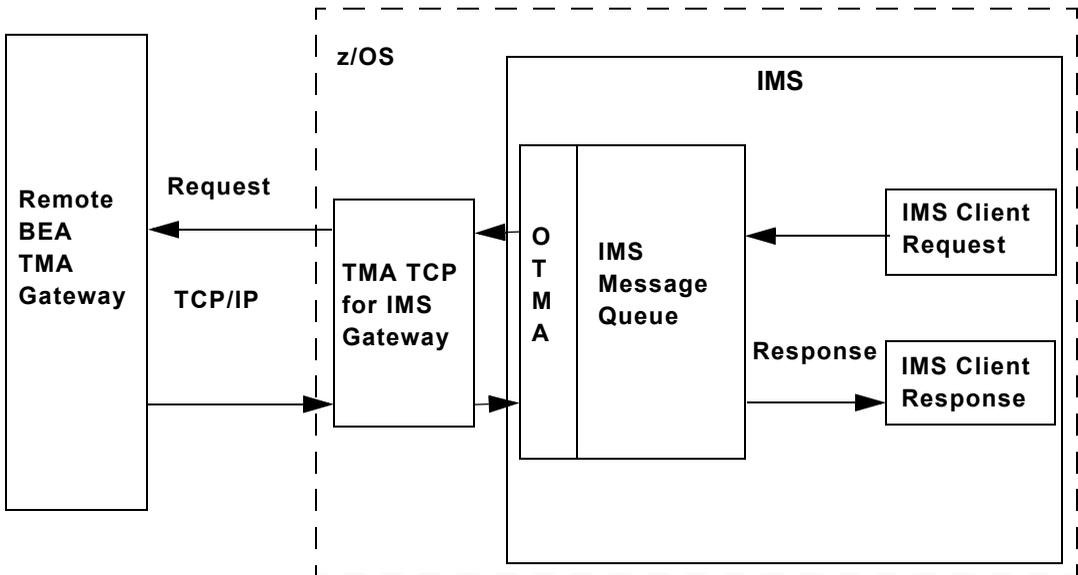
How Oracle TMA TCP for IMS Is Initialized

The TMA TCP for IMS gateway is started by submitting the appropriate JCL (or as a started task) for an OTMA client. The following activities then occur.

1. The gateway (load module name, `BEATCPI`) opens a message log (normally allocated to a disk dataset) into which all messages issued during the course of execution are written.

2. If the message log cannot be opened, the gateway immediately terminates; any messages are written to a `SYSOUT` dataset by default.

3. The gateway obtains configuration information from a sequential dataset containing text statements. These statements define the operating environment for TMA TCP for IMS, including the definitions of local and remote gateways. If any configuration errors are detected during initialization, the gateway immediately terminates.

Processing IMS Server Requests

An IMS server request, also referred to as an *inbound request* (relative to IMS), is a request issued by a remote client for a service provided by an IMS server transaction.

1. When TMA TCP for IMS receives a request from a remote system, a *request message* is formatted and is inserted into the IMS message queue, destined for the specified IMS server transaction (the *service name* for the request corresponds to the *transaction code* of the IMS server transaction that handles the request).

2. IMS schedules the specified server transaction to process the request message.

3. The server transaction retrieves the request message from the IMS message queue and performs the indicated processing.

4. If a response is required, the server transaction formats a *response message* and inserts it into the IMS message queue, destined for the TMA TCP for IMS gateway.

5. The TMA TCP for IMS gateway retrieves the response message from IMS and returns it to the requesting remote system via the TCP/IP connection.

Processing IMS Client Requests

An IMS client request, also referred to as an *outbound request* (relative to IMS), is a request issued by an IMS application message processing program (MPP) for a service provided by a remote system.

Two Phases of an IMS Client Request

Because of the design philosophy of IMS, processing of an IMS client request occurs in two distinct "phases."

1. A *request phase* wherein the request is issued during the execution of one transaction (T1).

2. A corresponding *response phase* wherein the response is processed during the execution of a second transaction (T2).

Transactions T1 and T2 may in fact be the same transaction ID (with appropriate logic to perform the required request or response processing, based on execution context). T1 and T2 must be two distinct transaction executions. This distinction is necessary because T1 can only initiate a request; it cannot "wait" on the response to that request because the architecture and design philosophy of IMS does not permit this.

How Oracle TMA TCP for IMS Processes an IMS Client Request

1. An IMS transaction issues a client request by inserting a properly formatted message into the IMS message queue specifying the TMA TCP for IMS OTMA client (through the use of the appropriate IMS user exit) as the destination.

   Note: For information about the IMS user exits, refer to the "Sample JCL and User Exits" section.

2. Once the request has been inserted into the Message Queue, the requester is effectively "decoupled" from the request; that is, processing of the request by TMA TCP for IMS proceeds asynchronously with respect to execution of the requesting transaction. The request includes the name (transaction code) of a *response transaction* that is scheduled by TMA TCP for IMS to process the response to the request.

3. The TMA TCP for IMS gateway retrieves the request from IMS and validates it for proper format. If any errors are detected, the specified response transaction is immediately scheduled with appropriate return codes.

4. The requested service name is located in the directory of services offered by remote systems to which TMA TCP for IMS has access. If the requested service cannot be found, or the required remote gateway is currently inaccessible, an error is recognized and the response transaction is immediately scheduled with appropriate return codes.

5. If a remote service provider is successfully identified for the request, an outbound session is established with the remote system (if one is not available) and the request is sent to the remote system for processing.

6. If a response *is* required, TMA TCP for IMS schedules the response transaction (with any response data) when the response is received.

7. Eventually, if no response is received from the remote system, the request *times out*, an error is recognized, and the response transaction is scheduled with appropriate return codes.

How Oracle TMA TCP for IMS Shuts Down

Once started, TMA TCP for IMS normally executes as a non-ending job, servicing inbound requests from remote systems and outbound requests originated by IMS client transactions.

Normal termination is initiated when a system operator issues the SHUTDOWN command. In response to a SHUTDOWN command, TMA TCP for IMS performs the following tasks.

1. Stops accepting new inbound TCP/IP connection requests.

2. Terminates active inbound sessions.

3. Terminates active outbound sessions.

4. Returns control to z/OS.

Note: Pending or in progress transactions are not allowed to complete prior to the system shutting down.

Configuring Oracle Tuxedo Mainframe Adapter for TCP Security

The TMA TCP product supports a security feature that allows a requester from Oracle Tuxedo services to pass a user ID requirement through the OTMA or CICS server interfaces for verification through a third-party security package.

Note: The security feature on Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) runs as an OTMA client only.

Security Checking from Tuxedo to Mainframe

Figure 3-1 depicts the process flow for security verifications from TMA TCP Gateway on UNIX to a mainframe.

Figure 3-1 Security Checking for UNIX to Mainframe Transactions
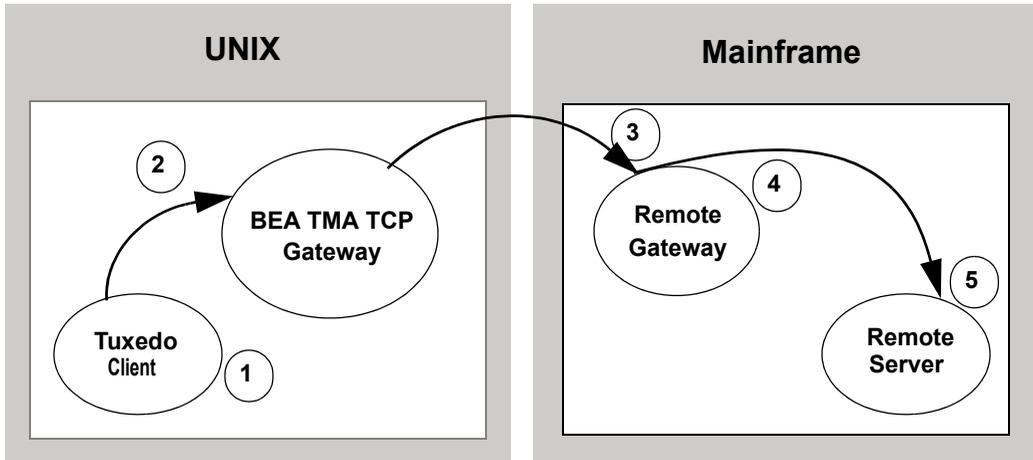
1. Verify the user is valid on UNIX. For valid users, access is given; for invalid users, access is rejected.

2. Verify user name (reviewing the `tpusr` file), group (reviewing the `tpgrp` file), and ACL (reviewing the `tpacl` file). If all three pass, the transaction request processes. If any one of the three are rejected, the transaction request stops and a security violation occurs.

   Note: The user IDs in these files must match in the Tuxedo and the mainframe environments or a security violation occurs.

3. Accept the transaction request at the mainframe gateway based on the request coming from a *trusted source*. No password is passed.

4. Verify the user name associated with the transaction against the security system (such as RACF). If the user name is not valid, the request is rejected and a security violation occurs.

5. Complete the transaction request to the server.

Security Checking from Mainframe to UNIX

Figure 3-2 depicts the process flow for security verifications from a mainframe to TMA TCP Gateway on UNIX.

Figure 3-2 Security Checking for Mainframe to UNIX Transactions
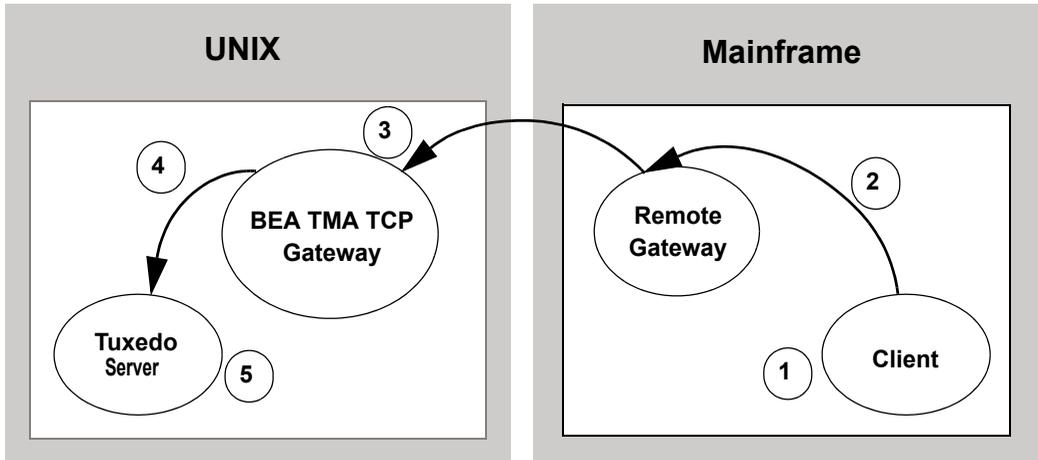
1. Authorization checking is done by the mainframe security package prior to initiating the client.

2. Pass the transaction request from the client to the mainframe gateway.

3. Accept the transaction request at the UNIX gateway based on the request coming from a *trusted source*. No password is passed.

4. Decode the appkey to obtain the user and group numbers. Verify the user name against the security system. If the user name is valid and the user has the authority to run the transaction, the transaction request is accepted. If the user name is not valid, the request is rejected and a security violation occurs.

5. Complete the transaction request to the server if the user name is accepted.

Setting Up Security for TMA TCP for IMS

The TMA TCP for IMS product has an OTMA interface that supports enhanced security. This interface allows a requester from Oracle Tuxedo services to pass a user ID through the OTMA server interface for authorization through your security package.

Securing Connections from IMS to IMS

Complete the following tasks to enable the connection security feature.

1. Specify the ACCOUNT and PASSWORD parameters in the GATEWAY configuration statement for local or remote gateways.

2. Verify that the parameter values for ACCOUNT and PASSWORD in the GATEWAY statement for the GATEWAY TYPE=LOCAL match the ACCOUNT and PASSWORD values in the GATEWAY TYPE=REMOTE statement.

Note: The security for connection validation is obsolete.

Securing Connections from IMS to CICS

Complete the following tasks to enable the connection security feature.

1. Specify the ACCOUNT and PASSWORD parameters in the GATEWAY TYPE=LOCAL configuration statement.

2. Verify that the parameter values for ACCOUNT and PASSWORD in the GATEWAY TYPE=LOCAL statement match the ACCOUNT and PASSWORD values in the User Account Connection screen.

Note: The security for connection validation is obsolete.

Securing Services

Complete the following tasks to enable the service security feature.

1. Set up transaction security through the mainframe with the security administrator.

2. Specify OTMASECURITY=Y in the SYSTEM statement of your TMA TCP for IMS configuration file.

3. Set the security flag for each local service using the SECURITY parameter in SERVICE TYPE=LOCAL statement. For parameter information, refer to the "Defining Local Services" section.

4. Issue the /SEC OTMA PROFILE command in IMS to enable security checking on a service by service basis for the OTMA interface. Issue the /SEC OTMA FULL command in IMS to enable security checking on all services.

   WARNING: If SECURITY=N in the SERVICE TYPE=LOCAL statement for any local service definition, issue /SEC OTMA PROFILE. A security failure results if you specify SECURITY=N and issue /SEC OTMA FULL command.

Configuring Oracle TMA TCP for IMS

Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) makes use of a *configuration file* that is read and processed at runtime to establish the processing environment. The configuration file is a simple, plain-text file that a systems programmer can edit easily to define and alter the configuration.

The configuration is defined in terms of the local (IMS) gateways, one or more remote gateways (for example, CICS), and one or more remote services offered by various remote gateways to which TMA TCP for IMS can have access. When using the OTMA client, you must configure local services as well.

To change the configuration file without shutting down the TMA TCP for IMS system, refer to "Dynamically Configuring TMA TCP for IMS" section.

The configuration file includes the following information:

- A SYSTEM statement that defines the system configuration parameters (refer to the "System Configuration Parameters" section)

- Statements that define one or more IMS host systems (OTMA only) with which TMA TCP for IMS establishes communications (refer to the "Defining the Local Host" section)

- Statements that define one or more local gateways (refer to the "Defining the Local Gateway" section)

- Statements that define one or more remote gateways with which TMA TCP for IMS can establish connections and exchange requests and responses (refer to the "Defining Remote Gateways" section)

- Statements that define one or more services offered by remote gateways that can be requested by IMS clients of TMA TCP for IMS (refer to the "Defining Remote Services" section)

- Statements that define one or more services offered by local IMS Hosts (OTMA only) that can be requested by remote clients of TMA TCP for IMS (refer to the "Defining Local Services" section)

- Security information when running as an OTMA client (refer to the "Dynamically Configuring TMA TCP for IMS" section)

System Configuration Parameters

System configuration parameters are defined by the SYSTEM statement. Only one SYSTEM statement is allowed, and it should be the first statement in the configuration file. See Listing 2-1 for parameter syntax.

Syntax of the SYSTEM Statement

The following listing contains the parameter syntax for the SYSTEM statement.

Listing 2-1   SYSTEM Statement Syntax

```
SYSTEM,
        SLEEPTIME=(sleep-min,sleep-max,sleep-delta),
        OTMACLIENT=TMA-clientname],
        OTMAGROUP=XCF-groupname]
        [,OTMASECURITY={Yes|No}]
        [,MSGLEVEL={msg-level|4}]
        [,CLIENTSHUTDOWN={Yes|No}]
        [,IDLETIMEOUT={nn|0}]
        [,DRUEXIT=exit-name|DFSYDRU0]
        [,SPARESOCKETS=nn|0]
```

Description of SYSTEM Parameters

The SYSTEM statement uses the following parameters.

Parameter	Value	Description
SLEEPTIME	sleep-min	Specifies the minimum amount of time (decimal, milliseconds) that TMA TCP for IMS delays before checking for work. Default value: 150
	sleep-max	Specifies the maximum amount of time (decimal, milliseconds) that TMA TCP for IMS delays before checking for work. Default value: 500

Parameter	Value	Description
	sleep-delta	Specifies the incremental amount of time (decimal, milliseconds) that TMA TCP for IMS uses to graduate from the minimum sleep time to the maximum sleep time.
		TMA TCP for IMS periodically "polls" for new work. The TMA TCP for IMS product uses a graduated polling interval that is set to the minimum sleep time whenever new work is found. The polling interval is then incrementally increased by the delta time until one of the following occurs:
		• New work is found (in which case the polling interval is again reset to the minimum value)
		• The maximum sleep time is reached (in which case the polling interval remains at the maximum value)
		This value limits the amount of CPU time required to poll for work when traffic is heavier.
		Avoid specifying values that cause the polling interval to be very small (or zero), or values smaller than 100 milliseconds. These values may result in polling too frequently. However, also avoid specifying values that cause the polling interval to be too large (greater than one second). These values may cause TMA TCP for IMS to be unresponsive. Varying the sleep time between 100 and 500 milliseconds in 5 millisecond increments is recommended.
		Default value: 5
OTMACLIENT	clientname	Specifies the XCF client name for TMA TCP OTMA. This parameter is 1-16 characters and referenced by DRU EXIT.

Parameter	Value	Description
OTMAGROUP	groupname	Specifies the XCF group name for IMS and TMA TCP. This parameter is 1-8 characters and the same as GRNAME parameter in the IMS system.
OTMASECURITY	Yes|No	Specifies whether to enable or disable security for user authorization. Specify Yes to enable security or No to disable security. Default value: No
MSGLEVEL	msg-level | 4	Specifies the message detail level to be logged by TMA TCP for IMS. 0 - No messages are logged 2 - Error Messages only 3 - Informational Messages and Error Messages 4 - Security Audit Messages The message level is cumulative. For example, if a message level of 4 is specified, all messages with a message level of 4 or less is logged (such as, security audit, informational, and error messages) and is also displayed on the z/OS console. Normally, a message level of 4 should be specified, which results in TMA TCP for IMS logging all security, informational and error messages. Default value: 5
CLIENTSHUTDOWN	Yes|No	Specifies whether a SHUTDOWN request can be made by a remote client request or as a response to a remote client request. For additional information for shutting down the system, refer to the "Monitoring Oracle TMA TCP for IMS" section. Default value: No

Parameter	Value	Description
IDLETIMEOUT	nn | 0	Specifies the number of seconds that lapses before the local gateway terminates a session. Default value: 0
DRUEXIT	exit-name	Specifies the name of the destination resolution User Exit routine in IMS that this client should use. The default is DFSYDRU0. For a sample of the DFSYDRU0 user exit, refer to the "Sample JCL and User Exits" section.
SPARESOCKETS	nn	Specifies the number of spare socket descriptors reserved for dynamic configuration changes, for example, adding a gateway, increasing the maximum number of sessions for a gateway. Default value: 0.

Defining the Local Host

IMS host systems that service IMS requests are defined with the HOST TYPE=IMS statement. This statement is only used when running TMA TCP for IMS as an OTMA client.

Syntax of the HOST Statement

The following listing contains the parameter syntax for the HOST statement.

Listing 2-2   HOST Statement Syntax

```
HOST,TYPE=IMS,
      IMSID=IMS-system-logical-identifier,
      OTMANAME=IMS-clientname,
      OTMAINPIPE=server-request-name,
      OTMAOUTPIPE=client-request-name]
```

```
[,NUMTPIPES=(nnnn|1)]
MAXRSPLEN=nnnn
```

Description of HOST Parameters

The HOST statement uses the following parameters.

Parameter	Value	Description
IMSID	IMS-system-logical-id entifier	Specifies a symbolic name that uniquely identifies the IMS system definition. This parameter is not related to the IMSID parameter specified in the IMS sysgen or on IMS region JCL statements.
OTMANAME	IMS-clientname	Specifies the XCF client name for the IMS system. This parameter is 1-16 characters and the same as OTMANM parameter in the IMS system. When OTMANM is not specified, it is the same as IMS APPLID.
OTMAINPIPE	server-request-name	Specifies the transaction pipe name for the IMS server requests. This parameter is 1-4 characters.
OTMAOUTPIPE	client-request-name	Specifies the transaction pipe name for the IMS client requests. This parameter is 1-8 characters and referenced by DRU EXIT.

Parameter	Value	Description
NUMTPIPES	nnnn|1	Specifies the number of transaction pipes for IMS server requests. The value can range from 1-9,999. Default value: 1
MAXRSPLEN	nnnn	Specifies the maximum permissible length for IMS server response. The value can range from 1024-8,192,000.

Defining the Local Gateway

The local (IMS) gateway defines the access points that remote gateways can use to connect to the IMS gateway.

The local gateway can be defined as having a single physical IP address and port number, or multiple physical IP addresses and/or port numbers. Furthermore, each physical port can be defined as accepting one or more concurrent *inbound* TCP/IP connections from remote gateways.

One or more GATEWAY TYPE=LOCAL statements must exist in the configuration file to define the local gateways. Each GATEWAY TYPE=LOCAL statement defines a specific IP address and port number through which TMA TCP for IMS accepts inbound connection requests from remote gateways. Inbound connections are used by a remote gateway to send client requests to the IMS gateway for processing by IMS server transactions. Each local gateway (as defined by a GATEWAY TYPE=LOCAL statement) must have a unique logical machine ID (a symbolic name used to identify a gateway).

Remote systems attempting to establish an inbound session with the local gateway can optionally be required to supply a valid account ID and/or password.

For sample configurations, refer to the "Example Configuration Files" section.

Syntax of the GATEWAY TYPE=LOCAL Statement

Listing 2-3 contains the parameter syntax for the local gateway.

Listing 2-3   Local Gateway Syntax

```
GATEWAY,TYPE=LOCAL,
        LMID=logical-machine-id,
        PORT=port-number,
        ACCOUNT={account-id|*},
        PASSWORD={password|*}
        [,HOSTADDR=(ip-address|hostname)]
        [,MAXMSGLEN={max-message-length|2048}]
        [,SESSIONS={(startup-sessions,max-sessions)|1}]
        [,IDLETIMEOUT={nn|0}]
        [,MULTIPLEX={nn|1}]
```

Description of GATEWAY TYPE=LOCAL Parameters

The GATEWAY TYPE=LOCAL statement uses the following parameters.

Parameter	Value	Description
LMID	logical-machine-id	Specifies a symbolic name (1-16 characters) that uniquely identifies this gateway/port.
		Note: Special characters are *not* supported.
PORT	port-number	Specifies the port number (decimal, 1-32,767) at which inbound connections from remote gateways are accepted. Choose a port number that is not in the range of well-known port numbers reserved for use by TCP/IP applications.

Parameter	Value	Description
ACCOUNT	`account-id|*`	Specifies the account ID (1-8 characters) that must be specified by a remote gateway to establish a connection. If an account ID is not used, `ACCOUNT=*` should be specified. The account ID for connection validation is obsolete.
PASSWORD	`password|*`	Specifies the password (1-8 characters) that must be specified by a remote gateway to establish a connection. If a password is not used, `PASSWORD=*` should be specified. The password for connection validation is obsolete.
HOSTADDR	`ip-address|hostname`	Is the IP address or hostname for this machine over which inbound connections from remote gateways are accepted at the specified port number. The IP address is specified using standard dotted-decimal notation (for example, `199.203.45.99`). The hostname is specified as a 1-256 character string and must match the DNS entry.
		Note: If any special characters, such as "-" are in the host address, quotes must be placed around the address name. Example: `HOSTADDR="SIA-COTS"`
		Default value: If this parameter is not specified, then connections are accepted over any network interface.

Parameter	Value	Description
MAXMSGLEN	max-message-length|2048	Specifies the maximum TCP/IP message length that is accepted over the connection. The value range is 1-32,767. Default value: 2048
SESSIONS	(startup-sessions,max-sessions)|1	Is the maximum number of concurrent, active inbound sessions that is accepted by this gateway. The input format is (*startup-sessions,max-sessions*), where the *startup-sessions* represents the number of sessions to initiate at startup and *max-sessions* specifying the maximum concurrent, active, inbound sessions. The range for the *max-sessions* is 0-32,767. Default value: 1
IDLETIMEOUT	nn|0	Specifies the number of seconds that lapse before the local gateway terminates a session. Default value: 0
MULTIPLEX	nn|1	Is the maximum number of concurrent messages per session that is accepted by this gateway. Default value: 1

Defining Remote Gateways

A remote gateway is another Oracle Tuxedo Mainframe Adapter gateway (TUX, CICS, or IMS) to which TMA TCP for IMS can be connected by one or more TCP/IP connections. A remote gateway definition defines the access points that TMA TCP for IMS uses to connect to the remote gateway.

The remote gateway is defined by its IP address and port number. The remote gateway may be defined as accepting one or more concurrent *outbound* TCP/IP connections initiated by the local

(IMS) gateway. Outbound connections are used by the IMS gateway to send IMS client requests to a remote gateway for processing by the requested service.

One or more `GATEWAY TYPE=REMOTE` statements are used in the configuration file to define remote gateways. Each `GATEWAY TYPE=REMOTE` statement defines the IP address and port number that TMA TCP for IMS uses to establish an outbound connection with a remote gateway. The `GATEWAY TYPE=REMOTE` statement also identifies a remote gateway by a unique logical machine ID.

The configuration file may contain multiple `GATEWAY TYPE=REMOTE` statements, each defining a different remote gateway. If no `GATEWAY TYPE=REMOTE` statements are present, then TMA TCP for IMS cannot establish outbound connections with remote gateways, and therefore cannot process IMS client requests.

The TMA TCP for IMS software can optionally be configured to supply a valid account ID and valid password when establishing an outbound session with a remote gateway.

For examples of the `GATEWAY TYPE=REMOTE` statement, refer to the "Example Configuration Files" section.

Syntax of the GATEWAY TYPE=REMOTE Statement

Listing 2-4 contains the parameter syntax for the `GATEWAY TYPE=REMOTE` statement.

Listing 2-4   Remote Gateway Syntax

```
GATEWAY,TYPE=(REMOTE,{TUX|IMS|CICS,tran-id|CICSCPT}),
       LMID=logical-machine-id,
       HOSTADDR=(ip-address|hostname),
       PORT=port-number,
       ACCOUNT={account-id,*},
       PASSWORD={password,*}
       [,MAXMSGLEN=max-message-length|2048]
       [,SESSIONS=(min-sessions),(max-sessions)]
       [,MULTIPLEX={nn|0}]
       [,IDLETIMEOUT={nn|0}]
```

Description of GATEWAY TYPE=REMOTE Parameters

The GATEWAY TYPE=REMOTE statement uses the following parameters.

Parameter	Value	Description
TYPE	(REMOTE,type)	Specifies the remote gateway type. You must specify one of the following.
		TUX - The remote gateway is an TMA TCP Gateway gateway.
		IMS -The remote gateway is an TMA TCP for IMS gateway.
		CICS, *tran-id* - The remote gateway is an TMA TCP for CICS gateway. *tran-id* specifies the 1-4 character name of the TMA TCP for CICS transaction that is to be scheduled by CICS to handle incoming TCP/IP TMA requests. Refer to the *Oracle Tuxedo Mainframe Adapter for TCP CICS User Guide* for more information.
		CICSCPT - The remote gateway is an TMA TCP for CICS gateway that uses the Interlink CPT product for TCP/IP access.
LMID	logical-machine -id	Specifies a symbolic name (1-16 characters) that uniquely identifies the remote gateway. The logical machine ID is used to associate a remote service with a particular remote gateway.
HOSTADDR	ip-address|host name	Specifies the IP address of the remote gateway. The IP address is specified using standard dotted-decimal notation (for example, 103.204.79.82). The hostname is specified as a 1-256 character string and must match the DNS entry.
		Note: If any special characters, such as "-" are in the host address, quotes must be placed around the address name. Example: HOSTADDR="SIA-COTS"

Parameter	Value	Description
PORT	port-number	Specifies the port number (decimal, 1-32,767) to be used to establish a connection with the remote gateway.
ACCOUNT	account-id	Specifies the account ID (1-8 characters) to be used to establish a connection with the remote gateway. If an account ID is not used, ACCOUNT=* should be specified. The account ID for connection validation is obsolete.
PASSWORD	password	Specifies the password (1-8 characters) to be used to establish a connection with the remote gateway. If a password is not used, PASSWORD=* should be specified. The password for connection validation is obsolete.
MAXMSGLEN	max-message-length	Specifies the maximum TCP/IP message length (decimal, 1-32,767) that is sent over the connection. Default value: 2048
SESSIONS	min-sessions	Specifies the minimum number of outbound sessions (decimal, 0-32,767) that are to be automatically started with this gateway during initialization of TMA TCP for IMS. Additional sessions (up to the maximum number of sessions specified) are started on a demand basis. Remember that by specifying a minimum number (greater than 0) of outbound sessions for a remote gateway, you can cause outbound session to be automatically established with that gateway during initialization. This process can be helpful in verifying outbound connectivity without having to make use of test transactions. Default value: 0

Parameter	Value	Description
	`max-sessions`	Specifies the maximum number of concurrent, active, outbound sessions (decimal, 0-32,767) that are established with this gateway. Default value: 1
`MULTIPLEX`	`nn｜0`	Specifies the maximum number of concurrent messages per session that the gateway accepts. Default value: 1
`IDLETIMEOUT`	`nn｜0`	Specifies the number of seconds that lapse before the remote gateway terminates a session. The remote gateway terminates sessions until it is equal to the minimum sessions allowed. Default value: 0

Defining Remote Services

A remote service is a service offered by a remote gateway to which TMA TCP for IMS has access. IMS client transactions can make requests for services offered by remote gateways.

One or more `SERVICE TYPE=REMOTE` statements are used in the configuration file to define remote services. Each `SERVICE TYPE=REMOTE` statement defines the local service name (used by the IMS client transaction to request the service), the remote service name (used to invoke the service on the remote system), and the logical machine ID of a remote gateway that offers the service. There must be a corresponding `GATEWAY TYPE=REMOTE` statement in the configuration file for the specified logical machine ID.

The configuration file can contain multiple `SERVICE TYPE=REMOTE` statements for a given (local) service name, each pointing to a different logical machine ID (that is, remote gateway). In this case, TMA TCP for IMS distributes requests for the service among the available service providers, thus maximizing throughput during busy periods.

For examples of this statement, refer to the "Example Configuration Files" section.

Syntax of the SERVICE TYPE=REMOTE Statement

Listing 2-5 contains the parameter syntax for the SERVICE TYPE=REMOTE statement.

Listing 2-5   Remote Services Syntax

```
SERVICE,TYPE=REMOTE,
      NAME=(local-service-name,remote-service-name),
      LMID=logical-machine-id
      [,TIMEOUT={timeout|30}]
```

Description of SERVICE TYPE=REMOTE Parameters

The SERVICE TYPE=REMOTE statement uses the following parameters.

Parameter	Value	Description
NAME	local-service-name	Specifies the name (1-16 characters) by which the service is known on *this* machine. This is the name which must be used by an IMS client to request the service.
	remote-service-name	Specifies the name (1-16 characters) by which the service is known on the *remote* machine. This name is the name used to invoke the service on the remote machine.
LMID	logical-machine-id	Specifies the logical machine ID (1-16 characters) of a remote gateway that offers this service. This name must match a logical machine ID (LMID) specified in a GATEWAY TYPE=REMOTE statement.
TIMEOUT	timeout|30	Specifies the time limit in seconds (decimal, 1 - 32,767) for the service. If a response is not received within the specified period of time, an error condition is recognized. Default value: 30

Defining Local Services

A service offered by a local IMS host is defined by a SERVICE TYPE=LOCAL statement. There can be multiple SERVICE TYPE=LOCAL statements and multiple statements defining the same service, provided each specifies a different local IMSID.

Syntax of the SERVICE TYPE=LOCAL Statement

Listing 2-6 contains the parameter syntax for the SERVICE TYPE=LOCAL statement.

Note: SERVICE TYPE=LOCAL statements are only used when running TMA TCP for IMS as an OTMA client.

Listing 2-6   Local Service Syntax

```
SERVICE,TYPE=LOCAL,
        NAME=(local-service-name,remote-service-name),
        IMSID=logical-IMS-id,
        [,V21COMPAT={Yes|No}]
        [,FASTPATH={Yes|No}]
        [,SECURITY={Yes|No}]
        [,RESPONSE=remote-service-name]
```

Description of SERVICES Parameters

The LOCAL SERVICES statement uses the following parameters.

Parameter	Value	Description
NAME	local-service-name	Specifies the name (1-16 characters) by which the service is known on *this* machine. This name is the name passed to IMS as the transaction name.
	remote-service-name	Specifies the name (1-16 characters) by which the service is known on the *remote* machine. This name is the name passed by the remote client to invoke this service.

Parameter	Value	Description
IMSID	logical-IMS-id	Specifies a symbolic name that uniquely identifies an IMS system definition. This name must match a logical IMS ID (IMSID) specified in a HOST, TYPE=IMS statement.
FASTPATH	Yes|No	Specifies whether this service is a FastPath transactions. Specify Yes to enable FastPath transactions or No to disable FastPath transactions. Default value: No.
SECURITY	Yes|No	Specifies whether to enable or disable security for this service. Specify Yes to enable security or No to disable security. Default value: No.
RESPONSE	remote-service-name	Specifies the remote service name you want to send the response to as a request. **Note:** This parameter is only valid for local service requests with a NOREPLY response.
V21COMPAT	Yes|No	Specifies whether the transaction specifically developed to run with version 2.1 or previous versions of TMA TCP. Specify Yes to run transactions that were developed with version 2.1 or previous versions of TMA TCP for IMS. Specify No to run transactions that were *not* developed with version 2.1 of TMA TCP for IMS or previous versions of TMA TCP for IMS. Default value: No.

Dynamically Configuring TMA TCP for IMS

The TMA TCP for IMS product makes use of a *configuration file* that is read and processed at runtime to establish the processing environment. The configured parameters can be modified while the gateway is running. You can make the following changes to the TMA TCP for IMS gateway configuration dynamicallyby entering the commands on TCP Outstanding WTOR:

- Modifying SYSTEM Parameters

- Writing the Configuration to a File

- Processing a File

- Changing Gateway Configurations

- Changing IMS Host Configurations

- Changing Remote Service Definitions

- Changing Local Service Definitions

- Display Status Information

Modifying SYSTEM Parameters

You can modify the following SYSTEM parameters dynamically using the MOD SYSTEM command.

- SLEEPTIME

- MSGLEVEL

- CLIENTSHUTDOWN

The example in Listing 2-7 uses the MOD SYSTEM command.

Listing 2-7 MOD SYSTEM Command Example

```
MOD SYSTEM, SLEEPTIME=(150,500,5), MSGLEVEL=4, CLIENTSHUTDOWN=NO
```

For parameter descriptions and syntax, refer to the "Description of SYSTEM Parameters" section.

Writing the Configuration to a File

To write the current configuration to a file, use the CHKPT CONFIG command with a fully qualified file name. The example in Listing 2-8 saves the current configuration to a file named BEA.TMATCP.CONFIG1.

Listing 2-8 CHKPT CONFIG Command Example

```
CHKPT CONFIG, FILE="BEA.TMATCP.CONFIG1"
```

Processing a File

To process a file containing commands, use the INFILE command with a fully qualified file name. The example in Listing 2-9 processes the BEA.TMATCP.TESTFILE1 file.

Listing 2-9 INFILE Command Example

```
INFILE BEA.TMATCP.TESTFILE1
```

Changing Gateway Configurations

You can dynamically change gateway configurations by adding a new gateway, modifying an existing gateway definition, starting a gateway, and stopping a gateway. For parameter descriptions and syntax, refer to the "Description of GATEWAY TYPE=LOCAL Parameters" and "Description of GATEWAY TYPE=REMOTE Parameters" sections.

Adding a Gateway

To add a gateway to the current configuration, use the ADD GATEWAY command. The following GATEWAY statement parameters are supported with this command.

- TYPE
- LMID
- PORT
- ACCOUNT
- PASSWORD
- HOSTADDR
- MAXMSGLEN
- SESSIONS

● MULTIPLEX

The example in Listing 2-10 uses the ADD GATEWAY command.

Listing 2-10 ADD GATEWAY Command Example

```
ADD GATEWAY, TYPE=LOCAL,
    LMID=IMS1,
    PORT=4500,
    ACCOUNT=ACCT101,
    PASSWORD=PSWD101,
    HOSTADDR=128.0.0.1,
    MAXMSGLEN=2048,
    SESSIONS=5,
    MULTIPLEX=3
```

Starting a Gateway

To start a gateway, use the START GATEWAY command with the LMID parameter. The example in Listing 2-11 starts the OS3901 gateway.

Listing 2-11 START GATEWAY Command Example

```
START GATEWAY, LMID=OS3901
```

Stopping a Gateway

To stop a gateway, use the STOP GATEWAY command with the LMID parameter.   Use the IMMED=YES parameter to stop the gateway immediately *without* waiting for requests in progress to complete. Outstanding requests are sent an error message and all gateway connections are closed. Use the IMMED=NO to allow the gateway to complete transaction processing and then shutdown. While waiting, the gateway does not accept any new requests. IMMED=NO is the default. The example in Listing 2-12 stops the OS3901 gateway after transaction processing completes.

Listing 2-12 `STOP GATEWAY` **Command Example**

```
STOP GATEWAY, LMID=OS3901
```

Modifying an Existing Gateway

To change an existing gateway, stop the gateway first. Then use the `MOD GATEWAY` command to change any supported parameter definitions. You must specify an existing LMID for the `MOD GATEWAY` command. The following `GATEWAY` statement parameters are supported with this command.

- `LMID`
- `ACCOUNT`
- `PASSWORD`
- `MAXMSGLEN`
- `SESSIONS`

The example in Listing 2-13 uses the `MOD GATEWAY` command.

Listing 2-13 `MOD GATEWAY` **Command Example**

```
MOD GATEWAY, LMID=SUN2, ACCOUNT=ACCT102, PASSWORD=PSWD102, MAXMSGLEN=2048
```

Changing IMS Host Configurations

You can dynamically change IMS host configurations by adding a new host, modifying an existing host definition, starting a host, and stopping a host. For parameter descriptions and syntax, refer to the "Description of GATEWAY TYPE=LOCAL Parameters" and "Description of GATEWAY TYPE=REMOTE Parameters" sections.

Adding a Host

To add a host to the current configuration, use the `ADD HOST` command. The following `HOST TYPE=IMS` statement parameters are supported with this command.

- `TYPE`

- IMSID

- OTMANAME

- OTMAINPIPE

- OTMAOUTPIPE

- NUMTPIPES

The example in Listing 2-14 uses the ADD HOST command.

Listing 2-14 ADD HOST **Command Example**

```
ADD HOST, TYPE=IMS,
    IMSID=IMS3,
    OTMANAME=IMS71SYS3,
    OTMAINPIPE=SYS3,
    OTMAOUTPIPE=SYS3OUT,
    NUMTPIPES=5
```

Starting a Host

To start a host, use the START HOST command with the IMSID parameter. The example in Listing 2-15 starts the IMS3 host.

Listing 2-15 **START HOST** **Command Example**

```
START HOST, IMSID=IMS3
```

Modifying an Existing Host

The following tasks explain how to change an existing host.

1. Stop the host first.

2. Then use the MOD HOST command to change any supported parameter definitions. You must specify an IMSID for the MOD HOST command.

The following HOST statement parameters are modifiable with this command.

- OTMAINPIPE

- OTMAOUTPIPE

- NUMTPIPES

The example in Listing 2-16 uses the MOD HOST command.

Listing 2-16 MOD HOST Command Example

```
MOD HOST, IMSID=IMS3, NUMTPIPES=6
```

Stopping a Host

To stop a host, use the STOP HOST command with the IMSID parameter with a value matching the IMSID specification on the HOST, TYPE=IMS statement. Refer to the "Defining the Local Gateway" section. Use the IMMED=YES parameter to stop the host immediately *without* waiting for requests in progress to complete. Outstanding requests are sent an error message. (For a description of error messages, refer to the "Error and Informational Messages" section.) Use the IMMED=NO to allow the host to complete processing outstanding requests and then shutdown. While waiting, the host does not accept any new requests. IMMED=NO is the default. The example in Listing 2-17 stops the IMS3 host after transaction processing completes.

Listing 2-17 STOP HOST Command Example

```
STOP HOST, IMSID=IMS3
```

Changing Remote Service Definitions

You can dynamically change remote service definitions by adding a new service, modifying an existing service definition, or starting and stopping services. Existing services must be stopped prior to modifying them. For parameter descriptions and syntax, refer to the "Description of SERVICE TYPE=REMOTE Parameters" section.

Adding a Remote Service

To add a remote service to the current configuration, use the ADD SERVICE command. The following SERVICE TYPE=REMOTE statement parameters are supported with this command. TYPE, LMID, and NAME are required parameters.

- TYPE
- LMID
- NAME
- TIMEOUT

The example in Listing 2-18 uses the ADD SERVICE command to add a remote service.

Listing 2-18 ADD SERVICE Command (RemoteService) Example

```
ADD SERVICE, TYPE=REMOTE,
    LMID=TUX1,
    NAME=(ECHO,ECHO),
    TIMEOUT=60
```

Stopping a Remote Service

To stop a remote service, use the STOP SERVICE command with the LMID and NAME parameters. In this case, the NAME parameter only specifies the *local name*, rather than the fully qualified (*local name, remote name*) syntax. Use the IMMED=YES parameter to stop the service immediately *without* waiting for requests in progress to complete. Outstanding requests are sent an error message. Use the IMMED=NO to allow the requests to complete processing. While waiting, the gateway does not accept any new requests. IMMED=NO is the default. The example in Listing 2-19 stops ECHO on the TUX1 gateway.

Listing 2-19 STOP SERVICE Command (Remote Service) Example

```
STOP SERVICE,
    LMID=TUX1,
    NAME=ECHO
```

Modifying an Existing Remote Service

The following tasks explain how to change an existing remote service definition.

1. Stop the service first.

2. Then use the MOD SERVICE command to change the service information. Use the LMID and NAME parameters to specify the service you want to modify. The TIMEOUT parameter in the SERVICE TYPE=REMOTE statement is the only parameter that can be modified with this command and is required.

The example in Listing 2-20 uses the MOD SERVICE command. In this case, the NAME parameter only specifies the *local name*, rather than the fully qualified (*local name, remote name*) syntax.

Listing 2-20 MOD SERVICE Command (Remote Service) Example

```
MOD SERVICE,
    LMID=TUX1,
    NAME=ECHO,
    TIMEOUT=60
```

Starting a Remote Service

To start a service, use the START SERVICE command with the LMID and NAME parameters. In this case, the NAME parameter only specifies the *local name* rather than the fully qualified (*local name, remote name*) syntax. The example in Listing 2-21 starts the TUX1 service.

Listing 2-21 START SERVICE Command (Remote Service) Example

```
START SERVICE,
    LMID=TUX1,
    NAME=ECHO
```

Changing Local Service Definitions

You can dynamically change local service definitions by adding a new service, modifying an existing service definition, or starting and stopping services. Existing services must be stopped prior to modifying them. For parameter descriptions and syntax, refer to the "Defining Local Services" section.

Adding a Local Service

To add a local service to the current configuration, use the ADD SERVICE command. The TYPE, IMSID, and NAME are required parameters when adding a local service. The following SERVICE TYPE=LOCAL statement parameters are supported with this command.

- TYPE
- IMSID
- NAME
- SECURITY
- FASTPATH
- V21COMPAT

The example in Listing 2-22 uses the ADD SERVICE command.

Listing 2-22 ADD SERVICE Command (Local Service) Example

```
ADD SERVICE, TYPE=LOCAL,
    IMSID=IMS1,
    NAME=(BEASVR01,ECHO),
    SECURITY=YES,
    FASTPATH=NO,
    V21COMPAT=NO
```

Stopping a Local Service

To stop a local service, use the STOP SERVICE command with the IMSID and NAME parameters. In this case, the NAME parameter only specifies the *remote name*, rather than the fully qualified (*local name, remote name)* syntax. Use the IMMED=YES parameter to stop the service immediately *without* waiting for requests in progress to complete. Outstanding requests are sent

an error message. Use the IMMED=NO to allow the requests to complete processing. While waiting, the gateway does not accept any new requests. IMMED=NO is the default. The example in Listing 2-23 stops ECHO on the IMS1 host.

Listing 2-23 `STOP SERVICE` Command (Local Service) Example

```
STOP SERVICE, IMSID=IMS1, NAME=ECHO
```

Modifying an Existing Local Service

The following tasks explain how to change an existing local service definition.

1. Stop the service first.

2. Then use the MOD SERVICE command to change any supported parameters.

The following SERVICE TYPE=LOCAL statement parameters can be modified with this command.

- SECURITY
- FASTPATH
- V21COMPAT

The example in Listing 2-24 uses the MOD SERVICE command. In this case, the NAME parameter only specifies the *remote name*, rather than the fully qualified (*local name, remote name)* syntax.

Listing 2-24   MOD SERVICE Command (Local Service) Example

```
MOD SERVICE, IMSID=IMS1, NAME=ECHO, SECURITY=YES
```

Starting a Local Service

To start a local service, use the START SERVICE command with the IMSID and NAME parameters. In this case, the NAME parameter only specifies the *remote name*, rather than the fully qualified (*local name, remote name)* syntax. The example in Listing 2-25 starts the ECHO service for IMS1.

Listing 2-25 `START SERVICE` **Command (Local Service) Example**

```
START SERVICE, IMSID=IMS1, NAME=ECHO
```

Display Status Information

Use the STATUS command to display the status of the TMA TCP gateway. The command displays XCF status with all IMS hosts, the number of messages processed, the number of XCF messages received, message control block usage, and service counts. The following status codes for IMS hosts can result:

- ACTIVE
- ERROR
- RESTART
- BID SENT
- UNKNOWN

Listing 2-26   STATUS Command Response Example

```
BEA2128I     XCF Status with IMS Client IMS71CR1 = Active
BEA2128I     XCF Status with IMS Client IMS71CR2 = Active
BEA2184I     XCF Messages Received = 4
BEA2183I     Messages Processed = 0
BEA2185I     MCBs: Allocated = 771 Assigned = 0
BEA2186I     Services: Remote = 7 Local = 6
```

Monitoring Oracle TMA TCP for IMS

The following topics explain operating and monitoring the Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) product:

- Testing Connectivity with Remote Systems

- Operating Oracle TMA TCP for IMS

- The Oracle TMA TCP for IMS Message Log

- The Server Response Log File

Testing Connectivity with Remote Systems

When you start TMA TCP for IMS for the first time, you should do so in a controlled environment, using a small, simple configuration that allows you to methodically test the system to verify your installation and the configuration.

An appropriate test configuration would include the IMS gateway (one port) and one remote gateway. The SOURCE distribution library includes several sample IMS client and server transactions that can be used to test connectivity with a remote Oracle Tuxedo Mainframe Adapter gateway.

By specifying a minimum number (greater than 0) of outbound sessions for a remote gateway, you can cause outbound sessions to be automatically established with that gateway during initialization. This can help verify outbound connectivity without having to make use of test transactions.

Execute test client and server transactions from both sides of the configuration to verify bidirectional connectivity. If errors are encountered, use the diagnostic messages issued by *both* sides of the configuration (that is, the IMS gateway *and* the remote Oracle Tuxedo gateway) to identify and correct the problem.

For a description of the TMA TCP for IMS error messages, refer to the "Error and Informational Messages" section.

Monitoring and Troubleshooting OTMA

The following commands are a few of the available IMS commands that may assist you in monitoring or troubleshooting problems with the OTMA connection. For definitions and command syntax for these IMS commands, refer to the *IMS/ESA Operator's Reference* or the *Open Transaction Manager Access Guide*.

- `/SEC OTMA` *security-level*

  Specify `FULL` for *security-level* to check security on all messages.

  Specify `PROFILE` for *security-level* to check security only when requested.

  Specify `NONE` for *security-level* to disable security checking.

- `/DIS OTMA`

  Displays the OTMA status.

- `/STO OTMA`

  Stops OTMA messaging.

- `/STA OTMA`

  Enables OTMA messaging.

- `/DIS TMEMBER` *name* `TPIPE ALL`

  Displays the status of the client.

- `/STO TMEMBER` *name* `TPIPE ALL`

  Stops an individual client from accessing a service.

- `/STA TMEMBER` *name* `TPIPE ALL`

  Enables an individual client and allows access to a service.

Operating Oracle TMA TCP for IMS

The TMA TCP for IMS product is started by submitting JCL. For sample JCL, refer to the "Sample JCL and User Exits" section.

During operation, TMA TCP for IMS writes all messages to the message log dataset (`DDNAME=MSGLOG`). The message log is primarily useful for historical purposes after TMA TCP for IMS has ended. The message log remains open for output during execution and recent messages cannot be viewed (using ISPF Browse, for example) until the dataset is closed at termination.

However, informational and error messages are also written to the z/OS console, where they can be viewed in real time by a system operator. When `MSGLEVEL=4` is specified in the configuration file (the normal mode), all messages written to the message log are also displayed on the z/OS console.

Initialization

During initialization, the following activities occur:

- The runtime datasets (configuration file, message log, and server response log) are opened

- The configuration file is read and processed to establish the configuration

- The TMA TCP for IMS product establishes a TCP/IP Listener for each defined local gateway (port)

- If requested, outbound sessions are established with remote gateways

- The TMA TCP for IMS product puts up an outstanding write-to-operator with reply (`WTOR`) on the z/OS console by means of which operator commands can be entered

If any errors are detected during initialization, TMA TCP for IMS issues the appropriate error messages and initialization fails. If initialization fails, correct the indicated errors and restart TMA TCP for IMS.

Normal Operation

If initialization is successful, normal operation begins, during which the following activities occur:

- Requests for new inbound sessions, initiated by remote systems, are accepted.

- New outbound sessions are requested and established with remote systems as required.

- The TMA TCP for IMS product monitors the TCP/IP network for requests and responses from remote systems.

- Inbound requests are received from remote systems through the TCP/IP network and are relayed to the appropriate IMS server transactions.

- IMS is polled for requests and responses from IMS client and server transactions.

- Outbound requests issued by IMS client transactions are relayed to the appropriate remote systems through the TCP/IP network.

- The TMA TCP for IMS product monitors requests-in-progress to ensure that a response (if required) is received within a specified period of time.

- Operator commands (entered through a reply to the outstanding command WTOR) are processed.

Operator Commands

During normal operation, TMA TCP for IMS puts up an outstanding WTOR (message ID BEA2113I) that can be used to enter commands. A command is entered by simply replying to the outstanding WTOR in the format in Listing 5-1.

Listing 5-1   Syntax for Replying to WTOR

```
R nn,command
```

In Listing 5-1, nn is the z/OS-assigned reply ID and command is the text of the command.

Issuing Session-related Messages

During normal operation, only messages for session-related events are issued. These include requests to establish a TCP/IP connection, requests to establish a session between two gateways, session disconnect, and session termination. This minimizes the amount of console traffic that occurs under normal operating conditions. Messages associated with TCP/IP connections include the 4-digit TCP/IP socket ID (immediately following the message ID).

Termination

Normal operation continues until a SHUTDOWN command is received. Under normal circumstances, TMA TCP for IMS is terminated by entering an operator SHUTDOWN command (through the outstanding command WTOR).

When a SHUTDOWN command is received and accepted, the following activities occur:

1. The TMA TCP for IMS gateway stops accepting requests for new inbound connections (from remote systems).

2. Active inbound and outbound sessions are terminated without permitting in progress transactions to complete.

3. The Message Log and Server Response Log datasets are closed.

4. The TMA TCP for IMS gateway terminates and returns control to z/OS.

SHUTDOWN Command

The SHUTDOWN command allows an operator to initiate termination of TMA TCP for IMS, and is entered in the format in Listing 5-2.

Listing 5-2   Syntax for Termination Initiation

```
R nn,SHUTDOWN
```

A Client-Initiated Shutdown

The TMA TCP for IMS product can be configured to allow shutdown to be initiated by a remote client request or a response to a remote client request. This may be useful if it is necessary to shut down TMA TCP for IMS from a remote system, rather than by operator command from an z/OS console.

Shutdown is requested by embedding a modify command into the user request data of an IMS server request, or the user response data of an IMS server response in the following format.

Format the command as shown in Listing 5-3. If the *jobname* specified is incorrect, TMA TCP for IMS simply ignores the command and processes the request or response in the usual way.

Note: To use this feature, the configuration file must specify the CLIENTSHUTDOWN=YES option on the SYSTEM statement (the default is NO). Otherwise, TMA TCP for IMS ignores a remote client request to initiate shutdown processing.

Listing 5-3 Syntax for Client-Initiated Shutdown

```
F jobname TERM=type
```

jobname
> is the z/OS jobname assigned to TMA TCP for IMS.

TERM=*type*
> is the method for shutting down the system. The values for *type* are as follows.

> STOP
>> is a normal shutdown. If TERM=STOP is specified, TMA TCP for IMS initiates normal shutdown processing, as if an operator had entered the SHUTDOWN command from an z/OS console.

> DUMP
>> is an abend with a dump. If TERM=DUMP is specified, TMA TCP for IMS issues a U3166 abend. If a SYSUDUMP DD statement is included in the JCL, a standard z/OS dump is produced.

The Oracle TMA TCP for IMS Message Log

The TMA TCP for IMS product uses a message log dataset to record all messages issued. Normally, the message log (DDNAME=MSGLOG) is allocated to a disk dataset, but it can be allocated to another destination (such as sysout) if desired.

The message log is primarily intended for historical use; that is, as a means to review TMA TCP for IMS activity after-the-fact. The message log remains open for output during the entire execution of TMA TCP for IMS. Consequently, messages cannot ordinarily be viewed interactively (for example, using ISPF Browse) due to the dataset disposition and/or buffering of messages by z/OS.

The MSGLEVEL parameter of the SYSTEM statement in the configuration file controls the type of messages written to the log. Specifying a MSGLEVEL of 4 causes all informational and error messages to be recorded. Specifying a MSGLEVEL of 2 records only error messages. A MSGLEVEL

of 0 (zero) suppresses all logging. Under normal circumstances, a `MSGLEVEL` of 4 should be specified.

You may elect to have messages appended to the existing log (thus preserving messages from previous executions of TMA TCP for IMS) by coding `DISP=MOD` in the `MSGLOG DD` statement in the JCL for TMA TCP for IMS. Alternatively, coding `DISP=OLD` or `DISP=SHR` causes the log to be overwritten, discarding any messages from a previous execution of TMA TCP for IMS.

Message Format

Each message written to the message log has the general format as in Listing 5-4.

Listing 5-4   Message Log Format

```
mm-dd-yyyy hh:mm:ss msgid ssss text
```

`mm-dd-yyyy`
> *mm* is the month of the year (1-12) in which the message was logged.
>
> *dd* is the day of the month (1-31) on which the message was logged.
>
> *yyyy* is the year that the message was logged.

`hh:mm:ss`
> *hh* is the hour of the day during which the message was logged.

mm is the minute of the hour during which the message was logged.

> *ss* is the second of the minute during which the message was logged.

`Figure 5-1  msgid`
> is the message ID, in the form *BEAnnnnt*, where *nnnn* is a unique message number and *t* is the message type.

`ssss`
> is the socket number for the TCP/IP connection with which the message is associated. If the message is not associated with a TCP/IP connection, this field is blank.

`text`
> is the text of the message.

For additional information on messages issued by the gateway, refer to the "Error and Informational Messages" section.

z/OS Console Messages

The TMA TCP for IMS product also logs messages to the z/OS console so that operators can monitor the operation of TMA TCP for IMS and respond to any conditions requiring their attention.

In general, TMA TCP for IMS logs the same messages to the console that are recorded in the message log (that is, informational and error messages). However, because TMA TCP for IMS issues few informational messages during normal operation, console traffic is minimized.

The Server Response Log File

When TMA TCP for IMS receives a client request from a remote system, the request is inserted into the IMS message queue for delivery to the specified IMS server transaction. The IMS server transaction processes the request and inserts the response (if required) into the IMS message queue for delivery to TMA TCP for IMS. When the response is received, it is returned to the requesting remote system.

Each IMS server request and the associated response contains a unique request/response ID, consisting of the date and time that TMA TCP for IMS was started, and a serial number. The TMA TCP for IMS gateway uses the request/response ID to correlate each response with a pending server request.

It is possible that TMA TCP for IMS may receive a response from an IMS server transaction for which no pending request exists. This can occur under any of the following conditions:

- The TMA TCP for IMS gateway was restarted after the request was sent to IMS but before the response was received. In this case, the response is usually received when TMA TCP for IMS is subsequently restarted.

- The TCP/IP connection with the remote gateway was lost after the request was sent to IMS but before the response was received.

- The request was sent to IMS, but timed out and was aborted before the response was received from IMS.

- The IMS server transaction returned a response to a request that did not require a response.

When a response cannot be correlated with a pending request (that is, a pending request with a matching request/response ID cannot be found), TMA TCP for IMS writes the response to a

server response log file (`DDNAME=SVRLOG`). The information in the server response log file can be useful as part of a manual recovery procedure. Message `BEA2033E` is also issued, indicating that a server response has been logged and specifying the reason ("Server Request not found" or "No response was expected").

Server responses are logged as two separate records: the BEA server request/response header (containing the unique request/response ID), and the response data.

Note: The dataset attributes of the server response Log File are fixed by architecture. Refer to the *Oracle* Tuxedo Mainframe Adapter for TCP *Installation Guide* for additional information.

Programming Oracle TMA TCP for IMS

Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) allows user-written IMS application transactions to service requests received from remote systems (server requests) and to initiate requests for services provided by remote systems (client requests).

The following topics are programming considerations:

- Programming Your Application
- Programming Interface
- Returning a Response
- IMS Client Requests
- Error Handling
- How Oracle TMA TCP Gateway Translates Data

Programming Your Application

IMS client and server transactions are ordinary IMS message processing programs (MPPs) and with the use of OTMA, server transactions can also be FastPath programs. These programs may be written in any programming language supported by IMS. Because COBOL is the traditional language used for this purpose, the examples in this document are written in COBOL. However, these examples may be translated easily to other supported programming languages such as C.

Programming Interface

The TMA TCP for IMS product and user-written IMS client and server transactions communicate by exchanging standard IMS messages (using the IMS message queue directly or through OTMA).

IMS Server Requests

An IMS server transaction is one that services requests originated by a remote system. The request message is inserted directly into the IMS message queue or indirectly through OTMA as a single segment. The IMS server transaction retrieves the request message from the IMS message queue and processes the request as required.

Message Format

When running the TMA TCP gateway as an OTMA client, the request or response message is in the standard IMS message format. The following message is a sample when using OTMA.

Listing 6-1   Sample Message using OTMA

```
01 BEA-SERVER-REQUEST-RESPONSE-MESSAGE.
05 BEA-SERVER-HEADER
   10 LL            PIC 9(4) COMP VALUE 0.
   10 ZZ            PIC 9(4) COMP VALUE 0.
   10 TRAN-CODE     PIC X(8) VALUE SPACES.
   REQUEST-DATA.
```

Field Descriptions

The request messages contain the following fields.

Field	Description
LL	The length of the complete request or response message (including this field).
ZZ	Reserved for use by IMS; normally zero.
TRAN-CODE	For a request message, the transaction code of the IMS server transaction. For a response message, the transaction code of the TMA TCP for IMS gateway.
FILL-CHAR	Message fill character (space).

Header Files and Copybooks

The INCLUDE distribution library contains the following header files and copybooks for use by IMS server transactions.

Member Name	Description
BEATCPI	C Header file
SERVER	COBOL copybook

Returning a Response

If a response is required, the server transaction formats a client response message.

OTMA Client Gateway

The request message presented to the server transaction contains the name of the transaction pipe (tpipe) in the LTERM field of the I/O PCB. If the security feature is in use, the USERID and GROUPID fields of I/O PCB also contain relevant data.

If a response is required, the response message is inserted into the IMS message queue and routed back to the gateway by OTMA. The response message is inserted either as a single segment, or as multiple segments. The TMA TCP for IMS gateway can handle either format.

IMS Client Requests

An IMS client transaction is one that issues a request for a service provided by a remote system. You must install the DFSYPRX0 and DFSYDRU0 IMS user exits prior to using an IMS client transaction with the OTMA client gateway. Refer to the IBM document, *Open Transaction Manager Access Guide* for additional information on these user exits. Basic samples of these exits are in the "Sample JCL and User Exits" section.

Message Format

An TMA TCP for IMS client request or response message consists of three contiguous "sections":

- BEA-defined request/response header

- User-defined context data

- User-defined request or response data

An TMA TCP for IMS client request or response has the following message format.

Listing 6-2   Client Request/Response Message Format

```
01 BEA-CLIENT-REQUEST-RESPONSE-MESSAGE.
   05 BEA-CLIENT-HEADER.
      10 LL                  PIC 9(04) COMP VALUE 0.
      10 ZZ                  PIC 9(04) COMP VALUE 0.
      10 TRAN-CODE           PIC  X(08) VALUE SPACES.
      10 FILL-CHAR           PIC  X     VALUE SPACES.
      10 BEA-RESERVED-1      PIC  X(03) VALUE LOW-VALUES.
      10 HEADER-LENGTH       PIC 9(08) COMP VALUE 0. .
      10 CONTEXT-LENGTH      PIC 9(08) COMP VALUE 0.
      10 DATA-LENGTH         PIC 9(08) COMP VALUE 0.
      10 MAX-RESPONSE-LENGTH PIC 9(08) COMP VALUE 0.
      10 REQUEST-TYPE        PIC 9(08) COMP VALUE 0.
         88 REQUEST-RESPONSE-REQUIRED        VALUE 1.
         88 REQUEST-NO-RESPONSE              VALUE 2.
      10 RESPONSE-FORMAT     PIC 9(08) COMP VALUE 0.
         88 RESPONSE-SINGLE-SEGMENT          VALUE 0.
```

```
     88 RESPONSE-MULTI-SEGMENT              VALUE 1.
 10 ERROR-CODE           PIC S9(08) COMP VALUE +0.
     88 ERR_NO_ERROR                       VALUE +0.
     88 ERR_RESPONSE_TRUNCATED             VALUE +4.
     88 ERR_HOST_NOT_AVAILABLE             VALUE +8.
     88 ERR_HOST_BUSY                      VALUE 12.
     88 ERR_TIMEOUT                        VALUE 16.
     88 ERR_SERVICE_NAME                   VALUE 20.
     88 ERR_NO_STORAGE                     VALUE 24.
     88 ERR_REQUEST_FORMAT                 VALUE 28.
     88 ERR_HOST_ERROR                     VALUE 32.
     88 ERR_TP_ERROR                       VALUE 36.
     88 ERR_INTERNAL_ERROR                 VALUE 40.
 10 REASON-CODE          PIC S9(08) COMP VALUE +0.
     88 RSN_NO_REASON                      VALUE  0.
     88 RSN_HEADER_LENGTH                  VALUE  4.
     88 RSN_HEADER_LENGTHS                 VALUE  8.
     88 RSN_REQUEST_TYPE                   VALUE 12.
     88 RSN_NO_RESPONSE_TRAN               VALUE 16.
     88 RSN_CONTEXT_LENGTH                 VALUE 20.
     88 RSN_DATA_LENGTH                    VALUE 24.
     88 RSN_MAX_DATA_LENGTH                VALUE 28.
     88 RSN_NO_SERVICE_NAME                VALUE 32.
     88 RSN_SERVICE_NAME_UNDEFINED         VALUE 36.
 10 SERVICE-NAME         PIC  X(16) VALUE SPACES.
 10 RESPONSE-TRAN        PIC  X(08) VALUE SPACES.
 10 ORIGIN-TERMINAL      PIC  X(08) VALUE SPACES.
 10 BEA-RESERVED-2       PIC  X(16) VALUE LOW-VALUES.
05 USER-CONTEXT-DATA.
 10 (user-defined...)|
05 USER-REQUEST-DATA.
 10 (user-defined...)
05 USER-RESPONSE-DATA REDEFINES USER-REQUEST-DATA.
 10 (user-defined...)
```

Field Descriptions

The client request or response messages contain the following fields.

Field	Description
LL	The length of the complete request or response message (including this field).
ZZ	Reserved for use by IMS; normally zero.
TRAN-CODE	For a request message, the transaction code of the TMA TCP for IMS gateway. For a response message, the transaction code of the IMS client response transaction.
FILL-CHAR	Message fill character (space).
BEA-RESERVED-1	Reserved for use by TMA TCP for IMS. For a request message, this field *must* be initialized to binary zero (low values).
HEADER-LENGTH	The length of the BEA request/response header.
CONTEXT-LENGTH	The length of user context data, if any. If there is no context data, the length is set to zero.
DATA-LENGTH	The length of user request or response data, if any. If there is no request or response data, the length is set to zero.
MAX-RESPONSE-LENGTH	For a request, the maximum length of user response data that can be accepted. If the response data exceeds this length, it is truncated as necessary and appropriate return codes are set.
REQUEST-TYPE	For a request, indicates whether or not a response is required. If no response is required, TMA TCP for IMS schedules the specified response transaction as soon as the request has been sent to the remote system. Otherwise, the response transaction is scheduled when the required response has been received from the remote system.

Field	Description
RESPONSE-FORMAT	For a request, specifies the type or response message format desired.
	If the single segment option is specified (the default), TMA TCP for IMS inserts the complete response message into the IMS message queue as a single message segment.
	If the multi-segment option is requested, the response message is inserted into the IMS message queue in three separate segments.
	1. response header
	2. user context data
	3. user response data
ERROR-CODE	This field is set in the response message to indicate that an error occurred. If this field is zero, the request successfully processed. Otherwise, the error code indicates the nature of the error that occurred.
	Error codes are documented in the "Error and Reason Codes" section.
REASON-CODE	For certain kinds of errors, this field may be set to provide additional information about the error. If this field is zero, no additional information is available.
	Reason Codes are documented in the "Error and Reason Codes" section.
SERVICE-NAME	Specifies the name of the service (as locally defined to TMA TCP for IMS) that processes the request. Note that the local service name may not be the same as the remote system name.
RESPONSE-TRAN	The name of the transaction (IMS transaction code) that is to be scheduled to process the response to a request. A response transaction *must* be specified for *all requests*, even if an application-level response is not required.
ORIGIN-TERMINAL	The name of the terminal (IMS LTERM) associated with this request. For example, if the request is issued by a transaction processing a terminal message, this name is the name of the associated terminal.

Field	Description
BEA-RESERVED-2	Reserved for use by TMA TCP for IMS. For a request message, this field *must* be initialized to binary zero (low values).
USER-CONTEXT-DATA	This user-defined data area is preserved by TMA TCP for IMS and returned in the response message. This data can be used for any purpose; for example, the response transaction can use this data to correlate the response with the original request. The context data, if present, must immediately follow the BEA request header with no intervening (slack) bytes.
USER-REQUEST-DATA	For a request message, user-defined data specific to the request. The request data, if present, must immediately follow the context data (if any), with no intervening (slack) bytes.
USER-RESPONSE-DATA	For a response message, the user-defined data specific to the response. The response data, if any, must immediately follow the context data (if any) with no intervening (slack) bytes.

Header Files and Copybooks

The INCLUDE distribution library contains the following header files and copybooks for use by IMS client transactions.

Member Name	Description
BEATCPI	C Header file
SERVER	COBOL copybook

Error Handling

Every client request *must* designate a response transaction (even though the request itself may not require an application-level response). The TMA TCP for IMS product schedules the response

transaction if an error is encountered that prevents processing of the request (for example, the request may be improperly formatted, or the specified service may be unavailable).

The response transaction should always check the error code to determine whether the request was successfully processed.

Types of Errors

The TMA TCP for IMS product recognizes a wide variety of error conditions that may prevent successful processing of a client request. These are briefly summarized in the following sections.

Invalid Request Format
> The TMA TCP for IMS gateway validates a client request prior to sending it to a remote system for processing. Types of validation errors include invalid service name, invalid length values, etc.

Remote System Not Available
> The TMA TCP for IMS gateway may be unable to process a request because the required remote system is either inaccessible or currently busy processing other requests.

Request Timeout
> The TMA TCP for IMS gateway monitors each request sent to a remote system for processing. If a response is required and is not received within a prescribed period of time, the request *times out*.

Remote System Errors
> The request may fail due to an error that occurs on the remote system. For example, the requested service may detect an application-level error, a security authorization failure, or the remote gateway may be unable to invoke the requested service.

Other Errors

Although unlikely, it is possible that TMA TCP for IMS may be unable to process a request due to an internal or system error, such as a temporary storage shortage.

How Oracle TMA TCP Gateway Translates Data

When a client program on the remote Oracle Tuxedo system sends data to (or receives data from) a service routine on a different model of computer, TMA TCP Gateway automatically translates data as required. Translation involves changing the representation of intrinsic data types by changing attributes such as the following:

- Word length

- Byte order

Oracle Tuxedo Buffer Types

The following table contains definitions for buffer types.

Term	Definition
STRING	A buffer of character data that is terminated by the first null character in the buffer. Typically these character string buffers undergo translation when sent to a system that is dissimilar from the sending system.
CARRAY	A CARRAY is a buffer of raw data that contains no terminating character. The data in the array undergoes no conversion or translation; it is sent from one system to another without modification. (A CARRAY is an exemplary buffer type for a graphics file.)
VIEW	A VIEW buffer is a collection of field definitions that can be treated as a single entity. It is comparable to a record layout in COBOL or a structure in C.
FML	Fielded manipulation language (FML) buffers are variable length, dynamic, self-describing buffers. Each field in the buffer has its own descriptive header. In the Oracle Tuxedo product, FML buffers can be tied closely to VIEW buffers so that conversion from one to the other is direct.

Data Translation Rules

The TMA TCP Gateway adheres to the following data translation rules:

- CARRAY fields are passed untranslated as sequences of bytes.

- STRING and CHAR fields undergo ASCII to EBCDIC translation (if needed).

- SHORT and LONG fields are translated to S9(4) COMP and S9(9) COMP, respectively.

- FLOAT and DOUBLE fields are translated to COMP-1 and COMP-2, respectively.

Note: The Oracle Tuxedo product provides a field type named `dec_t` that supports decimal values within VIEWs. The TMA TCP for IMS gateway translates these fields into machine independent representations of packed decimals. For example, `dec_t(m,n)` becomes `S9(2*m-(n+1))V9(n) COMP-3`. Therefore, a decimal field with a size of 8,5 corresponds to `S9(10)V9(5) COMP-3`.

The following table summarizes the rules for translating between C and IBM 370 data types.

Remote Data Type	Description	View Field Type/Length
`PIC X(n)`	Alphanumeric characters	`string / n`
`PIC X`	Single alphanumeric character	`char`
`PIC X(n)`	Raw bytes	`carray / n`
`PIC 9`	Single numeric byte	`carray / 1`
`PIC S9(4) COMP`	32-bit integer	`short`
`PIC S9(9) COMP`	64-bit integer	`long`
`COMP-1`	Single-precision floating point	`float`
`COMP-2`	Double-precision floating point	`double`
`PIC S9((m+(n+1))/2)V9(n) COMP-3`	Packed decimal	`dec_t / m,n`

Strings and Numeric Data: A Closer Look

This section provides the following information:

- Suggestions that help you develop VIEW definitions for input and output buffers and records

- Explanations of how TMA TCP Gateway treats string data and numeric data

Including NULL Characters in String Length Calculations

When you create VIEW definitions for input and output buffers that are used by IMS applications, do not specify extra characters for terminating NULL characters that are used in string fields.

For example, when a remote IMS application program expects 10 characters in an input record, specify *10* for that field, not 10 plus 1 (for the terminating NULL character).

Note: Although TMA TCP Gateway does not require strings to be NULL-terminated, it respects NULL termination. Therefore, when TMA TCP Gateway detects a NULL (zero) character within a string, it does not process any subsequent characters. To pass full 8-bit data that contains embedded NULL values, use a CARRAY type field or buffer.

The character set translations performed by TMA TCP Gateway are fully localizable, in accordance with the *X/Open XPG Portability Guides*. ASCII and EBCDIC translations are loadable from message files. The TMA TCP Gateway product contains default behaviors that should meet the requirements of most English-language applications. However, you may find it necessary to customize tables. For complete instructions, see *Oracle Tuxedo Mainframe Adapter for TCP Gateway User Guide*.

Converting Numeric Data

You can convert numeric data easily into different data types, provided that you have enough range in the intermediate and destination types to handle the maximum value you need to represent.

For example, you can convert an FML field of double into a packed decimal field on the remote target system by specifying an appropriate dec_t type VIEW element.

In addition, you can convert numeric values into strings (and the reverse). For example, while FML buffers do not directly support the dec_t type, you can place decimal values in string fields and map these to dec_t fields within VIEW definitions.

System Services Descriptions

Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) uses the following system services:

- TCP/IP for z/OS
- LE/370
- z/OS

TCP/IP for z/OS

The TMA TCP for IMS product makes use of the following TCP/IP for z/OS services by issuing the appropriate API calls.

TCP/IP for z/OS Service	Description
accept	Accept a TCP/IP connection request
bind	Bind a socket to an IP address and port
close	Close a socket and free associated resources
connect	Initiate a TCP/IP connection with a specified IP address and port
fcntl	Set the operational characteristics of a socket

TCP/IP for z/OS Service	Description
gethostbyaddr	Resolve an IP address into a domain name
gethostbyname	Resolve a hostname into a domain name
htonl	Convert a long integer from host to network byte order
htons	Convert a short integer from host to network byte order
inet_network	Convert an IP address from character format to internal format
inet_ntoa	Convert an IP address from internal format to character format
listen	Initiate listening on a socket bound to an IP address and port
read	Read data on a TCP/IP connection
selectex	Wait on one or more socket FDs to be posted, a timeout to occur, or an ECB to be posted
setsockopt	Set socket-related processing options
socket	Obtain (allocate) a socket descriptor for a TCP/IP connection
shutdown	Shut down a TCP/IP connection
write	Write data to a TCP/IP connection

LE/370

The TMA TCP for IMS product makes use of the following LE/370 services by issuing the appropriate API calls.

LE/370 Service	Description
CEE3ABD	Issue an abend

z/OS

The TMA TCP for IMS product makes use of the following z/OS services by issuing the appropriate API calls.

z/OS Service	Description
WTO	Issue a write-to-operator (WTO) message
WTOR	Issue a write-to-operator-with-reply (WTOR) message
XCF	Uses cross-system coupling facility to communicate to OTMA
Latch Manager Services	Locks storage resources to prevent simultaneous updates of shared memory

Error and Informational Messages

All messages issued by Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) have an IBM-standard 8-character message ID beginning with the characters, "BEA". Messages have the following general format: `BEAnnnnt ssss text`.

Message Part	Description
nnnn	A unique message number in the range 2000 - 2500.
t	The message type: I=Informational E=Error W=Warning
ssss	The socket number identifying the TCP/IP connection with which the message is associated. If the message is not associated with a specific TCP/IP connection, this field is blank.
text	The actual text of the message.

Logical Machine IDs

A logical machine ID (LMID) is a symbolic name used to identify a Oracle Tuxedo Mainframe Adapter gateway. LMIDs are defined in the Oracle TMA TCP for IMS configuration file, and appear in selected messages issued by Oracle TMA TCP for IMS.

When used in a message to identify a gateway, the logical machine ID displays as follows:

```
LMID (logical-machine-id, type)
```

logical-machine-id
> is the logical machine ID (1-16 characters)

type
> is the type of gateway: L is the local gateway; R is a remote gateway

Note: The logical machine IDs are defined in the configuration file for Oracle TMA TCP for IMS.

The terms *local* and *remote*, as used in this document, are relative to the Oracle TMA TCP for IMS gateway. *Local* refers to the IMS gateway; *remote* refers to another Oracle Tuxedo Mainframe Adapter gateway with which the IMS gateway is communicating.

The following are examples of LMIDs used in messages issued by Oracle TMA TCP for IMS:

♦ LMID(OS3901,L) is a local gateway named "OS3901"

♦ LMID(TUXC9A,R) is a remote gateway named "TUXC9A"

Messages Returned to the Remote Gateway

Oracle TMA TCP for IMS returns the following messages to a remote gateway in conjunction with positive and negative responses to requests presented by a remote gateway:

♦ BEA2030E

♦ BEA2034E

♦ BEA2038I

♦ BEA2039E

♦ BEA2042I

♦ BEA2045I

♦ BEA2047E

♦ BEA2049E

♦ BEA2078E

These messages may also be recorded in the message log and displayed on the z/OS console. For a complete description of each of these messages, refer to the "Messages Written to the Oracle TMA TCP for IMS Message Log" section that follows.

Messages Written to the Oracle TMA TCP for IMS Message Log

BEA2000I	*jobname* **BEA TMA** *vv.rr* **TCP For IMS has ended - RC =** *rc*	
	Description:	This message is issued during termination just before Oracle TMA TCP for IMS returns to z/OS.
		jobname is the z/OS job name assigned to Oracle TMA TCP for IMS.
		vv is the product version number.
		rr is the product release number.
		rc is a return code indicating the reason for termination. The most common return code is 24, indicating that termination occurred in response to a SHUTDOWN request.
	Response:	Oracle TMA TCP for IMS normally terminates in response to a SHUTDOWN request, in which case the return code is 24 and no special response is required.
		If Oracle TMA TCP for IMS terminates with a return code other than 24, termination is the result of an abnormal condition. In that case, there should be other messages that provide additional information about the reason for the termination.
BEA2001I	*jobname* **BEA TMA** *vv.rr* **TCP For IMS starting**	
	Description:	This message is issued when Oracle TMA TCP for IMS begins execution.
		jobname is the z/OS job name assigned to Oracle TMA TCP for IMS.
		vv is the product version number.
		rr is the product release number.
	Response:	None required.

BEA2002I	*jobname* BEA TMA *vv.rr* TCP For IMS initialization complete

	Description:	This message is issued when Oracle TMA TCP for IMS has successfully completed initialization and is ready to begin normal processing.
		jobname is the z/OS job name assigned to Oracle TMA TCP for IMS.
		vv is the product version number.
		rr is the product release number.

	Response:	None required.

BEA2003I	BEA TMA *vv.rr* TCP For IMS is terminating (RSN=*rc*)

	Description:	This message is issued when Oracle TMA TCP for IMS begins the termination process (for example, in response to an operator SHUTDOWN command).
		vv is the product version number.
		rr is the product release number.
		rc is a reason code indicating the reason for termination.

	Response:	Oracle TMA TCP for IMS normally terminates in response to a SHUTDOWN request, in which case the return code is 24 and no special response is required.
		If Oracle TMA TCP for IMS terminates with a return code other than 24, termination is the result of an abnormal condition. In that case, there should be other messages that provide additional information about the reason for the termination.

BEA2004E	Invalid IMS Client Request: *description*, Error(*error-code*), Reason(*reason-code*)

	Description:	An IMS client transaction has issued a request that is invalid.
		description is a text description of the error detected.
		error-code is the error code. For a description of error codes issued by Oracle TMA TCP for IMS, refer to the "Error and Reason Codes" section.
		reason-code is the reason code. For a description of reason codes issued by Oracle TMA TCP for IMS, refer to the "Error and Reason Codes" section.

	Response:	Identify and correct the indicated problem.
BEA2005E	**IMS Client Request for Service(*service*) failed: Requested service not defined**	
	Description:	The requested service is not defined to Oracle TMA TCP for IMS. *service* is the specified service name.
	Response:	The specified service is not defined in the Oracle TMA TCP for IMS configuration file. Ensure that the correct local service name is being specified, and that the service is properly defined in the configuration file with the specified local service name.
BEA2006E	**IMS Client Request for Service(*service*) failed: All outbound sessions busy**	
	Description:	All available outbound sessions with remote systems offering the service are currently in use (and no additional sessions can be started due to session limits). *service* is the specified service name.
	Response:	Retry the request later. Increase the maximum number of outbound sessions defined for remote systems that offer the specified service.
BEA2007E	**Client Request routing error: Service(*service-name*), RC(*rc*)**	
	Description:	An internal error occurred while attempting to select a remote system and outbound session to process an IMS client request. *service-name* is the specified service name. *rc* is the return code returned by the GetServiceInfo() function.
	Response:	Report the error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2008E	**Operator command unrecognized - rejected**	
	Description:	An operator command has been entered that is syntactically invalid.
	Response:	Correct and re-enter the command.

BEA2009I	Operator request for SHUTDOWN accepted	
	Description:	Oracle TMA TCP for IMS has recognized and accepted an operator request to initiate shutdown processing.
	Action:	Oracle TMA TCP for IMS begins the process of terminating.
	Response:	None required.
BEA2010I	Initializing IMS interface	
	Description:	This message is issued during initialization to indicate that the interface with IMS (i.e., via the IMS message queue) is being initialized.
	Response:	None required.
BEA2011E	Abnormal return from IMS *function* request - Status = *ss*	
	Description:	An IMS API call has returned an abnormal or unexpected status code. *function* is the IMS function code: GU (Get Unique) GN (Get Next) CHNG (Change) ISRT (Insert) PURG (Purge) CHKP (Checkpoint). *ss* is the status code from the program control block (PCB).
	Response:	Identify the type of error and determine the reason for it. For example, the error may be the result of a temporary change in the IMS configuration.
BEA2012E	Open failed for Message Log: DDNAME(*ddname*)	
	Description:	Oracle TMA TCP for IMS was unable to open the message log. *ddname* is the DDNAME of the message log dataset.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Verify that the correct DDNAME is coded in the JCL for Oracle TMA TCP for IMS and that the message log dataset has the correct attributes.
BEA2013I	Initializing network (TCP/IP) interface	

Description:	This message is issued during initialization to indicate that the TCP/IP network interface is being initialized. This includes starting a Listener session for each local gateway defined in the Oracle TMA TCP for IMS configuration file.	
Response:	None required.	

BEA2014I	**Terminating network (TCP/IP) interface**
Description:	This message is issued during termination to indicate that the TCP/IP network interface is being terminated. This involves: - terminating active inbound sessions - terminating active outbound sessions - terminating Listener sessions
Response:	None required.

BEA2015I	***ssss* Inbound Sessions are no longer being accepted by LMID(*lmid*,L)**
Description:	The Listener for the specified logical machine ID is being stopped; inbound TCP/IP connection requests are no longer accepted by this LMID.
	ssss is the socket ID assigned to the Listener by TCP/IP.
	lmid is the logical machine ID of the local gateway.
Response:	None required.

BEA2016I	**Starting Listener for LMID(*lmid*,L), IP(*ip-address*), Port(*port-number*)**
Description:	A Listener is being started for the local gateway to accept TCP/IP connection requests from remote systems.
	lmid is the logical machine ID of the local gateway.
	ip-address is the IP address at which TCP/IP connection requests are accepted. If an asterisk (*) appears, connection requests are accepted through any available network interface on the machine.
	port-number is the port number at which TCP/IP connection requests are accepted.
Response:	None required.

BEA2017E	**Unable to allocate Session Control Block for Listener**

	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal control block used to manage a Listener session.
	Response:	This is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks. It may be necessary to terminate Oracle TMA TCP for IMS (preferably with a dump) to identify and correct the problem.

BEA2018I	ssss LMID(*lmid*,L) is accepting TCP/IP connection requests at IP(*ip-address*), Port(*port-number*)
	Description:	A Listener was successfully started for a local gateway and is ready to accept inbound TCP/IP connection requests from remote systems.
		ssss is the socket ID assigned to the Listener by TCP/IP.
		lmid is the logical machine ID of the local gateway.
		ip-address is the IP address at which TCP/IP connection requests are accepted. If an asterisk (*) appears, connection requests are accepted through any available network interface.
		port-number is the port number on which TCP/IP connection requests are accepted.
	Response:	None required.

BEA2019I	ssss Inbound TCP/IP connection request received for LMID(*lmid*,L) from IP(*ip-address*: host-name)
	Description:	A TCP/IP connection request was received from a remote system for a local gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the local gateway receiving the request.
		ip-address is the IP address of the remote system making the request.
		host-name is the network name of the remote system making the request. TCP/IP obtains this information from a domain name server or from a local /etc/hosts file. If the name of the remote host cannot be determined, "Unknown" is displayed.

	Response:	None required.
BEA2020E	***ssss* Inbound TCP/IP connection request rejected: Session limit (*max-sessions*) exceeded**	
	Description:	A TCP/IP connection request from a remote system was rejected because the local gateway is already operating at the specified maximum number of concurrent, inbound sessions.
		ssss is the socket ID assigned to the connection by TCP/IP.
		max-sessions is the maximum number of concurrent, active inbound sessions supported by the local gateway.
	Response:	If necessary, increase the maximum number of inbound sessions for the local gateway (defined by the SESSIONS parameter in the GATEWAY TYPE=LOCAL statement).
BEA2021E	***ssss* Unable to allocate Session Control Block for Inbound Session**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal control block used to manage an inbound session.
		ssss is the socket ID assigned to the connection by TCP/IP.
	Response:	This is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks. It may be necessary to terminate Oracle TMA TCP for IMS (preferably with a dump) to identify and correct the problem.
BEA2022I	***ssss* Inbound TCP/IP connection accepted by LMID(*lmid*,L(*port*)) from R(*ip-address:port*)**	
	Description:	An inbound TCP/IP connection from a remote system has been accepted by a local gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the port for logical machine ID of the local gateway accepting the connection.
		port is the port for the local gateway accepting the connection.
		ip-address:port is the IP address and port for the remote system making the connection.
	Response:	None required.

BEA2023I	Requesting outbound TCP/IP connection with LMID(*lmid*,R) at IP(*ip-address*), Port(*port-number*)
Description:	The local gateway is attempting to establish an outbound TCP/IP connection with a remote system.
	lmid is the logical machine ID of the remote gateway.
	ip-address is the IP address of the remote gateway.
	port-number is the port number of the remote gateway.
Response:	None required.
BEA2024I	*ssss* Unable to establish TCP/IP connection with LMID(*lmid*,R)
Description:	The local gateway failed to establish an outbound TCP/IP connection with a remote system.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
Response:	None required.
BEA2025E	*ssss* Received message length (*rcvd-length*) exceeds maximum allowed on session (*max-length*)
Description:	The local gateway received a gateway message whose length exceeds the maximum allowed for the session.
	ssss is the socket ID assigned to the connection by TCP/IP.
	rcvd-length is the length of the message received.
	max-length is the maximum message length allowed on the session.
Action:	The session is terminated.

Response: This error can be caused by any of the following:

1. The configurations of the local and/or remote gateways may be incorrect or inconsistent with respect to the maximum message length allowed. The maximum message length of the local gateway is specified by the MAXMSGLEN parameter on the GATEWAY TYPE=LOCAL statement.

2. The remote gateway may not be properly configured to connect to an IMS gateway. In particular, the remote gateway may be configured incorrectly to connect to a CICS gateway.

3. Some other TCP/IP application (i.e., not a Oracle Tuxedo Mainframe Adapter gateway) may be attempting to connect to the IP address and port number used by Oracle TMA TCP for IMS. Check the configuration and verify that Oracle TMA TCP for IMS is not using an IP address and port number which are also being used by another TCP/IP application.

BEA2026E	*ssss* Message header length (*length*) is not valid

Description: The local gateway received a gateway message containing an invalid header length.

ssss is the socket ID assigned to the connection by TCP/IP.

length is the length of the message header received.

Action: The session is terminated.

Response: This error may be caused by any of the following:

1. The versions of the local and remote gateways may be incompatible.

2. Some other TCP/IP application (i.e., not a Oracle Tuxedo Mainframe Adapter gateway) may be attempting to connect to the IP address and port number used by Oracle TMA TCP for IMS. Check the configuration and verify that Oracle TMA TCP for IMS is not using an IP address and port number which is also being used by another TCP/IP application.

BEA2027E	*ssss* Message length (*length*) is not valid
Description:	The local gateway received a gateway message whose overall length is invalid (the total length is less than the length of the message header).
	ssss is the socket ID assigned to the connection by TCP/IP.
	length is the length of the gateway message received.
Action:	The session is terminated.
Response:	Contact your Oracle TMA TCP for IMS system programmer.

BEA2028E	*ssss* IMS Client Request timed out: LMID(*lmid*,R), Service(*service*)
Description:	An IMS client request was sent to a remote system for processing, but no response was received within a specified period of time.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
	service is the remote name of the service requested (i.e., the name of the service as defined on the remote system).
Action:	Oracle TMA TCP for IMS aborts the request and schedules the specified IMS response transaction with the appropriate return codes.
Response:	The remote system may be experiencing problems, or may be extremely busy. An adjustment to the time out value may resolve this problem.

BEA2029E	*ssss* Allocation failed for buffer (size = *buffer-size*)
Description:	Oracle TMA TCP for IMS is unable to allocate a buffer of the specified size for a gateway message.
	ssss is the socket ID assigned to the connection by TCP/IP (this field is blank if there is no associated connection).
	buffer-size is the size of the requested buffer.
Action:	The session is terminated.

	Response:	Assuming a reasonable buffer size, this is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks. It may be necessary to terminate Oracle TMA TCP for IMS (preferably with a dump) to identify and correct the problem.
BEA2030E	*ssss* **IMS Server Request failed - Invalid IMS transaction code:** **Service(***service-name***)**	
	Description:	Oracle TMA TCP for IMS received an abnormal return from IMS (PCB Status Code = "A1") while attempting to insert a server request message into the IMS message queue.
		ssss is the socket ID assigned to the connection by TCP/IP.
		service-name is the name of the requested service (i.e., the IMS transaction code for the server transaction).
	Action:	The request fails. This message is also returned to the remote gateway as part of a negative response to the request.
	Response:	The requested service name must be the (correct) IMS transaction code for the server transaction that processes the request. Check the remote configuration and verify that a valid IMS transaction name is specified as the remote service name.
BEA2031I	*ssss* **Shutdown requested by client transaction: Type(***type***)**	
	Description:	A client transaction requested a shutdown of the IMS gateway. Note that this request can be made either by a remote (e.g., Oracle TUXEDO) client or an IMS server transaction if CLIENTSHUTDOWN is set to Yes.
		ssss is the socket ID assigned to the connection by TCP/IP.
		type is the type of shutdown requested: STOP - Normal shutdown DUMP - User 3166 abend with dump
	Action:	Oracle TMA TCP for IMS initiates shutdown processing.
	Response:	Assuming that this is a valid request, no response is required.

BEA2032E	*ssss* IMS Server Request (size=*size*) exceeds maximum supported IMS message length (*max-length*)
Description:	Oracle TMA TCP for IMS received a server request which is too large to be formatted into a single IMS message segment for insertion into the IMS message queue. *ssss* is the socket ID assigned to the connection by TCP/IP. *size* is the length of the request message received. *max-length* is the maximum supported length of an IMS message segment.
Action:	The request fails.
Response:	Server requests are limited by the maximum supported IMS message segment length.

BEA2033E	Logging IMS Server Response: *mmddyyyy.hhmmss.nnnnnn* (*reason*)
Description:	Oracle TMA TCP for IMS is unable to correlate a response message returned by an IMS server transaction with a pending, active request. Each server request and response message is identified by a timestamp consisting of the date and time that Oracle TMA TCP for IMS was started and a unique serial number: *mm* month (1-12) *dd* day (1-31) *yyyy* year *hh* hour (0-23) *mm* minute (0-59) *ss* second (0-59) *nnnnnn* serial number *reason* specifies the reason that the response is being logged.
Action:	The response message is logged in the server response log dataset.

Response:	If the reason is "Server Request not found", one of the following occurred:	

1. Oracle TMA TCP for IMS was restarted after the server request was sent to IMS but before the response was received. This message may be issued following a restart of Oracle TMA TCP for IMS if server requests were in progress at the time Oracle TMA TCP for IMS was terminated.

2. The TCP/IP connection with the remote gateway was lost after the server request was sent to IMS but before the response was received.

3. A server request timed out and was aborted (either by the local or the remote gateway) before the response was received from IMS.

Response:	If the reason is "No response was expected", it indicates that an IMS server transaction issued a response to a request for which a response was not required. Correct the IMS server transaction. One other possible cause for this error is that Oracle TMA TCP for IMS was unable to identify an IMS client request and processed it as if it were an IMS server response. This can happen if an IMS client transaction improperly initializes the Oracle Client request header by failing to initialize the BEA-RESERVED1 field (BEA_Reserved1 in the C header file) to binary zero (low values).

BEA2034E	*ssss* **Invalid or unsupported request received by LMID(*lmid*,L): Opcode(*opcode*)**

Description:	Oracle TMA TCP for IMS received a gateway message from a remote gateway containing an invalid or unsupported request type.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is theological machine ID of the local gateway receiving the request.
	opcode is a numeric value identifying the request type.

Action:	The session is terminated. This message is also sent to the remote gateway as part of a negative response to the request.

	Response:	The local and remote gateways may be incompatible (different versions).

BEA2035E	**Unable to add service _service-name_, maximum service count reached.**	
	Description:	The maximum number of dynamically added services has been reached.
	Action:	The ADD SERVICE operator command is rejected.
	Response:	The service cannot be added dynamically. The Oracle TMA TCP for IMS gateway must be stopped and restarted before additional services can be added dynamically.

BEA2036I	**_ssss_ CONNECT request received by LMID(_lmid_,L)**	
	Description:	Oracle TMA TCP for IMS received a CONNECT request from a remote gateway. A CONNECT request is issued to establish an inbound session with the local gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the local gateway receiving the request.
	Response:	None required.

BEA2037I	**_ssss_ CONNECT request accepted by LMID(_lmid_,L)**	
	Description:	Oracle TMA TCP for IMS accepted a CONNECT request from a remote gateway. An inbound session has been established.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the local gateway receiving the request.
	Response:	None required.

BEA2038I	**Reserved for future use by Oracle TMA TCP for IMS.**	

BEA2039E	**_ssss_ CONNECT request rejected by LMID(_lmid_,L): Not Authorized**	

Description:	The local gateway rejected a CONNECT request from a remote gateway because the account ID and/or password presented is not correct.	
	ssss is the socket ID assigned to the connection by TCP/IP.	
	lmid is the logical machine ID of the local gateway.	
Action:	The session is terminated. This message is also returned to the remote gateway as part of a negative response to the CONNECT request.	
Response:	Check the respective configurations of the local and remote gateways to verify that they are consistent with respect to account ID and/or password. If the local gateway definition specifies that no account ID and/or password are to be used (by coding an asterisk for the account ID and/or password), the remote gateway must present a blank (i.e., spaces) account ID and/or password.	

BEA2040I	*ssss* **SHUTDOWN request received by LMID(***lmid***,L)**	
Description:	Oracle TMA TCP for IMS received a SHUTDOWN request from a remote gateway.	
	ssss is the socket ID assigned to the connection by TCP/IP.	
	lmid is the logical machine ID of the local gateway receiving the request.	
Action:	Oracle TMA TCP for IMS initiates termination processing.	
Response:	None required.	

BEA2041I	*ssss* **DISCONNECT request received by LMID(***lmid***,L)**	
Description:	Oracle TMA TCP for IMS received a DISCONNECT request from a remote gateway. A DISCONNECT request may be sent by a remote gateway to logically terminate a session.	
	ssss is the socket ID assigned to the connection by TCP/IP.	
	lmid is the logical machine ID of the local gateway receiving the request.	

Action:		Oracle TMA TCP for IMS terminates the inbound session with the remote gateway. Note, however, that the TCP/IP connection is not affected and remains open. The remote gateway may issue a subsequent CONNECT request to establish a new inbound session, or it may close the TCP/IP connection at its option.
Response:		None required.

BEA2042I	*ssss* **DISCONNECT request accepted by LMID(***lmid***,L)**
Description:	Oracle TMA TCP for IMS accepted a DISCONNECT request received from a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the local gateway receiving the request.
Action:	This message is also returned to the remote gateway as part of a positive response to the DISCONNECT request.
Response:	None required.

BEA2043I	**Inbound (***request/response***) for LMID(***lmid***,L)**
Description:	A network message was received.
	lmid is the logical machine ID of the local gateway receiving the request.
Action:	None.
Response:	None required. This message is used only when MSGLEVEL is set to DEBUG(10).

BEA2044I	*ssss* **PING request received by LMID(***lmid***,L)**
Description:	Oracle TMA TCP for IMS received a PING request from a remote gateway. A PING request may be sent by a remote gateway to verify that a logical session exists and that the partner gateway is operative.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the local gateway receiving the request.

	Response:	None required.
BEA2045I	**PING response:** *jobname* **BEA TMA** *vv.rr* **TCP For IMS**	
	Description:	This message is returned to the remote gateway by Oracle TMA TCP for IMS in response to a PING request. This message is not logged.
		jobname is the z/OS job name assigned to Oracle TMA TCP for IMS.
		vv is the product version number.
		rr is the product release number.
	Response:	None required.
BEA2046I	*ssss* **COMMAND received by LMID(***lmid***,L)**	
	Description:	Oracle TMA TCP for IMS has received a command from a remote gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the local gateway receiving the request.
	Response:	The COMMAND request is not currently supported by Oracle TMA TCP for IMS and should not be sent by a remote gateway. (See ID: BEA2047E).
BEA2047E	*ssss* **Command rejected by LMID(***lmid***,L): Remote commands are not supported**	
	Description:	Oracle TMA TCP for IMS does not currently support commands sent by remote gateways.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the local gateway.
	Action:	Oracle TMA TCP for IMS ignores the request. This message is also returned to the remote gateway as part of a negative response to the COMMAND request.
	Response:	The remote gateway should not be sending commands. Check the configuration and version of the remote gateway to determine why this is occurring.

BEA2048I	Allocating Buffer (size=*n*)
	Description: An internal storage buffer was allocated.
	Action: None.
	Response: None required. This message is used only when MSGLEVEL is set to DEBUG(10).

BEA2049E	*ssss* Protocol error detected by LMID(*lmid*,L) on Inbound Session: Request(*request*), State(*state*)
	Description: Oracle TMA TCP for IMS received a request from a remote gateway, but the session is currently in a state which is inconsistent with the request.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the local gateway receiving the request.
	request is the type of request received: CONNECT, DISCONNECT, etc.
	state is a numeric value corresponding to the current state of the session, as viewed by Oracle TMA TCP for IMS.
	Action: Oracle TMA TCP for IMS takes no specific action. However, subsequent errors (including additional protocol errors) can occur, which likely leads to termination of the session. This message is also returned to the remote gateway as part of a negative response to the request.
	Response: This error can occur if two gateways become "out of sync" on a session with respect to their respective states. If this error occurs frequently or persistently, notify the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2050I	IMS Host hostname has been added.
	Description: The ADD HOST operator command has completed successfully.
	Action: None.
	Response: None required.

BEA2051E	*ssss* **Invalid or unsupported response received from LMID(***lmid***,R): Opcode(***opcode***)**	
	Description:	Oracle TMA TCP for IMS received a response message from a remote gateway on an outbound session that cannot be identified (that is, the Opcode in the Oracle Tuxedo Mainframe Adapter message header is not valid).
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the remote gateway.
		opcode is the numeric value of the Opcode in the Message Header.
	Action:	The session is terminated.
	Response:	If this error occurs, notify the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2052I	*ssss* **Issuing CONNECT request for LMID(***lmid***,R)**	
	Description:	Oracle TMA TCP for IMS is requesting an outbound session with a remote gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the remote gateway.
	Response:	None required.
BEA2053E	*ssss* **CONNECT request rejected by LMID(***lmid***,R): GWError(***gwerror***), GWMsg(***gwmsg***)**	
	Description:	Oracle TMA TCP for IMS received a negative response to a CONNECT request to establish an outbound session with a remote gateway.
		ssss is the socket ID assigned to the connection by TCP/IP.
		lmid is the logical machine ID of the remote gateway.
		gwerror is the gateway error code returned by the remote gateway.
		gwmsg is the gateway error message returned by the remote gateway.
	Action:	The CONNECT request fails and the TCP/IP connection with the remote gateway is terminated.

	Response:	Refer to the documentation for the remote gateway for information about the reason for the error. Also, consult the remote gateway's log file for additional information.
BEA2054I	*ssss* **CONNECT request accepted by LMID(***lmid***,R)**	
	Description:	Oracle TMA TCP for IMS has received a positive response to a CONNECT request to establish an outbound session with a remote gateway. The session is established and is ready to process requests. *ssss* is the socket ID assigned to the connection by TCP/IP. *lmid* is the logical machine ID of the remote gateway.
	Response:	None required.
BEA2055I	*ssss* **Issuing DISCONNECT for LMID(***lmid***,R)**	
	Description:	Oracle TMA TCP for IMS is ending an outbound session with a remote gateway. *ssss* is the socket ID assigned to the connection by TCP/IP. *lmid* is the logical machine ID of the remote gateway.
	Response:	None required.
BEA2056E	*ssss* **DISCONNECT rejected by LMID(***lmid***,R): GWError(***gwerror***), GWMsg(***gwmsg***)**	
	Description:	Oracle TMA TCP for IMS received a negative response to a DISCONNECT request to end an outbound session with a remote gateway. *ssss* is the socket ID assigned to the connection by TCP/IP. *lmid* is the logical machine ID of the remote gateway. *gwerror* is the gateway error code returned by the remote gateway. *gwmsg* is the gateway error message returned by the remote gateway.
	Action:	The session is terminated.
	Response:	Refer to the documentation for the remote gateway for information about the reason for the error. Also, consult the remote gateway's log file for additional information.

BEA2057I	ssss DISCONNECT accepted by LMID(*lmid*,R)
Description:	Oracle TMA TCP for IMS received a positive response to a DISCONNECT request to end an outbound session with a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
Response:	None required.

BEA2058I	ssss Sending PING request to LMID(*lmid*,R)
Description:	Oracle TMA TCP for IMS is sending a PING request to a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
Response:	None required.

BEA2059E	ssss PING request rejected by LMID(*lmid*,R): GWError(*gwerror*), GWMsg(*gwmsg*)
Description:	Oracle TMA TCP for IMS received a negative response to a PING request sent to a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
	gwerror is the gateway error code returned by the remote gateway.
	gwmsg is the gateway error message returned by the remote gateway.
Action:	The session is terminated.
Response:	Refer to the documentation for the remote gateway for information about the reason for the error. Also, consult the remote gateway's log file for additional information.

BEA2060I	*ssss* PING response from LMID(*lmid*,R): response
Description:	Oracle TMA TCP for IMS received a positive response to a PING request sent to a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway. response is the text of the response message returned by the remote gateway.
Response:	None required.

BEA2061I	*ssss* Sending command to LMID(*lmid*,R)
Description:	Oracle TMA TCP for IMS is sending a command to a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
Response:	None required.

BEA2062E	*ssss* COMMAND rejected by LMID(*lmid*,R): GWError(*gwerror*), GWMsg(*gwmsg*)
Description:	Oracle TMA TCP for IMS received a negative response to a command sent to a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the remote gateway.
	gwerror is the gateway error code returned by the remote gateway.
	gwmsg is the gateway error message returned by the remote gateway.
Action:	The session is terminated.
Response:	Refer to the documentation for the remote gateway for information about the reason for the error. Also, consult the remote gateway's log file for additional information.

BEA2063E	*ssss* Unable to allocate buffer for IMS Client Request (size=*buffer-size*)
Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal buffer required to process an IMS client request. *ssss* is the socket ID assigned to the connection by TCP/IP. *buffer-size* is the size of the required buffer.
Response:	This is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks. It may be necessary to terminate Oracle TMA TCP for IMS (preferably with a dump) to identify and correct the problem.

BEA2064E	*ssss* IMS Client Request sent to LMID(*lmid*,R) failed: GWError(*gwerror*), GWMsg(*gwmsg*)
Description:	Oracle TMA TCP for IMS received a negative response to an IMS client request sent to a remote gateway. *ssss* is the socket ID assigned to the connection by TCP/IP. *lmid* is the logical machine ID of the remote gateway. *gwerror* is the gateway error code returned by the remote gateway. *gwmsg* is the gateway error message returned by the remote gateway.
Action:	The specified IMS client response transaction is scheduled with the appropriate return codes.
Response:	Refer to the documentation for the remote gateway for information about the reason for the error. Also, consult the remote gateway's log file for additional information.

BEA2065E	_ssss_ State error on _inout_ Session: LMID(_lmid_,_type_), Request(_request_), State(_state_)	
	Description:	Oracle TMA TCP for IMS attempted to execute an operation against a session which is not currently in a state consistent with the requested operation.
		ssss is the socket ID assigned to the connection by TCP/IP.
		inout session type: inbound or outbound.
		lmid is the logical machine ID of the gateway.
		type is the gateway type: L (local) or R (remote).
		request is the request type: CONNECT, DISCONNECT, etc.
		state describes the current state of the session.
	Action:	The session is terminated.
	Response:	Refer this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2066E	Unable to allocate Session Control Block for Outbound Session	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal control block required to manage an outbound session.
	Response:	This is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks. It may be necessary to terminate Oracle TMA TCP for IMS (preferably with a dump) to identify and correct the problem.
BEA2067I	_ssss_ TCP/IP connection closed by session partner	
	Description:	Oracle TMA TCP for IMS was notified that a TCP/IP connection with a remote system was closed by the session partner.
		ssss is the socket ID assigned to the connection by TCP/IP.
	Action:	The session is terminated.
	Response:	None required.

BEA2068I	*ssss* TCP/IP connection reset	
	Description:	Oracle TMA TCP for IMS was notified that a connection with a remote system was reset. A reset occurs when the connection is hard-closed (i.e., closed without first issuing a TCP/IP shutdown request). *ssss* is the socket ID assigned to the connection by TCP/IP.
	Action:	The session is terminated.
	Response:	None required.
BEA2069E	*ssss* Length error on socket read	
	Description:	TCP/IP reported an illogical length read from a connection; for example, the length reported was greater than the actual length requested. *ssss* is the socket ID assigned to the connection by TCP/IP.
	Action:	The session is terminated.
	Response:	This error may indicate a problem with TCP/IP for z/OS.
BEA2070E	*ssss* Abnormal return from TCP/IP API request: fcn(*function*), rc(*rc*), errno(*errno*)	
	Description:	Oracle TMA TCP for IMS received an abnormal return from a TCP/IP socket operation. *ssss* is the socket ID assigned to the connection by TCP/IP. *function* is the TCP/IP API function called: read, write, etc. *rc* is the TCP/IP return code (usually -1). *errno* is the TCP/IP errno value returned.
	Action:	The session is terminated.
	Response:	Consult the IBM TCP/IP for z/OS documentation for a description of possible errno values and their meanings.

BEA2071I	*ssss* Session termination in progress (RSN=*reason*)
Description:	Oracle TMA TCP for IMS has initiated termination of a session with a remote gateway.
	ssss is the socket ID assigned to the connection by TCP/IP.
	reason is a numeric value indicating the reason the session is being terminated. Some typical reason codes are: 12 A socket error occurred.
	16 The connection was closed by the session partner. 20 An internal gateway request (such as CONNECT) timed out. 24 BEA TMA TCP for IMS is terminating in response to a SHUTDOWN request. 28 Session limit exceeded (a new session cannot be started). 60 A session protocol error occurred.
Response:	This action typically occurs as the result of a session-related error condition (identified by the reason code), or in conjunction with a SHUTDOWN request. If a reason code other than one of those previously listed is given, the error should be reported to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2072I	*ssss* TCP/IP connection closed
Description:	As part of the session termination process, Oracle TMA TCP for IMS successfully closed the TCP/IP connection. ssss is the socket ID assigned to the connection by TCP/IP.
Response:	None required.

BEA2073I	*ssss* Session termination complete
Description:	A session was successfully terminated by Oracle TMA TCP for IMS.
	ssss is the socket ID assigned to the connection by TCP/IP.
Response:	None required.

BEA2074E	Error writing to Server Response Log File
Description:	Oracle TMA TCP for IMS received an abnormal return attempting to write a record to the server response log file.

Response:	Check the server response log file to ensure that it is allocated with the correct dataset attributes, allocated using the correct DDNAME, and is not full or experiencing I/O errors.	

BEA2075E — **Open failed for server response log file: DDNAME(*ddname*)**

Description:	Oracle TMA TCP for IMS is not able to open the Server Response Log File.
	ddname is the DDNAME used by Oracle TMA TCP for IMS to open the dataset.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Check the server response log file to ensure that it is allocated with the correct dataset attributes and is allocated using the correct DDNAME as shown.

BEA2076E — **ssss IMS Server Request received with previous request pending (timeout assumed)**

Description:	Oracle TMA TCP for IMS received an IMS server request from a remote gateway, but a prior request is still pending (i.e., currently being serviced by IMS).
	ssss is the socket ID assigned to the connection by TCP/IP.
Action:	Oracle TMA TCP assumes that the remote gateway timed out while waiting for a response to the previous request. Therefore, the previous request (currently being serviced by IMS) is aborted (discarded) and Oracle TMA TCP for IMS begins processing the new request.
Response:	This error can occur when a remote gateway cancels a previously sent request (i.e., due to timeout) and immediately sends another request.

BEA2077E — **ssss Pending IMS Server Request for Service(service) aborted**

Description:	Oracle TMA TCP for IMS aborted processing of the current server request.
	ssss is the socket ID assigned to the connection by TCP/IP.
	service is the name of the IMS server transaction scheduled to process the current request.

	Action:	The current request is discarded and the session is ready to accept a new request.
	Response:	None required.
BEA2078E	**_ssss_ IMS Server Request timed out: Service(_service_)**	
	Description:	An IMS server request requiring a response was being processed by IMS, but no response was received within a specified period of time.
		ssss is the socket ID assigned to the connection by TCP/IP.
		service is the name of the IMS server transaction scheduled to process the request.
	Action:	The request is aborted. This message is also returned to the remote gateway as part of a negative response to the request.
	Response:	Check the IMS server transaction (service) that processes the request to make sure that it is not stopped or has an unusually high backlog.
BEA2079E	**Client Response failed: Sense Code=_sc_ Reason=_reason_**	
	Description:	A response to a client request was rejected by OTMA.
		_sc_ is the sense code.
		reason is a numeric value indicating the reason for the response failure.
	Action:	The response is logged.
	Response:	Consult the IMS Open Transaction Manager Access Guide to determine the cause of the error.
BEA2080E	**Malloc failed for parse work area**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal work area used to parse the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2081I	IOPCB after CHKP Call:
Description:	Displays the contents of the IOPCB after a CHKP DLI call.
Action:	None.
Response:	None required. This message is used only when MSGLEVEL is set to DEBUG(10).

BEA2082E	Missing LMID option for REMOTE GATEWAY
Description:	A required keyword parameter (LMID) was omitted from a GATEWAY TYPE=REMOTE statement in the configuration File.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2083E	Missing HOSTADDR option for REMOTE GATEWAY
Description:	A required keyword parameter (HOSTADDR) was omitted from a GATEWAY TYPE=REMOTE statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2084E	Missing PORT option for REMOTE GATEWAY
Description:	A required keyword parameter (PORT) was omitted from a GATEWAY TYPE=REMOTE statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2085E	NAME option is invalid for REMOTE GATEWAY
Description:	An invalid keyword parameter (NAME) was specified on a GATEWAY TYPE=REMOTE statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.

	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2086E	**TIMEOUT option is invalid for REMOTE GATEWAY**	
	Description:	An invalid keyword parameter (TIMEOUT) was specified on a GATEWAY TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2087E	**Cannot malloc for Remote Host**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal control block used to manage a remote gateway.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2088E	**Missing LMID option for LOCAL GATEWAY**	
	Description:	A required keyword parameter (LMID) was omitted from a GATEWAY TYPE=LOCAL statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2089E	**Missing HOSTADDR option for LOCAL GATEWAY**	
	Description:	A required keyword parameter (HOSTADDR) was omitted from a GATEWAY TYPE=LOCAL statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2090E	**Missing PORT option for LOCAL GATEWAY**	

Description:	A required keyword parameter (PORT) was omitted from a GATEWAY TYPE=LOCAL statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2091E	Missing ACCOUNT option for LOCAL GATEWAY
Description:	A required keyword parameter (ACCOUNT) was omitted from a GATEWAY TYPE=LOCAL statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2092E	Missing PASSWORD option for LOCAL GATEWAY
Description:	A required keyword parameter (PASSWORD) was omitted from a GATEWAY TYPE=LOCAL statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2093E	NAME option is invalid for LOCAL GATEWAY
Description:	An invalid keyword parameter (NAME) was specified on a GATEWAY TYPE=LOCAL statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2094E	TIMEOUT option is invalid for LOCAL GATEWAY
Description:	An invalid keyword parameter (TIMEOUT) was specified on a GATEWAY TYPE=LOCAL statement in the configuration file.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.

	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2095E	**Cannot malloc for Local Host**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage for an internal control block used to manage the local gateway.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2096E	**Missing LMID option for REMOTE SERVICE**	
	Description:	A required keyword parameter (LMID) was omitted from a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2097E	**HOSTADDR option is invalid for REMOTE SERVICE**	
	Description:	An invalid keyword parameter (HOSTADDR) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2098E	**PORT option is invalid for REMOTE SERVICE**	
	Description:	An invalid keyword parameter (PORT) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2099E	**ACCOUNT option is invalid for REMOTE SERVICE**	

	Description:	An invalid keyword parameter (ACCOUNT) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2100E	**PASSWORD option is invalid for REMOTE SERVICE**	
	Description:	An invalid keyword parameter (PASSWORD) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2101E	**MAXMSGLEN option is invalid for REMOTE SERVICE**	
	Description:	An invalid keyword parameter (MAXMSGLEN) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2102E	**SESSIONS option is invalid for REMOTE SERVICE**	
	Description:	An invalid keyword parameter (SESSIONS) was specified on a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.
BEA2103E	**Missing NAME option for REMOTE SERVICE**	
	Description:	A required keyword parameter (NAME) was omitted from a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.

	Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2104E	**Missing TIMEOUT option for REMOTE SERVICE**	
	Description:	A required keyword parameter (TIMEOUT) was omitted from a SERVICE TYPE=REMOTE statement in the configuration file.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the problem and restart Oracle TMA TCP for IMS.

BEA2105E	**Cannot malloc for Work Service**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage used to process remote service definitions.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2106E	**Cannot malloc for CurrWorkSer Info**	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage used to process remote service definitions.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2107E	**The command lines which are in error are: _text_**	
	Description:	When a syntax error is detected during processing of the configuration file, Oracle TMA TCP for IMS displays the lines containing the error.
		text is the line containing the text in error.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the error and restart Oracle TMA TCP for IMS.

BEA2108E	**Cannot malloc for ServiceKeys**	

	Description:	Oracle TMA TCP for IMS was unable to allocate storage used to process remote service definitions.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2109E	**Could not find LMID [*lmid*] for Service [*service*]**	
	Description:	The logical machine ID (LMID) specified on a SERVICE TYPE=REMOTE statement could not be matched with a GATEWAY TYPE=REMOTE statement specifying the same (matching) LMID in the configuration file. *lmid* is the logical machine ID specified in the SERVICE TYPE=REMOTE statement. *service* is the local service name specified in the SERVICE TYPE=REMOTE statement.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Each Remote Service must be associated with a particular remote gateway (identified by a unique logical machine ID) that provides the service. Check the GATEWAY TYPE=REMOTE and SERVICE TYPE=REMOTE statements to verify that they specify the same logical machine ID. Correct any errors and restart Oracle TMA TCP for IMS.
BEA2110E	**Syntax error in configuration file, line *line-no***	
	Description:	A syntax error was detected during processing of the configuration file. *line-no* is the line number of the line containing the syntax error.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Correct the error and restart Oracle TMA TCP for IMS.
BEA2111E	**Line in error: text**	

Description:	This message is displayed in conjunction with message BEA2110E.	
	text is the line containing the text in error.	
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.	
Response:	Correct the error and restart Oracle TMA TCP for IMS.	

BEA2112E	**Open failed for configuration file: DDNAME(*ddname*)**
Description:	Oracle TMA TCP for IMS was unable to open the configuration file.
	ddname is the logical dataset name of the configuration file dataset.
Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
Response:	Verify that the correct DDNAME is coded in the JCL for Oracle TMA TCP for IMS and that the configuration file dataset has the correct attributes.

BEA2113I	***jobname* BEA TMA *vv.rr* TCP For IMS ready**
Description:	This message is issued by Oracle TMA TCP for IMS in conjunction with an outstanding WTOR which can be used to enter operator commands.
	jobname is the z/OS job name assigned to Oracle TMA TCP for IMS.
	vv is the product version number.
	rr is the product release number.
Response:	None required. You can reply to the associated WTOR to enter an operator command for Oracle TMA TCP for IMS.

BEA2114I	***ssss* Session TIMEOUT detected on LMID(*lmid,type*)**
Description:	This message is issued by Oracle TMA TCP for IMS when an IDLE TIMEOUT has occurred.
	ssss is the socket ID assigned to the connection by TCP/IP.
	lmid is the logical machine ID of the gateway.
	type is the gateway type: L (local) or R (remote).

	Response:	Refer this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2115I	**Service *service-name* for IMSID *logical-IMS-identifier* has been added.**	
	Description:	The ADD SERVICE operator command for a local service has completed successfully.
		service-name is the local service name which is passed to IMS as the transaction name.
		logical-IMSID-identifier is a symbolic name that uniquely identifies an IMS system definition. This name must match a logical IMS ID (IMSID) specified in a HOST, TYPE=IMS statement.
	Action:	None.
	Response:	None required.
BEA2116	**Reserved for future use.**	
BEA2117I	**IMS Host IMSID has been modified.**	
	Description:	The MOD HOST operator command has completed successfully. IMSID is a symbolic name that uniquely identifies the IMS system definition.
	Action:	None.
	Response:	None required.
BEA2117I	**IMS Host *IMSID* has been modified.**	
	Description:	The MOD HOST operator command has completed successfully.
		IMSID is a symbolic name that uniquely identifies the IMS system definition.
	Action:	None.
	Response:	None required.
BEA2118E	**IMS Host must be stopped prior to modifying.**	

	Description:	The STOP HOST command must be issued before entering the MOD HOST command.
	Action:	The MOD HOST command is aborted.
	Response:	Enter the STOP HOST command and then retry the MOD HOST command.
BEA2119E	**Missing IMSID option for MOD HOST.**	
	Description:	The IMSID parameter was omitted and is required.
	Action:	The MOD HOST command is aborted.
	Response:	Enter the IMSID parameter and then retry the MOD HOST command.
BEA2120E	**Allocation failed for OTMA Work Area**	
	Description:	Upon initialization of the OTMA interface, Oracle TMA TCP for IMS was unable to allocate storage used to interface with OTMA.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.
	Response:	Refer this error to the systems programmer responsible for Oracle TMA TCP for IMS.
BEA2121I	**Terminating OTMA interface**	
	Description:	During shutdown, Oracle TMA TCP for IMS prepares to close its connection with OTMA.
	Action:	The OTMA interface is closed and its associated resources are returned to the system.
	Response:	None required.
BEA2122E	**Cannot resolve host name**	
	Description:	During configuration file processing, a hostname for a local or remote gateway could not be resolved by the domain name server or the local host file.

	Action:	If the error occurs during initialization, Oracle TMA TCP for IMS terminates. If the error occurs during the dynamic addition of a gateway, the gateway is not added.
	Response:	Check the hostname to verify spelling. Contact your network administrator to verify the hostname or change the hostname if necessary.
BEA2123I	**Host address for *hostname* is *IP-address***	
	Description:	A hostname in the configuration file has been resolved to the following IP address.
	Action:	None.
	Response:	None required.
BEA2124E	**Client Bid Failed**	
	Description:	The initial communication between Oracle TMA TCP for IMS and the IMS OTMA interface failed.
	Action:	Initialization of the OTMA interface fails.
	Response:	Verify that the OTMA interface for the IMS system you want to access is enabled and that the OTMAGROUP parameter defined for Oracle TMA TCP for IMS matches the XCF group defined to IMS.
BEA2125I	**OTMA Msg Received**	
	Description:	Informational message only displayed when message level is set to DEBUG(10).
	Action:	None
	Response:	None required.
BEA2126I	**OTMA Msg Sent**	
	Description:	Informational message only displayed when message level is set to DEBUG(10).
	Action:	None
	Response:	None required.

BEA2127I	Client-Bid Message Sent	
	Description:	Informational message only displayed when message level is set to DEBUG(10).
	Action:	None
	Response:	None required.
BEA2128I	XCF Status with IMS Client OTMANAME=*status*	
	Description:	Response message to the STATUS operator command.
		status is one of the following: ACTIVE, UNKNOWN, ERROR, RESET, or BID SENT
	Action:	None
	Response:	None required.
BEA2129I	Processing input from file *filename*	
	Description:	Response message to the INFILE operator command.
	Action:	None
	Response:	None required.
BEA2130I	Writing Configuration to file *filename*	
	Description:	Response message to the CHKPT CONFIG operator command.
	Action:	None
	Response:	None required.
BEA2131E	Open failed for Checkpoint File: *filename*	
	Description:	The filename given in the CHKPT CONFIG operator command was not a valid file name or the file could not be created.
	Action:	The configuration checkpoint is aborted.

Response:	Check the file name and re-enter the command. Contact the system programmer responsible for Oracle TMA TCP for IMS to check for availability of DASD resources.

BEA2132I	**Configuration checkpoint complete**
Description:	Normal response to a CHKPT CONFIG operator command.
Action:	None
Response:	None required.

BEA2133E	**Error opening file *filename***
Description:	The file name entered with the INFILE operator command could not be opened.
Action:	The INFILE command processing is aborted.
Response:	Check the file name and retry if it is correct. Resolve any contention issues with other processes needing exclusive access to the file.

BEA2134E	**Host LMID not Unique**
Description:	The LMID for a gateway definition is not a unique name. No two gateways can share the same LMID.
Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization aborts. If the error occurs while dynamically adding a gateway, the gateway is not added.
Response:	Change the LMID to a unique name.

BEA2135I	**Gateway *lmid* has been added**
Description:	This is the normal response to an ADD GATEWAY operator command.
	lmid is the logical machine ID specified for the ADD GATEWAY command.
Action:	None
Response:	None required.

BEA2136E	Missing LMID option for MOD GATEWAY	
	Description:	The LMID option is required for a MOD GATEWAY operator command.
	Action:	The command action is aborted.
	Response:	Add the LMID parameter to the command and retry.
BEA2137E	Gateway *lmid* is invalid	
	Description:	The LMID parameter entered in a MOD GATEWAY or MOD SERVICE command is not a currently defined gateway.
		lmid is the logical machine ID specified for the MOD command.
	Action:	The MOD command is aborted.
	Response:	Change the LMID to match the name of the defined gateway to be modified.
BEA2138E	Gateway must be stopped prior to modifying	
	Description:	A MOD GATEWAY operator command was issued prior to stopping the gateway with a STOP GATEWAY command.
	Action:	The MOD command processing is aborted.
	Response:	Issue a STOP GATEWAY command and retry the MOD GATEWAY command.
BEA2139I	Gateway *lmid* has been modified	
	Description:	This is the normal response to a MOD GATEWAY operator command.
		lmid is the logical machine ID specified for the MOD GATEWAY command.
	Action:	None
	Response:	None required.
BEA2140I	Gateway *lmid* has been started	

Description:	This is the normal response to a START GATEWAY command.	
	lmid is the logical machine ID specified for the START GATEWAY command.	
Action:	None	
Response:	None required.	
BEA2141I	**Gateway *lmid* is being stopped**	
Description:	This is the initial response to a STOP GATEWAY operator command.	
	lmid is the logical machine ID specified for the STOP GATEWAY command.	
Action:	All outstanding messages are allowed to continue processing unless the IMMED=YES option was specified. All sessions for the gateway are then closed.	
Response:	None required.	
BEA2142I	**Gateway *lmid* has been stopped**	
Description:	The STOP GATEWAY command has completed stopping the gateway.	
	lmid is the logical machine ID specified for the STOP GATEWAY command.	
Action:	None	
Response:	None required.	
BEA2143E	**Local Service Name not Unique**	
Description:	A service of the same name exists for the LMID associated with this service.	
Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization aborts and the program terminates. If the error occurs during processing of an ADD SERVICE operator command, command processing aborts.	
Response:	Choose a unique name for the service and retry the command.	

BEA2144I	Service *service-name* for LMID *lmid* has been added	
	Description:	This is the normal response to an ADD SERVICE operator command.
		service is the local service name specified in the SERVICE TYPE=REMOTE statement.
		lmid is the logical machine ID specified for the ADD SERVICE command.
	Action:	None
	Response:	None required.
BEA2145I	**Service *service-name* for LMID *lmid* is invalid**	
	Description:	The service name specified in the MOD SERVICE operator command does not exist, or the LMID is incorrect.
		service is the local service name specified in the SERVICE TYPE=REMOTE statement.
		lmid is the logical machine ID specified for the MOD SERVICE command.
	Action:	The MOD SERVICE command processing aborts.
	Response:	Correct the error and retry the command.
BEA2146E	**Service must be stopped prior to modifying**	
	Description:	A MOD SERVICE operator command was entered prior to stopping the service with a STOP SERVICE command.
	Action:	The MOD SERVICE command processing aborts.
	Response:	Issue a STOP SERVICE command and retry the MOD SERVICE command.
BEA2147I	**Service *service-name* for LMID *lmid* has been modified**	

Description:	This is the normal response for a MOD SERVICE operator command.	
	service is the local service name specified in the SERVICE TYPE=REMOTE statement.	
	lmid is the logical machine ID specified for the MOD SERVICE command.	
Action:	None	
Response:	None required.	
BEA2148I	**System parameters have been modified**	
Description:	This is the normal response to a MOD SYSTEM operator command.	
Action:	None	
Response:	None required.	
BEA2149E	**Inbound TCP/IP connection refused: MCB Error**	
Description:	A connection attempt from a remote gateway was rejected because of a shortage of message control blocks probably due to an allocation of system resource failure.	
Action:	The connection is refused.	
Response:	Refer this error to the system programmer responsible for Oracle TMA TCP for IMS.	
BEA2150S	**Security Violation: Tran=*tran-id*, UserID=*userid*, GroupID=*groupid*, TermID=*terminalid***	
Description:	A request to execute a transaction on behalf of the given userid failed authorization.	
Action:	A security error response is returned to the requestor.	
Response:	None required. The message is given for auditing purposes only.	
BEA2151E	**XCF Send Failed Ret=*return-code* Rsn=*reason-code***	
Description:	An attempt to send a message to OTMA failed.	

	Action:	A system error response is sent back to the requestor. TMA will then abend.
	Response:	Verify the OTMA system parameters, correct any errors, and retry. If the error persists, refer this error to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2152I	Message rejected by LMID(*lmid*,L) on Inbound Session - Gateway Stopped	
	Description:	A new request was received by a gateway in a stopping condition.
		lmid is the logical machine ID specified for the MOD SERVICE command.
	Action:	A system error response is sent to the requestor.
	Response:	None required.

BEA2153I	Service *service-name* for LMID *lmid* has been started	
	Description:	This is the normal response for a START SERVICE operator command.
		service-name is the name of the requested service (i.e., the IMS transaction code for the server transaction).
		lmid is the logical machine ID specified for the gateway.
	Action:	None
	Response:	None required.

BEA2154I	Service *service-name* for LMID *lmid* is being stopped	
	Description:	This is the initial response to a STOP SERVICE operator command.
		service-name is the name of the requested service (i.e., the IMS transaction code for the server transaction).
		lmid is the logical machine ID specified for the gateway.
	Action:	All outstanding requests are allowed to continue processing unless the IMMED=YES option was specified.
	Response:	None required.

BEA2155I	Service *service-name* for LMID *lmid* has been stopped	

Description:	This is the normal response to a STOP SERVICE operator command.	
	service-name is the name of the requested service (i.e., the IMS transaction code for the server transaction).	
	lmid is the logical machine ID specified for the gateway.	
Action:	None	
Response:	None required.	
BEA2156I	**Response received for previously timed out request**	
Description:	A response was received for a request for which timeout processing had already initiated.	
Action:	None	
Response:	None required.	
BEA2157I	**Hostname maximum length (256) exceeded.**	
Description:	The hostname string used in the HOSTADDR gateway parameter is too long.	
Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization aborts. If the error occurs while dynamically adding a gateway, the gateway is not added.	
Response:	Contact your network administrator to provide a new hostname less than 256 characters, or use the IP address in dotted decimal format.	
BEA2158I	**Maximum number of hostnames (256) exceeded.**	
Description:	More than 256 gateways were defined in the configuration using the hostname option of the HOSTADDR parameter.	
Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization aborts. If the error occurs while dynamically adding a gateway, the gateway is not added.	
Response:	Refer this error to the systems programmer responsible for Oracle TMA TCP for IMS.	
BEA2159I	**Inbound TCP/IP connection request rejected: Gateway Stopped**	

Description:	A remote gateway connection attempt to a stopped gateway was rejected.	
Action:	A connection error response was returned to the remote gateway.	
Response:	None required.	

BEA2160E	**IMS Error Message received**	
Description:	IMS rejected a service request for a variety of reasons.	
Action:	An IMS DFS Error message was returned to the gateway on behalf of a client request.	
Response:	Examine the text of the message to determine the nature of the error and take corrective action.	

BEA2161E	**IMS Server Request failed - IMS Unavailable**	
Description:	The IMS host system required to service this request is not available.	
Action:	An error message is returned to the client with the appropriate error and reason codes set.	
Response:	Determine why the IMS Host is unavailable and change the configuration to reroute the request to another available Host, if possible.	

BEA2162I	**OTMA Status change detected with status: Old=*oldstatus* New=*newstatus***	
Description:	The Tuxedo Mainframe Adapter gateway detected a status change with an IMS Host.	
Action:	The message is logged and displayed to the console.	
Response:	Determine why the status of the IMS Host has changed.	

BEA2163E	**OTMAINPIPE maximum length n exceeded.**	
Description:	An IMS Host was configured with an OTMAINPIPE parameter.	
Action:	The message is logged and displayed to the console.	

	Response:	Correct the configuration information and retry.
BEA2164I	**Multi-Segment Message Reconstructed**	
	Description:	A multi-segment client response was received.
	Action:	None.
	Response:	None required. This message is used only when MSGLEVEL is set to DEBUG(10).
BEA2165E	**Not enough spare sockets available.**	
	Description:	A dynamic configuration change was attempted that required the use of additional TCP/IP socket resources and not enough were available. Message BEA2166E should follow with additional details.
	Action:	The configuration change was rejected.
	Response:	The TMA TCP for IMS gateway must be shut down to accomplish the change. Consider increasing the value of the SPARESOCKETS parameter for future dynamic updates.
BEA2166E	**Requested:** *n*, **Available:** *n*	
	Description:	A follow on message to BEA2165E. This message details the TCP/IP socket resources requested and available.
	Action:	The configuration change was rejected.
	Response:	The TMA TCP for IMS gateway must be shut down to accomplish the change. Consider increasing the value of the SPARESOCKETS parameter for future dynamic updates.
BEA2167E	**Invalid Command Syntax**	
	Description:	The command was entered incorrectly.
	Action:	The command was rejected.
	Response:	For correct command syntax, refer to the "Configuring Oracle TMA TCP for IMS" section.
BEA2168E	**IMS Server Request for Service(*service-name*) failed: Requested Service not defined**	

	Description:	The service request from a remote client was for an undefined service.
	Action:	The client request is rejected with an appropriate error and reason code.
	Response:	Update the remote client to request the correct service name or define a new local service with the name requested.
BEA2169E	IMS Server Request for Service (*service-name*) failed:Requested Service not available	
	Description:	The service request from a remote client was for a service that is temporarily unavailable.
	Action:	The client request is rejected with an appropriate error and reason code.
	Response:	Determine why the service is currently unavailable and take corrective action, if necessary.
BEA2170E	IMS Server Request for Service (*service-name*) failed: Buffer Size Error	
	Description:	The service request from a remote client failed due to an internal buffer size error. Typically, this is caused by exceeding the maximum message size of 64K, including internal header data.
	Action:	The client request is rejected with an appropriate error and reason code.
	Response:	Contact Oracle Support to report the error.
BEA2171E	Multiplex Count must be greater than zero (0)	
	Description:	A GATEWAY configuration statement contained a MULTIPLEX parameter set to zero.
	Action:	The configuration is rejected. If the error occurred on initial startup, the TMA TCP for IMS gateway exits.
	Response:	Change the MULTIPLEX parameter to a number greater than zero or remove the parameter and use the default (1).
BEA2172E	Missing IMSID option for IMS HOST	

	Description:	A HOST configuration statement was missing an IMSID parameter which is required.
	Action:	The configuration is rejected. If the error occurred on initial startup, the TMA TCP for IMS gateway exits.
	Response:	Correct the configuration information and retry.
BEA2173E	Missing OTMANAME option for IMS HOST	
	Description:	A HOST configuration statement was missing an OTMANAME parameter which is required.
	Action:	The configuration is rejected. If the error occurred on initial startup, the TMA TCP for IMS gateway exits.
	Response:	Correct the configuration information and retry.
BEA2174E	Missing OTMAINPIPE option for IMS HOST	
	Description:	A HOST configuration statement was missing an OTMAINPIPE parameter which is required.
	Action:	The configuration is rejected. If the error occurred on initial startup, the TMA TCP for IMS gateway exits.
	Response:	Correct the configuration information and retry.
BEA2175E	Missing OTMAOUTPIPE option for IMS HOST	
	Description:	A HOST configuration statement was missing an OTMAOUTPIPE parameter which is required.
	Action:	The configuration is rejected. If the error occurred on initial startup, the TMA TCP for IMS gateway exits.
	Response:	Correct the configuration information and retry.
BEA2176E	Cannot malloc for IMS HOST	
	Description:	Oracle TMA TCP for IMS was unable to allocate storage used to process IMS HOST definitions.
	Action:	Initialization fails and Oracle TMA TCP for IMS terminates.

	Response:	Report this error to the systems programmer responsible for Oracle TMA TCP for IMS.

BEA2177E	**Host IMSID not Unique**	
	Description:	A HOST configuration with the same IMSID already exists.
	Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization is aborted and the program terminates. If the error occurs during processing of an ADD HOST operator command, command processing is aborted.
	Response:	Choose a unique name for the HOST and retry the command.

BEA2178E	**Missing IMSID option for Service**	
	Description:	A local service definition is missing an IMSID parameter which is required.
	Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization is aborted and the program terminates. If the error occurs during processing of an ADD SERVICE operator command, command processing is aborted.
	Response:	Change the SERVICE, TYPE=LOCAL statement to include an IMSID parameter.

BEA2179E	**Local Service *service-name* for IMSID *IMS-logical-identifier* is invalid**	
	Description:	A dynamic configuration operator command (MOD, START, or STOP SERVICE) was entered for a local service that does not exist.
	Action:	Command processing is aborted.
	Response:	Enter the correct remote name of the local service in the NAME parameter of the dynamic configuration command.

BEA2180I	**Service *service-name* for IMSID *IMS-logical-identifier* is being stopped**	
	Description:	A STOP SERVICE operator command for a local service is being processed.
	Action:	The STOP processing continues for the local service.
	Response:	None Required. Informational message only.

BEA2181I	Service *service-name* for IMSID *IMS-logical-identifier* has been stopped
Description:	A STOP SERVICE operator command for a local service has completed processing.
Action:	The STOP processing has completed.
Response:	None Required. Informational message only.

BEA2182E	Could not find IMSID *IMS-logical-identifier* for service *service-name*
Description:	A dynamic configuration operator command was entered for a local service which did not contain a valid IMSID parameter.
Action:	Command processing is aborted.
Response:	Enter the correct IMSID of the local service in the IMSID parameter of the dynamic configuration command.

BEA2183I	Messages Processed = *n*
Description:	Part of the STATUS display showing the number of service requests processed.
Action:	None.
Response:	None Required. Informational message only.

BEA2184I	XCF Messages Received = *n*
Description:	Part of the STATUS display showing the number of XCF messages received by the gateway.
Action:	None.
Response:	None Required. Informational message only.

BEA2185I	MCBs: Allocated = *number of MCBs* Assigned = *number of MCBs*
Description:	Part of the STATUS display showing the number of message control blocks defined and currently in use.
Action:	None.
Response:	None Required. Informational message only.

BEA2186I	Services: Remote = *number of remote services* Local = *number of local services*	
	Description:	Part of the STATUS display showing the number of services currently defined.
	Action:	None.
	Response:	None Required. Informational message only.
BEA2187E	IMS HOST *IMS-logical-identifier* is invalid	
	Description:	A dynamic configuration operator command (MOD, START, or STOP was entered for an IMSID that does not exist.
	Action:	Operator command processing is aborted.
	Response:	Retry the command with a valid IMSID.
BEA2188I	IMS HOST *IMS-logical-identifier* has been started	
	Description:	A START HOST operator command for an IMS host has completed processing.
	Action:	None
	Response:	None Required. Informational message only.
BEA2189I	IMS HOST *IMS-logical-identifier* is being stopped	
	Description:	A STOP HOST operator command for an IMS host is being processed.
	Action:	The STOP HOST processing continues for the host.
	Response:	None Required. Informational message only.
BEA2190I	IMS HOST *IMS-logical-identifier* has been stopped	
	Description:	A STOP SERVICE operator command for an IMS host has completed processing.
	Action:	The STOP SERVICE processing has completed.
	Response:	None Required. Informational message only.

BEA2191E	Service *service-name* for IMSID *IMS-logical-identifier* already exists.
Description:	An ADD SERVICE operator command for a local service has been attempted but the service has been previously defined.
Action:	The ADD SERVICE processing has been aborted.
Response:	Change the service name and retry, if necessary,

BEA2192E	Missing LMID option for START GATEWAY
Description:	A START GATEWAY operator command has been attempted but the LMID parameter, which is required, has been omitted.
Action:	The START GATEWAY processing has been aborted.
Response:	Add the LMID parameter to the command and retry.

BEA2193E	Missing LMID option for STOP GATEWAY
Description:	A STOP GATEWAY operator command has been attempted but the LMID parameter, which is required, has been omitted.
Action:	The STOP GATEWAY processing has been aborted.
Response:	Add the LMID parameter to the command and retry.

BEA2194E	Missing IMSID option for START HOST
Description:	A START HOST operator command has been attempted but the IMSID parameter, which is required, has been omitted.
Action:	The START HOST processing has been aborted.
Response:	Add the IMSID parameter to the command and retry.

BEA2195E	Missing IMSID option for STOP HOST
Description:	A STOP HOST operator command has been attempted but the IMSID parameter, which is required has, been omitted.
Action:	The STOP HOST processing has been aborted.
Response:	Add the IMSID parameter to the command and retry.

BEA2196E	OTMANAME for IMSID *IMS-logical-identifier* not unique	
	Description:	A HOST statement contains an OTMANAME parameter value that already is used in another HOST statement.
	Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization is aborted and the program terminates. If the error occurs during processing of an ADD HOST operator command, command processing is aborted.
	Response:	Change the OTMANAME parameter to match the unique OTMA client name of the IMS system and retry.
BEA2197 - BEA2213	Reserved for internal trace messages used only when debugging is enabled.	
BEA2214E	Response Service *remote-service-name* for Service *local-service-name* is invalid.	
	Description:	The specified RESPONSE service on a SERVICE, TYPE=LOCAL statement was not a valid remote service.
	Action:	If the error occurs during Oracle TMA TCP for IMS startup, initialization is aborted and the program terminates. If the error occurs during processing of an ADD SERVICE operator command, command processing is aborted.
	Response:	Change the service name and retry.
BEA2215E	Response Transaction *remote-service-name* from IMS Client is invalid.	
	Description:	The response transaction specified in the Oracle client request/response header is not defined as a local service.
	Action:	The client request is aborted.
	Response:	Define the response transaction as a local service.
BEA2216E	Client request for Service *remote-service-name* timed out on queue.	
	Description:	A service request from an IMS client timed out while waiting for an available session on a remote host.
	Action:	A timeout error is returned to the response transaction.

Response:		Reconfigure the SESSIONS or MULTIPLEX count for the desired remote gateway, if necessary.
BEA2217I	**Service *local-service-name* for IMSID *IMS-logical-identifier* has been started.**	
	Description:	This is the normal response for a START SERVICE operator command for a local service.
	Action:	None.
	Response:	None Required.
BEA2218E	**Required SYSTEM parameter missing.**	
	Description:	The SYSTEM parameter is missing in the configuration file.
	Action:	Make sure the SYSTEM parameter is in the configuration file.
	Response:	None Required.
BEA2219E	**Response Message length (nnnn) for Server *<server_name>* exceeds maximum length allowed (nnnn).**	
	Description:	IMS Server response exceeds the maximum permissible length given in the MAXRSPLEN parameter. THe response is discarded and the request fails.
	Action:	Change the MAXRSPLEN value to the response length required. The acceptable value range for the parameter is 1024-8,192,000.
	Response:	None Required.
BEA2220E	**Allocation failed for Message Buffer (Size = <requested size>, SP= <storage pool>, RC = <return code>, RSN = <reason code>)**	
	Description:	OS GETMAIN fails to allocate the requested buffer size. The session is terminated.
	Action:	Assuming a reasonable buffer size, this is an abnormal condition indicating a severe storage shortage or corruption of the storage allocation control blocks.

	Response:	Contact Oracle Support to report the error.
BEA2221E	**Deallocation failed for Message Buffer (Size = <requested size>, SP= <storage pool>, RC = <return code>, RSN = <reason code>)**	
	Description:	OS FREEMAIN fails to deallocate the buffer. The session is terminated.
	Action:	Assuming a valid buffer point is passed for deallocation, this is an abnormal condition that indicates a corruption of the storage allocation control block.
	Response:	Contact Oracle Support to report the error.
BEA2222I	**Snap dump completed.**	
	Description:	Indicates the end of the snap dump request.
	Action:	None.
	Response:	None Required.
BEA2223I	**MSGLEVEL = %d**	
	Description:	Displays the current message level.
	Action:	None.
	Response:	None Required.
BEA2224 – BEA2500	**Reserved for future use by Oracle TMA TCP for IMS.**	
BEA9999E	**Unable to locate message number <number>.**	
	Description:	An undefined error code has been generated.
	Action:	The gateway is unable to describe an error which has occurred.
	Response:	Contact Oracle Support to report the error. Be sure to note the error number listed.

Example Configuration Files

This document illustrates several Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) configurations, from a simple, server-only configuration to a fully-functional, bidirectional configuration. Member CONFIGOT in the CONTROL distribution library contain a sample configuration file, which you can use as a starting point for developing a configuration file tailored to your environment.

Listing C-1 is a sample configuration for running TMA TCP for IMS. Every configuration file must contain one SYSTEM statement that is the first statement in the file. The SYSTEM statement contains the OTMA-specific parameters including the definition for security. In this example, FASTPATH is not enabled.

Listing C-1   Sample OTMA Configuration

```
#----------------------------------------------------------------------#
#                                                                      #
#        BEA TMA TCP FOR IMS CONFIGURATION FILE                  #
#                                                                      #
#----------------------------------------------------------------------#
SYSTEM,                           # SYSTEM PARAMETERS
 SLEEPTIME=(150,500,5),           # IMS POLLING INTERVAL (MIN,MAX,DELTA) MS
 CLIENTSHUTDOWN=NO,               # DO NOT ALLOW CLIENT-REQUESTED SHUTDOWN
 MSGLEVEL=4,                      # MESSAGE LOGGING LEVEL
                                  # 2 = ERROR MESSAGES (ONLY)
                                  # 4 = ERROR & INFORMATIONAL MESSAGES
 SPARESOCKETS=50,                 # SPARE SOCKETS USED TO DYNAMICALLY ADD
                                  # OR MODIFY GATEWAYS
```

```
 OTMACLIENT=BEAOTMA01,          # XCF GROUP MEMBER NAME THAT CONNECT FOR
                                # IMS WILL USE
 OTMAGROUP=BEAGROUP,            # XCF GROUP NAME
 DRUEXIT=DFSYBEA0,              # DRU EXIT NAME USED BY CONNECT FOR IMS
 OTMASECURITY=YES              # ENABLE SECURITY


#-----------------------------------------------------------------------#
#        INBOUND SESSIONS (FROM REMOTE GATEWAYS TO IMS)                 #
#-----------------------------------------------------------------------#

GATEWAY,TYPE=LOCAL,            # LOCAL IMS GATEWAY DEFINITION
 LMID=OS3901,                  # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,     # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=4500,                    # PORT NUMBER (DECIMAL)
 ACCOUNT=ACCT101,              # ACCOUNT ID
 PASSWORD=PSWD101,             # PASSWORD
 MAXMSGLEN=2048,               # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=1                    # MAXIMUM NUMBER INBOUND SESSIONS
                               # VIA THIS IP/PORT

GATEWAY,TYPE=LOCAL,            # LOCAL IMS GATEWAY DEFINITION
 LMID=OS3902,                  # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,     # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=4501,                    # PORT NUMBER (DECIMAL)
 ACCOUNT=*,                    # CONNECTION SECURITY NOT USED
 PASSWORD=*,                   # BY THIS LISTENER
 MAXMSGLEN=32512,              # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=1,                   # MAXIMUM NUMBER OF INBOUND SESSIONS
 MULTIPLEX=5                   # MAXIMUM NUMBER OF SIMULTANEOUS
                               # REQUESTS PER SESSION

GATEWAY,TYPE=LOCAL,            # LOCAL IMS GATEWAY DEFINITION
 LMID=OS3903,                  # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,     # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=4502,                    # PORT NUMBER (DECIMAL)
 ACCOUNT=ACCT103,              # ACCOUNT ID
 PASSWORD=PSWD103,             # PASSWORD
 MAXMSGLEN=2048,               # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=5                    # MAXIMUM NUMBER INBOUND SESSIONS


#-----------------------------------------------------------------------#
#        OUTBOUND SESSIONS (FROM IMS TO REMOTE GATEWAYS)                #
#-----------------------------------------------------------------------#

GATEWAY,TYPE=(REMOTE,TUX)      # REMOTE TPS GATEWAY DEFINITION
 LMID=TUX1,                    # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,     # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=3333,                    # PORT NUMBER (DECIMAL)
 ACCOUNT=*,                    # ACCOUNT ID (* MEANS "NOT USED")
```

```
 PASSWORD=*,                     # PASSWORD (* MEANS "NOT USED")
 MAXMSGLEN=2048,                 # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=(0,5),                 # (MIN,MAX) NUMBER OUTBOUND SESSIONS
 MULTIPLEX=5                     # MAXIMUM NUMBER OF SIMULTANEOUS
                                 # REQUESTS PER SESSION

GATEWAY,TYPE=(REMOTE,IMS)        # REMOTE IMS GATEWAY DEFINITION
 LMID=IMSR,                      # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,       # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=3333,                      # PORT NUMBER (DECIMAL)
 ACCOUNT=*,                      # ACCOUNT ID (* MEANS "NOT USED")
 PASSWORD=*,                     # PASSWORD (* MEANS "NOT USED")
 MAXMSGLEN=2048,                 # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=(0,5)                  # (MIN,MAX) NUMBER OUTBOUND SESSIONS

GATEWAY,TYPE=(REMOTE,CICS,BEAH), # REMOTE CICS GATEWAY DEFINITION
 LMID=CICS1,                     # LOGICAL MACHINE ID
 HOSTADDR=111.111.111.111,       # IP ADDRESS (STANDARD DOTTED-DECIMAL)
 PORT=4444,                      # PORT NUMBER (DECIMAL)
 ACCOUNT=*,                      # ACCOUNT ID (* MEANS "NOT USED")
 PASSWORD=*,                     # PASSWORD (* MEANS "NOT USED")
 MAXMSGLEN=2048,                 # MAXIMUM GATEWAY MESSAGE SIZE
 SESSIONS=(0,5)                  # (MIN,MAX) NUMBER OUTBOUND SESSIONS

#----------------------------------------------------------------------#
#        IMS HOST SYSTEMS TO BE USED BY CONNECT FOR IMS                 #
#----------------------------------------------------------------------#

HOST,TYPE=IMS,                   # IMS HOST DEFINITION
 IMSID=IMS1,                     # LOGICAL IMS IDENTIFIER
 OTMANAME=IMS71CR1,              # XCF GROUP MEMBER NAME OF TARGET IMS
 OTMAINPIPE=BEAI,                # TPIPE BASE NAME FOR REQUESTS OF IMS
                                 # AS A SERVER
 OTMAOUTPIPE=BEAOPIPE,           # TPIPE NAME FOR REQUESTS OF IMS AS A
                                 # CLIENT
 NUMTPIPES=5                     # NUMBER OF INBOUND TPIPES

#----------------------------------------------------------------------#
#        REMOTE SERVICES (CAN BE REQUESTED BY IMS CLIENTS)              #
#----------------------------------------------------------------------#

SERVICE,TYPE=REMOTE,             # REMOTE SERVICE DEFINITION
 LMID=TUX1,                      # LOGICAL MACHINE ID
 NAME=(ECHO,ECHO),               # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 TIMEOUT=60                      # PROCESSING TIME LIMIT (SECONDS)

SERVICE,TYPE=REMOTE,             # REMOTE SERVICE DEFINITION
 LMID=TUX1,                      # LOGICAL MACHINE ID
 NAME=(TOUPPER,TOUPPER),         # LOCAL SERVICE NAME, REMOTE SERVICE NAME
```

```
   TIMEOUT=60                      # PROCESSING TIME LIMIT (SECONDS)

SERVICE,TYPE=REMOTE,               # REMOTE SERVICE DEFINITION
 LMID=TUX1,                        # LOGICAL MACHINE ID
 NAME=(ANSWERBACL,DATALOG)         # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 TIMEOUT=10                        # PROCESSING TIME LIMIT (SECONDS)

SERVICE,TYPE=REMOTE,               # REMOTE SERVICE DEFINITION
 LMID=IMSR,                        # LOGICAL MACHINE ID
 NAME=(TOUPPER,TOUPPER),           # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 TIMEOUT=60                        # PROCESSING TIME LIMIT (SECONDS)

SERVICE,TYPE=REMOTE,               # REMOTE SERVICE DEFINITION
 LMID=CICS1,                       # LOGICAL MACHINE ID
 NAME=(TOUPPER,TOUPPER),           # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 TIMEOUT=60                        # PROCESSING TIME LIMIT (SECONDS)

#----------------------------------------------------------------------#
#         LOCAL SERVICES (CAN BE REQUESTED BY REMOTE CLIENTS)          #
#----------------------------------------------------------------------#

SERVICE,TYPE=LOCAL,                # LOCAL SERVICE DEFINITION
 IMSID=IMS1,                       # LOGICAL IMS ID
 NAME=(BEASVR01,ECHO),             # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 SECURITY=NO,                      # SERVICE LEVEL SECURITY SETTING
 FASTPATH=NO,                      # NOT A FASTPATH TRANSACTION
 V21COMPAT=YES                     # MESSAGE FORMAT IS VERSION 2.1 AND
                                   # EARLIER COMPATIBLE
SERVICE,TYPE=LOCAL,                # LOCAL SERVICE DEFINITION
 IMSID=IMS1,                       # LOGICAL IMS ID
 NAME=(BEASVR02,REDIRECT)          # LOCAL SERVICE NAME, REMOTE SERVICE NAME
 SECURITY=YES,                     # SERVICE LEVEL SECURITY SETTING
 FASTPATH=NO,                      # NOT A FASTPATH TRANSACTION
 V21COMPAT=NO,                     # MESSAGE FORMAT IS VERSION 2.1 AND
                                   # EARLIER COMPATIBLE
 RESPONSE=ANSWERBACK               # REROUTE RESPONSE TO THIS REMOTE
                                   # IF THE REQUEST WAS REQUEST NO REPLY
```

CHAPTER **D**

Sample JCL and User Exits

Use the following sample JCL and user exits to run the BEA Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) product:

- JCL for Executing TMA TCP for IMS
- Sample User Exits Enabling IMS Clients to Communicate to Remote Services
    - OTMA Prerouting User Exit (DFSYPRX0)
    - OTMA Destination Resolution User Exit (DFSYDRU0)

JCL for Executing TMA TCP for IMS

The JCL distribution library contains sample JCL for executing the TMA TCP for IMS product. You must modify the sample JCL to conform to the conventions and standards for your installation. Modifications include the following:

- Adding an appropriate job card
- Ensuring all concatenations of the JOBLIB/STEPLIB are APF-authorized, when using it for executing the TMA TCP for IMS
- Changing the names of IBM product datasets (IMS, TCP/IP for z/OS, and LE/370) to match those used by your installation
- Changing the names of TMA TCP for IMS datasets to match those used by your installation

- Changing the names of certain program modules (for example, the linkage editor), if necessary, to match those used by your installation

Executing TMA TCP for IMS

Listing D-1 is sample JCL for executing as an OTMA client. Use the following JCL only as a reference for modifying the standard OTMA JCL for use with the TMA TCP for IMS product.

Listing D-1   Sample Run JCL

```
//JOBNAME  JOB    ETC.
//***********************************************************
//*  BRING UP BEA TMA TCP FOR IMS/OTMA                     *
//***********************************************************
//STEP1    EXEC PGM=BEATCPI,REGION=0M,TIME=1440
//STEPLIB  DD   DSN=hlq1.hlq2,DISP=SHR
//* Place the name of the authorized library in the STEPLIB DD above
//SYSTCPD  DD   DISP=SHR,DSN=TCPIP.DATA
//MSGLOG   DD   DISP=SHR,DSN=BEATCPI.MSGLOG
//MSGCAT   DD   DISP=SHR,DSN=BEATCPI.MSGCAT
//SVRLOG   DD   DISP=SHR,DSN=BEATCPI.SVRLOG
//CONFIG   DD   DISP=SHR,DSN=hlq1.hlq2.JCL(CONFIG)
//* Place the name of the Config file in the CONFIG DD above
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
```

Sample User Exits Enabling IMS Clients to Communicate to Remote Services

To enable IMS clients to communicate to remote services through OTMA, you must install both the DFSYPRX0 and DFSYDRU0 IBM user exits available in IMS. Customize the exits to recognize specific transactions as well as the Tuxedo Mainframe Adapter OTMA client name as defined in the configuration file. For more information about setting up the configuration file, refer to the "Configuring Oracle TMA TCP for IMS" section. Refer to the IBM document *Open Transaction Manager Access Guide* for additional information on the IBM user exits.

OTMA Prerouting User Exit (DFSYPRX0)

Listing D-2 is the sample IBM OTMA prerouting user exit which can be found in the dataset BEATCPI source. The IBM DFSYPRX0 user exit enables IMS to search for a destination for an application request. In the following sample, the lines in bold are modifications that you must make to the IBM DFSYPRX0 user exit.

Listing D-2   OTMA Pre-routing Sample User Exit (DFSYPRX0)

```
TITLE 'DFSYPRX0: OTMA PRE-ROUTING USER EXIT'
DFSYPRX0 CSECT
DFSYPRX0 AMODE 31
DFSYPRX0 RMODE ANY
**********************************************************************
*                                                                    *
* DESCRIPTION: OTMA PRE-ROUTING USER EXIT                            *
*                                                                    *
*********************************************************@SCPYRT**
*                                                                    *
*        Licensed Materials - Property of IBM                       *
*                                                                    *
*        "Restricted Materials of IBM"                              *
*                                                                    *
*        5655-158 (C) Copyright IBM Corp. 1991,1996                 *
*                                                                    *
*********************************************************@ECPYRT**
*                                                                    *
*   MODULE TYPE:  DC                                                *
*                                                                    *
*   PROCESSOR:    ASSEMBLER H                                       *
*                                                                    *
*   MODULE SIZE: SEE EXTERNAL SYMBOL DICTIONARY PRODUCED BY         *
*                ASSEMBLER                                           *
*                                                                    *
*   ATTRIBUTE:   REENTRANT                                          *
*                                                                    *
*   ENTRY POINT: DFSYPRX0                                           *
*                                                                    *
*   ENTRY INTERFACES :                                             *
*                                                                    *
* STATUS:      RELEASE 5.1     CHANGE LEVEL - 0                     *
*                                                                    *
* FUNCTION:    THIS MODULE IS CALLED BY IMS WHEN AN APPLICATION     *
*              CALL (IE CHNG OR ISRT) RESULTS IN A SEARCH FOR       *
*              A DESTINATION.                                        *
*              DFSYPRX0 DETERMINES IF:                             *
```

```
*                   1. IMS SHOULD SEARCH FOR THE DESTINATION        *
*                      WITHOUT LOOKING AT ANY OTMA DESTINATIONS      *
*                      (LEGACY PROCESSING).                          *
*                   2. IMS SHOULD INCLUDE OTMA DESTINATIONS,         *
*                      AND PROVIDE A DESTINATION CLIENT MEMBER       *
*                      NAME IF NECESSARY.                            *
*                                                                    *
* DEPENDENCY:  IMS/ESA 5.1                                           *
*                                                                    *
* MODULE TYPE: PROCEDURE                                             *
*    ATTRIBUTE:  RE-ENTRANT                                          *
*    PROCESSOR:  ASSEMBLER H                                         *
*                                                                    *
* REGISTERS:   STANDARD ENTRY AND EXIT                               *
*                                                                    *
* MODULE SIZE: SEE ASSEMBLER LISTING                                 *
*                                                                    *
* LINKAGE:     BALR 14,15                                            *
*                                                                    *
*                                                                    *
**********************************************************************
         EJECT
**********************************************************************
*                                                                    *
*  INTERFACE:                                                        *
*                                                                    *
*      CONTENTS OF REGISTERS AT ENTRY:                               *
*          R1     = ADDRESS OF STANDARD IMS USER EXIT PARMLIST       *
*                                                                    *
*               STANDARD PARMLIST                                    *
*               ---------                                            *
*               |       |                                            *
*               |-------|                                            *
*               |       |                                            *
*               |-------|                                            *
*               |       |    DFSYPRX0 PARMLIST                       *
*         +12   |-------|    |---------------|                       *
*               |       |--->|INPUT LTERM    | +0                    *
*               ---------    |---------------|                       *
*                            |DEST NAME      | +8                    *
*                            |---------------|                       *
*                            |TRAN NAME      | +16                   *
*                            |---------------|                       *
*                            |FLAGS          | +24                   *
*                            |---------------|                       *
*                            |USER ID        | +28                   *
*                            |---------------|                       *
*                            |GROUP          | +36                   *
*                            |---------------|                       *
```

```
*                                       |RESERVED        | +44          *
*                                       |---------------|              *
*                                       |CLIENT MEM NAME| +48          *
*                                       |---------------|              *
*                                       |A(MCI)         | +64          *
*                                       |---------------|              *
*                                       |A(STATE DATA)  | +68          *
*                                       |---------------|              *
*                                       |A(USER DATA)   | +72          *
*                                       |---------------|              *
*                                       |RESERVED        | +76          *
*                                       |---------------|              *
*                                       |A(MEM OVERRIDE)| +80          *
*                                       |---------------|              *
*                                                                      *
*                                                                      *
*          R13    = SAVE AREA ADDRESS                                  *
*          R14    = RETURN ADDRESS                                     *
*          R15    = ENTRY POINT ADDRESS                               *
*                                                                      *
*                                                                      *
***********************************************************************
          EJECT
***********************************************************************
*                                                                      *
*        CONTENTS OF OTMA PRE-ROUTING USER EXIT PARMLIST:             *
*                                                                      *
*          +0     = 8-BYTE NAME OF LTERM/TPIPE WHICH                  *
*                   INVOKED THE CURRENT TRANSACTION                   *
*                   (LEFT-JUSTIFIED, PADDED WITH BLANKS)              *
*                   THIS IS AN ENTRY PARAMETER ONLY.                 *
*                                                                      *
*          +8     = 8-BYTE DESTINATION NAME                          *
*                   (LEFT-JUSTIFIED, PADDED WITH BLANKS)              *
*                   THIS IS AN ENTRY PARAMETER ONLY.                 *
*                                                                      *
*          +16    = 8-BYTE TRANSACTION NAME                          *
*                   (LEFT-JUSTIFIED, PADDED WITH BLANKS)              *
*                   THIS IS AN ENTRY PARAMETER ONLY.                 *
*                                                                      *
*          +24    = 1-BYTE FLAG                                       *
*                   X'80' - IF SET, INDICATES THAT AN INPUT          *
*                           OTMA PREFIX EXISTS.  THE MCI,            *
*                           STATE DATA, AND USER DATA ARE            *
*                           ACCESSIBLE IN THIS PARMLIST.             *
*                   THIS IS AN ENTRY PARAMETER ONLY.                 *
*                                                                      *
*          +25    = SYNCRONIZATION LEVEL IF THE INPUT WAS            *
*                   FROM AN OTMA CLIENT.                             *
```

```
*                                                               *
*              +26    = 2-BYTE RESERVED                         *
*                                                               *
*              +28    = 8-BYTE USERID                           *
*                       (LEFT-JUSTIFIED, PADDED WITH BLANKS)    *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +36    = 8-BYTE GROUP ID                         *
*                       (LEFT-JUSTIFIED, PADDED WITH BLANKS)    *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +44    = 4-BYTE RESERVED                         *
*                                                               *
*              +48    = 16-BYTE NAME OF INPUT CLIENT MEMBER NAME *
*                       IF INPUT WAS FROM A CLIENT, BLANKS OTHERWISE. *
*                       (LEFT-JUSTIFIED, PADDED WITH BLANKS)    *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +64    = ADDR(MESSAGE CONTROL INFORMATION),      *
*                       AVAILABLE FROM INPUT OTMA MESSAGE PREFIX. *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +68    = ADDR(STATE DATA),                       *
*                       AVAILABLE FROM INPUT OTMA MESSAGE PREFIX. *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +72    = ADDR(USER DATA),                        *
*                       AVAILABLE FROM INPUT OTMA MESSAGE PREFIX. *
*                       THIS IS AN ENTRY PARAMETER ONLY.        *
*                                                               *
*              +76    = 4-BYTE RESERVED                         *
*                                                               *
*                                                               *
*              +80    = ADDR(16-BYTE MEMBER OVERRIDE)           *
*                       THIS FIELD IS USED WHEN THE TRANSACTION IS *
*                       INVOKED FROM A NON-OTMA LTERM, TO INDICATE *
*                       THE CLIENT NAME WHEN AN OTMA DESTINATION *
*                       IS DESIRED.                             *
*                       (LEFT JUSTIFIED, PADDED WITH BLANKS)    *
*                       THIS IS AN EXIT PARAMETER ONLY.         *
*                                                               *
*                                                               *
*        CONTENTS OF REGISTERS AT EXIT:                         *
*                                                               *
*              R15    = RETURN CODE                             *
*                                                               *
*                       RETURN CODE CAN BE ONE OF THE FOLLOWINGS: *
*                       0 : CONTINUE DEFAULT PROCESSING:        *
*                           IF THE TRANSACTION WAS INVOKED FROM AN *
```

```
*                              OTMA TPIPE, THEN OTMA FIND-DESTINATION  *
*                               PROCESSING SHOULD OCCUR.               *
*                            IF THE TRANSACTION WAS INVOKED FROM A NON-*
*                              OTMA LTERM, THEN LEGACY FIND-DESTINATION*
*                              PROCESSING SHOULD OCCUR.                *
*                    4 : OTMA FIND-DESTINATION PROCESSING SHOULD       *
*                        OCCUR.  IF THE TRANSACTION WAS ENTERED        *
*                        FROM A NON-OTMA LTERM, THEN A CLIENT          *
*                        MEMBER NAME MUST BE PROVIDED IN THE           *
*                        PRE-ROUTING PARAMETER LIST.                   *
*                    8 : LEGACY FIND-DESTINATION PROCESSING            *
*                        SHOULD OCCUR.                                 *
*                                                                      *
*                                                                      *
*                                                                      *
*    REGISTER 13 IS THE ADDRESS OF SAVE AREA.                          *
*                                                                      *
*    NORMAL LINKAGE CONVENTIONS FOR REGISTER 13, 14 AND 15             *
*                                                                      *
*                                                                      *
*                                                                      *
***********************************************************************
*
*
        SAVE  (14,12),,DFSYPRX0&SYSDATE&SYSTIME
        SPACE 2
        LR    R12,R15            MODULE ADDRESSABILITY
        USING DFSYPRX0,R12
        USING OTMAPARM,R10
        USING SXPL,R9
*
        LR    R9,R1              LOAD PARAMETER BASE
        L     R10,SXPLFSPL       OTMA SPECIFIC PARAMETERS
        CLC   OTMDEST,MYPIPE     SPECIAL DESTINATION?
        BNE   PRX01500           B NO
        ICM   R8,15,OTMCOVRD     GET ADDRESS OF OVERRIDING NAME
        BZ    PRX01550           B IF NO ADDRESS
        MVC   0(16,R8),MYCLIENT  SET OVERRIDING CLIENT NAME
        LA    R15,4              ROUTE TO OTMA
        B     PRX01600           RETURN
*
PRX01500 DS   0H
        CLC   OTMTRANS,MYTRAN    SPECIAL TRANSACTION?
        BNE   PRX01550           B NO
        LA    R15,8              INVOKE LEGACY PROCESSING
        B     PRX01600           RETURN
*
PRX01550 DS   0H
        LA    R15,0              RC = 0
```

```
PRX01600 DS    0H
*
         RETURN (14,12),,RC=(15)    RETURN WITH RETURN CODE IN R15
         SPACE 2
         REQUATE
         SPACE 2
MYPIPE   DC    CL8'BEAOPIPE'         TEST TPIPE
MYTRAN   DC    CL8'BEACRP01'         TEST TRANSACTION
MYCLIENT DC    CL16'BEAOTMA01'       TEST CLIENT
*
* DATA MACROS
*
         DFSSXPL
         BEAOTM
*
         END
```

Sample DSECT BEAOTM

Listing D-3 is the DSECT BEAOTM macro referenced previously. A DSECT for the OTMA parameter area passed to the DFSYPRX0 exit is not provided by IBM.

Listing D-3 DSECT BEAOTM

```
MACRO
         BEAOTM
OTMAPARM DSECT                  OTMA SPECIFIC PARAMETER LIST
OTMLTERM DS    CL8              ORIGINATING LTERM/TPIPE
OTMDEST  DS    CL8              DESTINATION NAME
OTMTRANS DS    CL8              TRANSACTION NAME
OTMFLAGS DS    X                OTMA FLAGS
#OTMINP  EQU   X'80'            INPUT OTMA MSG PREFIX EXISTS
OTMSYNCH DS    X                OTMA SYNCHRONIZATION LEVEL
OTMRESVD DS    XL2              RESERVED
OTMUSER  DS    CL8              USER ID
OTMGROUP DS    CL8              GROUP NAME
OTMRESV2 DS    XL4              RESERVED
OTMCNAME DS    CL16             ORIGINATING CLIENT NAME
OTMMSGCL DS    A                ADDRESS OF INPUT MESSAGE CTL
OTMSTATE DS    A                ADDRESS OF INPUT STATE DATA
```

```
OTMUSERD DS    A                  ADDRESS OF INPUT USER DATA
OTMRSVD3 DS    XL4                RESERVED
OTMCOVRD DS    A                   ADDRESS OF OVERRIDING CLIENT NAME
*
         MEND
```

OTMA Destination Resolution User Exit (DFSYDRU0)

Listing D-4 is the sample IBM OTMA destination resolution user exit. The IBM DFSYDRU0 user exit enables IMS to determine whether the destination is an OTMA client, a non-OTMA LTERM, a different OTMA client, or an invalid destination. In the following sample, the lines in bold are modifications that you must make to the IBM DFSYDRU0 user exit.

Listing D-4   OTMA Destination Resolution User Exit (DFSYDRU0)

```
TITLE 'DFSYDRU0: OTMA DESTINATION RESOLUTION USER EXIT'
DFSYDRU0 CSECT
DFSYDRU0 AMODE 31
DFSYDRU0 RMODE ANY
*********************************************************************
*                                                                  *
* DESCRIPTION: OTMA DESTINATION RESOLUTION USER EXIT               *
*                                                                  *
***************************************************@SCPYRT**
*                                                                  *
*       Licensed Materials - Property of IBM                       *
*                                                                  *
*       "Restricted Materials of IBM"                              *
*                                                                  *
*       5655-158 (C) Copyright IBM Corp. 1991,1996                 *
*                                                                  *
***************************************************@ECPYRT**
*                                                                  *
*   MODULE TYPE:  DC                                               *
*                                                                  *
*   PROCESSOR:    ASSEMBLER H                                      *
*                                                                  *
*   MODULE SIZE: SEE EXTERNAL SYMBOL DICTIONARY PRODUCED BY        *
*                ASSEMBLER                                         *
*                                                                  *
*   ATTRIBUTE:    REENTRANT                                        *
*                                                                  *
```

```
*   ENTRY POINT: DFSYDRU0                                              *
*                                                                      *
*   ENTRY INTERFACES :                                                 *
*                                                                      *
* STATUS:        RELEASE 5.1      CHANGE LEVEL - 0                     *
*                                                                      *
* FUNCTION:   THIS MODULE IS CALLED BY IMS WHEN AN APPLICATION        *
*             CALL (IE CHNG OR ISRT) RESULTS IN A SEARCH FOR          *
*             A DESTINATION, AND OTMA FIND-DEST PROCESSING            *
*             IS TO BE PERFORMED (AS DETERMINED BY DFSYPRX0           *
*             PROCESSING).                                             *
*             DFSYDRU0 DETERMINES IF:                                  *
*                1. DESTINATION IS AN OTMA CLIENT TPIPE               *
*                2. DESTINATION IS A NON-OTMA LTERM                   *
*                   (LEGACY PROCESSING).                              *
*                3. DESTINATION IS IN A DIFFERENT OTMA CLIENT         *
*                4. DESTINATION IS INVALID                            *
*                                                                      *
* DEPENDENCY:  IMS/ESA 5.1                                             *
*                                                                      *
* MODULE TYPE: PROCEDURE                                               *
*    ATTRIBUTE:  RE-ENTRANT                                            *
*    PROCESSOR:  ASSEMBLER H                                           *
*                                                                      *
* REGISTERS:   STANDARD ENTRY AND EXIT                                 *
*                                                                      *
* MODULE SIZE: SEE ASSEMBLER LISTING                                   *
*                                                                      *
* LINKAGE:     BALR 14,15                                              *
*                                                                      *
*                                                                      *
**********************************************************************
          EJECT
**********************************************************************
*                                                                      *
*   INTERFACE:                                                         *
*                                                                      *
*       CONTENTS OF REGISTERS AT ENTRY:                               *
*             R1     = ADDRESS OF STANDARD IMS USER EXIT PARMLIST      *
*                                                                      *
*                   STANDARD PARMLIST                                 *
*                    ---------                                        *
*                   |         |                                       *
*                   |---------|                                       *
*                   |         |                                       *
*                   |---------|                                       *
*                   |         |     DFSYPRX0 PARMLIST                 *
*            +12 |---------|   |---------------|                      *
*                   |         |   |---->|INPUT LTERM    | +0           *
```

```
*                        ---------      |---------------|                  *
*                                       |DEST NAME      | +8               *
*                                       |---------------|                  *
*                                       |TRAN NAME      | +16              *
*                                       |---------------|                  *
*                                       |FLAGS          | +24              *
*                                       |---------------|                  *
*                                       |USER ID        | +28              *
*                                       |---------------|                  *
*                                       |GROUP          | +36              *
*                                       |---------------|                  *
*                                       |DEST CLIENT    | +44              *
*                                       |---------------|                  *
*                                       |RESERVED       | +60              *
*                                       |---------------|                  *
*                                       |INPUT CLIENT   | +64              *
*                                       |---------------|                  *
*                                       |A(MCI)         | +80              *
*                                       |---------------|                  *
*                                       |A(STATE DATA)  | +84              *
*                                       |---------------|                  *
*                                       |A(USER DATA)   | +88              *
*                                       |---------------|                  *
*                                       |RESERVED       | +92              *
*                                       |---------------|                  *
*                                       |A(MEM OVERRIDE)| +96              *
*                                       |---------------|                  *
*                                       |FLAGS          | +100             *
*                                       |---------------|                  *
*                                                                          *
*                                                                          *
*            R13    = SAVE AREA ADDRESS                                     *
*            R14    = RETURN ADDRESS                                        *
*            R15    = ENTRY POINT ADDRESS                                   *
*                                                                          *
*                                                                          *
****************************************************************************
         EJECT
****************************************************************************
*                                                                          *
*        CONTENTS OF OTMA PRE-ROUTING USER EXIT PARMLIST:                   *
*                                                                          *
*            +0     = 8-BYTE NAME OF LTERM/TPIPE WHICH                      *
*                     INVOKED THE CURRENT TRANSACTION                       *
*                     (LEFT-JUSTIFIED, PADDED WITH BLANKS)                  *
*                     THIS IS AN ENTRY PARAMETER ONLY.                      *
*                                                                          *
*            +8     = 8-BYTE DESTINATION NAME                               *
*                     (LEFT-JUSTIFIED, PADDED WITH BLANKS)                  *
```

```
*                        THIS IS AN ENTRY PARAMETER ONLY.           *
*                                                                   *
*           +16    = 8-BYTE TRANSACTION NAME                        *
*                    (LEFT-JUSTIFIED, PADDED WITH BLANKS)           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +24    = 1-BYTE FLAG                                    *
*                    X'80' - IF SET, INDICATES THAT AN INPUT        *
*                            OTMA PREFIX EXISTS.  THE MCI,          *
*                            STATE DATA, AND USER DATA ARE          *
*                            ACCESSIBLE IN THIS PARMLIST.           *
*                    X'40' - IF SET, INDICATES THAT A DIFFERENT     *
*                            OTMA CLIENT MAY BE SPECIFIED USING     *
*                            RETURN CODE OF R15=8. (I.E. MEMBER     *
*                            OVERRIDE IS ALLOWED FOR THIS CALL).    *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +25    = SYNCRONIZATION LEVEL IF THE INPUT WAS          *
*                    FROM AN OTMA CLIENT.                           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +26    = 1-BYTE FLAG                                    *
*                    X'80' - IF SET, TPIPE EXISTS FOR THE CLIENT    *
*                    X'40' - IF SET, LTERM EXISTS IN IMS (LEGACY)   *
*                    X'20' - IF SET, LU62 DESCRIPTOR EXISTS         *
*                    X'10' - IF SET, ETO IS AVAILABLE               *
*                    X'08' - IF SET, CLIENT IS ACTIVE               *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +27    = 1-BYTE RESERVED                                *
*                                                                   *
*           +28    = 8-BYTE USERID                                  *
*                    (LEFT-JUSTIFIED, PADDED WITH BLANKS)           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +36    = 8-BYTE GROUP ID                                *
*                    (LEFT-JUSTIFIED, PADDED WITH BLANKS)           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +44    = 16-BYTE DESTINATION CLIENT NAME                *
*                    (LEFT-JUSTIFIED, PADDED WITH BLANKS)           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
*                                                                   *
*           +60    = 4-BYTE RESERVED                                *
*                                                                   *
*           +64    = 16-BYTE NAME OF INPUT CLIENT MEMBER NAME       *
*                    IF INPUT WAS FROM A CLIENT, BLANKS OTHERWISE.  *
*                    (LEFT-JUSTIFIED, PADDED WITH BLANKS)           *
*                    THIS IS AN ENTRY PARAMETER ONLY.               *
```

```
*                                                                  *
*              +80   = ADDR(MESSAGE CONTROL INFORMATION),          *
*                      AVAILABLE FROM INPUT OTMA MESSAGE PREFIX.    *
*                      THIS IS AN ENTRY PARAMETER ONLY.            *
*                                                                  *
*              +84   = ADDR(STATE DATA),                           *
*                      AVAILABLE FROM INPUT OTMA MESSAGE PREFIX.    *
*                      THIS IS AN ENTRY PARAMETER ONLY.            *
*                                                                  *
*              +88   = ADDR(USER DATA),                            *
*                      AVAILABLE FROM INPUT OTMA MESSAGE PREFIX.    *
*                                                                  *
*                      THIS AREA IS ALSO USED TO RETURN NEW OR     *
*                      MODIFIED USER DATA, UP TO A MAXIMUM OF       *
*                      1024 BYTES.                        @PQ07683 *
*                                                                  *
*                      THE FORMAT OF THE USER DATA IS:             *
*                      0-1 LENGTH OF FOLLOWING USER DATA, WHICH     *
*                          INCLUDES THIS LENGTH FIELD              *
*                      2-  USER DATA                               *
*                                                                  *
*              +92   = 4-BYTE RESERVED                             *
*                                                                  *
*              +96   = ADDR(OUTPUT PARAMETER LIST)                 *
*                      THE OUTPUT PARAMETER LIST IS USED TO         *
*                      RETURN INFORMATION TO IMS.  SEE UNDER        *
*                      CONTENTS OF REGISTERS AT EXIT.              *
*                                                                  *
*                                                                  *
*         CONTENTS OF REGISTERS AT EXIT:                           *
*                                                                  *
*              R15   = RETURN CODE                                 *
*                                                                  *
*                      RETURN CODE CAN BE ONE OF THE FOLLOWINGS:    *
*                      0 : DESTINATION IS OTMA CLIENT TPIPE        *
*                      4 : DESTINATION IS NON-OTMA LTERM (LEGACY)   *
*                      8 : DESTINATION IS IN A DIFFERENT CLIENT.    *
*                          THE CLIENT NAME MUST BE RETURNED IN     *
*                          THE DFSYDRU0 PARMLIST.                  *
*                      12: DESTINATION IS INVALID                  *
*                                                                  *
*         CONTENTS OF OTMA PRE-ROUTING USER EXIT PARMLIST:         *
*                                                                  *
*              ALL FIELDS IN THE PARMLIST SHOULD REMAIN UNCHANGED.  *
*              OUTPUT INFORMATION IS RETURNED AS FOLLOWS:          *
*                                                                  *
*              +96   = ADDR(OUTPUT PARAMETER LIST)                 *
*                      +00 = (16-BYTE MEMBER OVERRIDE)             *
*                          THIS FIELD IS USED WHEN THE DESTINATION *
```

```
*                              IS IN A DIFFERENT OTMA CLIENT.         *
*                              RETURN CODE 8 MUST BE SET.             *
*                              (LEFT JUSTIFIED, PADDED WITH BLANKS)   *
*                                                                     *
*                    +16 = 1-BYTE OUTPUT FLAG FIELD                   *
*                          X'80' = IF SET, INDICATES THAT IF A        *
*                                  TPIPE NEEDS TO BE CREATED, IT       *
*                                  SHOULD BE A SYNC'D TPIPE.           *
*                                  THIS IS ONLY VALID WHEN             *
*                                  RETURN CODE = 0.                    *
*                                                                     *
*                    +17 = 15-BYTE RESERVED                           *
*                                                                     *
*                                                                     *
*                                                                     *
*   REGISTER 13 IS THE ADDRESS OF SAVE AREA.                          *
*                                                                     *
*   NORMAL LINKAGE CONVENTIONS FOR REGISTER 13, 14 AND 15             *
*                                                                     *
*                                                                     *
*                                                                     *
***********************************************************************
*                                                        @PQ00242
*                                                        @PQ00242
*                                                        @PQ00242
*                                                        @PQ00242
*                                                        @PQ00242
*                                                        @PQ00242
        SAVE  (14,12),,DFSYDRU0&SYSDATE&SYSTIME          @PQ00242
        SPACE 2                                          @PQ00242
        LR    R12,R15             MODULE ADDRESSABILITY   @PQ00242
        USING DFSYDRU0,R12                                @PQ00242
*                                                        @PQ00242
*
        L     R2,12(,R1)
        CLC   44(16,R2),MYCLIENT
        BNE   EXIT4
*
EXIT0   DS    0H
        LA    R15,0             RC = 0
        B     EXIT
*
EXIT4   DS    0H
        LA    R15,4
EXIT    DS    0H
        RETURN (14,12),,RC=(15)   RETURN WITH RETURN CODE IN R15
        SPACE 2
        REQUATE
*
```

```
MYCLIENT DC    CL16'BEAOTMA01'     TEST CLIENT
*
          END
```

Sample IMS Client and Server Transactions

Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) client and server transactions are ordinary IMS MPP transactions, and when running the Oracle TMA TCP for IMS gateway as an OTMA client, FastPath transactions as well. Transactions can be written in any application programming language supported by IMS. Source code for the sample transactions in this document can be found in the Oracle TMA TCP for IMS SOURCE distribution library. The following sample transactions are provided in this document:

- IMS Server Transaction
- IMS Client Transactions

IMS Server Transaction

An IMS server transaction offers a specified service and processes client requests for that service. A server request takes place according to the following sequence of events.

1. A client transaction running on a remote system makes a request for a service offered by the IMS gateway. The remote gateway forwards the request to the IMS gateway, which formats and inserts a *server request message* indirectly through OTMA. The server request message is destined for the IMS server transaction that offers the service.

2. IMS schedules the specified server transaction, which retrieves the server request message from the IMS message queue and performs whatever processing is appropriate. If a response is required, the server transaction formats a *server response message* and inserts it into the IMS message queue destined for the Oracle TMA TCP for IMS server response transaction.

3. Oracle TMA TCP for IMS retrieves the server response message from the IMS message queue or the OTMA interface and returns the response to the remote system making the request.

BEASVR01 - A Sample IMS Server Transaction

Listing E-1 is a simple *echo transaction*; that is, it simply returns a response consisting of whatever request data it received.

Listing E-1   Sample IMS Server Transaction

```
CBL APOST
*******************************************************************
FILE:      BEASVR01
PURPOSE:   SAMPLE IMS SERVER TRANSACTION FOR USE WITH
           BEA TMA TCP FOR IMS
COMMENTS:  THIS IS A SIMPLE ECHO SERVER TRANSACTION THAT ISSUES A
           RESPONSE CONSISTING OF THE SAME DATA AS RECEIVED.
LANGUAGE:  COBOL
COPYRIGHT  (C) 1997 BEA SYSTEMS, INC. ALL RIGHTS RESERVED
*******************************************************************

IDENTIFICATION DIVISION.
PROGRAM-ID. BEASVR01.
ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-370.
OBJECT-COMPUTER. IBM-370.
DATA DIVISION.
WORKING-STORAGE SECTION.

77 GU     PIC X(04) VALUE 'GU '.
77 CHNG   PIC X(04) VALUE 'CHNG'.
77 ISRT   PIC X(04) VALUE 'ISRT'.
77 PURG   PIC X(04) VALUE 'PURG'.

01 BEAGW  PIC X(08) VALUE 'BEATCPI '.
```

```
      ********************************************************************
      *              REQUEST MESSAGE                                    *
      ********************************************************************
          01   REQUEST-MESSAGE.
(1)         COPY SERVER.
            05 USER-DATA          PIC X(512).
      ********************************************************************
      *               RESPONSE MESSAGE                                  *
      ********************************************************************
          01   REQUEST-MESSAGE.
(1)         COPY SERVER.
            05 USER-DATA          PIC X(512).
          LINKAGE SECTION.
      ********************************************************************
      *               I/O PCB                                           *
      ********************************************************************
01    01 IOPCB.
          05 LTERM               PIC X(08).
          05 FILLER              PIC X(02).
          05 IOPCB-STATUS        PIC X(02).
          05 FILLER              PIC X(28).
          *********************************************************************


          PROCEDURE DIVISION.
              ENTRY 'DLITCBL' USING IOPCB, ALTPCB.
              PERFORM IOPCB-GET    THRU IOPCB-GET-EXIT.
              PERFORM ECHO-MSG     THRU ECHO-MSG-EXIT.
              PERFORM ISRT-MSG     THRU ISRT-MSG-EXIT.
              GO TO 9999-RETURN.


      ********************************************************************
      *      RETRIEVE THE REQUEST MESSAGE FROM THE IMS QUEUE           *
      ********************************************************************
          IOPCB-GET.
(2)     CALL 'CBLTDLI' USING GU, IOPCB, REQUEST-MESSAGE.
        IF IOPCB-STATUS NOT = SPACES
              GO TO 9999-RETURN.
```

```
        IOPCB-GET-EXIT.
              EXIT.
****************************************************************
*         COMPOSE THE RESPONSE MESSAGE                        *
****************************************************************
          ECHO-MSG.
* THE RESPONSE MESSAGE HAS THE SAME BASIC FORMAT AS
* THE REQUEST MESSAGE. WE CHANGE THE TRAN CODE TO THAT
* OF THE DESTINATION. NOTE THAT THE FIELD
* BEA-RESERVED MUST BE COPIED INTACT FROM THE
* REQUEST MESSAGE TO THE RESPONSE MESSAGE. FOR RE-
* SPONSE DATA, WE SIMPLY RETURN THE REQUEST DATA.
* HENCE THIS IS AN ECHO TRANSACTION.

(3)     MOVE REQUEST-MESSAGE TO RESPONSE-MESSAGE.
(4,6)       MOVE BEAGW        TO TRAN-CODE IN RESPONSE-MESSAGE.


      ECHO-MSG-EXIT.
            EXIT.
****************************************************************
*         INSERT RESPONSE MESSAGE TO IMS QUEUE                *
****************************************************************
       ISRT-MSG.
* (5)    CALL 'CBLTDLI' USING ISRT, IOPCB, RESPONSE-MESSAGE.
         IF IOPCB-STATUS NOT = SPACES
             GO TO 9999-RETURN.
ISRT-MSG-EXIT.
          EXIT.
****************************************************************
*         INSERT RESPONSE MESSAGE TO ALTERNATE PCB            *
****************************************************************
      PCB-ISRT.
      9999-RETURN.
             GOBACK.
```

Notes

1. The format of the Oracle TMA TCP for IMS server request/response message header is supplied by a COBOL copybook, `SERVER`. The equivalent C language header is provided by the `BEATCPI.H` header file. Both are available in the Oracle TMA TCP for IMS `INCLUDE` distribution library.

2. A `GU` (Get Unique) call is issued to retrieve the request message from the IMS message queue. A server request message is always formatted as a single message segment, so a `GN` (Get Next) call is not strictly required.

3. The `USER-DATA` (user-defined request data) is simply copied from the request message to the response message.

4. The `TRAN-CODE` in the response message is set to that of the Oracle TMA TCP for IMS (in this example, `BEAGW="BEATCPI"`; the name may be different in your installation).

5. An `ISRT` (Insert) call is issued to insert the message into the IMS message queue, returning the response to Oracle TMA TCP for IMS.

6. In cases where no response is required, the server transaction simply performs any processing required by the request and returns to IMS (without sending a response message to Oracle TMA TCP for IMS).

IMS Client Transactions

An IMS client transaction is one that issues a request for a specified remote service made available through Oracle TMA TCP for IMS. IMS client requests (unlike server requests) are processed in two distinct "phases": a *request* phase, followed by a *response* phase. The request and response must be processed by two separate transaction executions (for example, `T1` and `T2`).

Request Phase

A client request takes place according to the following scenario.

1. The request transaction, `T1`, issues a request for a service provided by a remote gateway by inserting a *client request message* into the IMS message queue. The client request message is destined for TMA TCP for IMS, and must specify the name (transaction code) of a response transaction (`T2`).

2. The TMA TCP for IMS gateway retrieves the client request message and forwards the request to a remote system which offers the requested service.

Response Phase

A client response takes place according to the following scenario.

1. When the response (if required) is received, a *client response message* is formatted and inserted directly into the IMS message queue. If running the OTMA client, the response is placed into the IMS message queue indirectly through the OTMA interface. The client response message is destined for the specified response transaction (T2).

2. The response transaction is scheduled by IMS and retrieves the client response message from the IMS message queue. The client response message contains sufficient information to enable the response transaction to correlate the response with the original request.

BEACRQ01 - A Sample IMS Client Request Transaction

The following sample IMS client request transaction makes a request for a service called TOUPPER, provided by a remote system. The TOUPPER service returns a response consisting of the request data translated to uppercase.

Listing E-2   Sample IMS Client Request Transaction

```
CBL APOST
      IDENTIFICATION DIVISION.
      PROGRAM-ID. BEACRQ01.
      ENVIRONMENT DIVISION.
      CONFIGURATION SECTION.
      SOURCE-COMPUTER. IBM-370.
      OBJECT-COMPUTER. IBM-370.
      DATA DIVISION.
      WORKING-STORAGE SECTION.

77 GU        PIC X(04) VALUE 'GU '.
77 CHNG      PIC X(04) VALUE 'CHNG'.
77 ISRT      PIC X(04) VALUE 'ISRT'.
77 PURG      PIC X(04) VALUE 'PURG'.

01 MSG-IN.
   05 MI-LL      PIC S9(04) COMP VALUE +0.
   05 MI-ZZ      PIC S9(04) COMP VALUE +0.
```

```
   05 MI-TRANCODE  PIC X(08) VALUE SPACES.
   05 FILLER       PIC X(01) VALUE SPACES.
   05 MI-AREA.     PIC X(91) VALUE SPACES.
   10 MI-DATA


(1)   01 CLIENT-REQUEST.
      05 CRR-LL               PIC 9(04) COMP VALUE 0.
      05 CRR-ZZ               PIC 9(04) COMP VALUE 0.
      05 CRR-TRANCODE         PIC X(08) VALUE SPACES.
      05 FILLER               PIC X(01) VALUE SPACES.
      05 BEA-RESERVED-1       PIC X(03) VALUE LOW-VALUES.
      05 CRR-HEADER-LEN       PIC 9(08) COMP.
      05 CRR-CONTEXT-DATA-LEN PIC 9(08) COMP.
      05 CRR-REQUEST-DATA-LEN PIC 9(08) COMP.
      05 CRR-MAX-RESPONSE-LEN PIC 9(08) COMP.
      05 CRR-REQUEST-TYPE     PIC 9(08) COMP.
      05 CRR-RESPONSE-FORMAT  PIC 9(08) COMP.
      05 CRR-ERROR-CODE       PIC 9(08) COMP.
      05 CRR-REASON-CODE      PIC 9(08) COMP.
      05 CRR-SERVICE-NAME     PIC X(16) VALUE LOW-VALUES.
      05 CRR-RESPONSE-TRAN    PIC X(08) VALUE LOW-VALUES.
      05 CRR-ORIGIN-TERMINAL  PIC X(08) VALUE LOW-VALUES.
      05 BEA-RESERVED-2       PIC X(16) VALUE LOW-VALUES.
      05 CRR-CONTEXT-AREA.
         10 CRR-CONTEXT-DATA  PIC X(31) VALUE SPACES.
      05 CRR-REQUEST-AREA.
         10 CRR-REQUEST-DATA  PIC X(100) VALUE SPACES.

LINKAGE SECTION.
01 IOPCB.
   05 LTERM         PIC  X(08).
   05 FILLER        PIC  X(02).
   05 IOPCB-STATUS  PIC  X(02).
   05 FILLER        PIC  X(28).
   01 ALTPCB.
   05 ALTPCB-DEST   PIC  X(08).
   05 FILLER        PIC  X(02).
   05 ALTPCB-STATUS PIC  X(02).
```

```
     05 FILLER           PIC   X(10).


         PROCEDURE DIVISION.
         ENTRY 'DLITCBL' USING IOPCB, ALTPCB.

(2)      CALL 'CBLTDLI' USING GU, IOPCB, MSG-IN.
         IF IOPCB-STATUS NOT = SPACES
         GO TO 9999-RETURN.


(3)      MOVE 'BEATCPI' TO CRR-TRANCODE.
         MOVE 96 TO CRR-HEADER-LEN.
         MOVE 1 TO CRR-REQUEST-TYPE.
         MOVE 0 TO CRR-RESPONSE-FORMAT.
         MOVE LTERM TO CRR-ORIGIN-TERMINAL.
         MOVE 'TOUPPER' TO CRR-SERVICE-NAME.
         MOVE 'BEACRP01' TO CRR-RESPONSE-TRAN.
         MOVE ALL 'A' TO CRR-REQUEST-DATA.
         MOVE LENGTH OF CRR-REQUEST-AREA TO
              CRR-REQUEST-DATA-LEN.
         MOVE CRR-REQUEST-DATA-LEN TO CRR-MAX-RESPONSE-LEN.

(4)      MOVE ALL 'B' TO CRR-CONTEXT-DATA.
         MOVE LENGTH OF CRR-CONTEXT-AREA TO CRR-CONTEXT-DATA-LEN.


(5)      COMPUTE CRR-LL = CRR-REQUEST-DATA-LEN +
         CRR-CONTEXT-DATA-LEN +
         CRR-HEADER-LEN.


(6) CALL 'CBLTDLI' USING CHNG, ALTPCB, CRR-TRANCODE.
         IF ALTPCB-STATUS NOT = SPACES
         GO TO 9999-RETURN.


(7)      CALL 'CBLTDLI' USING ISRT, ALTPCB, CLIENT-REQUEST.
         IF ALTPCB-STATUS NOT = SPACES
         GO TO 9999-RETURN.


(8)      CALL 'CBLTDLI' USING PURG, ALTPCB.
         IF ALTPCB-STATUS NOT = SPACES
```

```
     GO TO 9999-RETURN.

(9)    9999-RETURN.

     GOBACK.
```

Notes

1. Although not used in the previous example, the format of the TMA TCP for IMS client request/response message header is supplied by a COBOL copybook, CLIENT. The equivalent C language header is provided by the BEATCPI.H header file. Both are available in the TMA TCP for IMS INCLUDE distribution library.

2. A GU (Get Unique) call is issued to retrieve the terminal input message from the IMS message queue.

3. The client request header is initialized as follows:

   – CRR-TRANCODE is set to the transaction code of the TMA TCP for IMS gateway (in this example, "BEATCPI"; the name may be different in your installation).

   – BEA-RESERVED-1 *must be initialized to binary zero*.

   – CRR-HEADER-LEN is set to the length of the client request header (96 bytes).

   – CRR-REQUEST-TYPE is set to 1, specifying that a response is required.

   – CRR-RESPONSE-FORMAT is set to 0, specifying that the response is to be returned as a single message segment.

   – CRR-ORIGIN-TERMINAL is set to the name of the requesting terminal (LTERM), obtained from the IOPCB.

   – CRR-SERVICE-NAME is set to the name of the service being requested ("TOUPPER"). *This name must be the name of the service as locally defined to* TMA TCP for IMS. This name may (or may not) be the same as the name of the service as defined on the remote system which offers the service.

   – CRR-RESPONSE-TRAN is set to the name of the designated response transaction ("BEACRP01").

   – CRR-REQUEST-DATA-LEN is set to the length of user-defined request data being sent.

- CRR-MAX-RESPONSE-LEN is set to the maximum amount of response data that can be accommodated.

- BEA-RESERVED-2 *must be initialized to binary zero*.

4. Context data is optional and can be any data desired. Typically, context data is used by the response transaction to correlate the response with the original request.

   - CRR-CONTEXT-DATA-LEN is set to the length of any user-defined context data included.

5. The length of the message segment (LL) is set to the overall length of the client request message (header + context data + request data).

6. A CHNG (Change) call is issued to set the destination to the transaction code of the TMA TCP for IMS gateway (in this example, "BEATCPI"; the name may be different in your installation).

7. An ISRT (Insert) call is issued to insert the client request message into the IMS message queue. Although the client request message is formatted as a single message segment in this example, the client request message may be formatted as multiple message segments, if desired.

8. A PURG call is issued to signal that the message is complete; for example, there are no additional message segments.

9. The requesting transaction does not wait on the response. Rather, the specified response transaction is scheduled by TMA TCP for IMS when processing of the request completes.

BEACRP01 - A Sample IMS Client Response Transaction

The following sample IMS client response transaction processes the response from a request for a service called TOUPPER, provided by a remote system. The TOUPPER service returns a response consisting of the request data translated to uppercase.

Listing E-3   Sample IMS Response Transaction

```
CBL APOST
      IDENTIFICATION DIVISION.
      PROGRAM-ID. BEACRP01.
      ENVIRONMENT DIVISION.
      CONFIGURATION SECTION.
      SOURCE-COMPUTER. IBM-370.
```

```
      OBJECT-COMPUTER. IBM-370.
       DATA DIVISION.


   WORKING-STORAGE SECTION.
       77 GU    PIC X(04) VALUE 'GU'.
       77 CHNG  PIC X(04) VALUE 'CHNG'.
       77 ISRT  PIC X(04) VALUE 'ISRT'.
       77 PURG  PIC X(04) VALUE 'PURG'.


   1 MSG-OUT.
       05 MO-LL                PIC S9(04) COMP VALUE +0.
       05 MO-ZZ                PIC S9(04) COMP VALUE +0.
       05 MO-TRANCODE          PIC X(08) VALUE SPACES.
       05 FILLER               PIC X(01) VALUE SPACES.
       05 MO-AREA
         10 MO-DATA            PIC X(91) VALUE SPACES.
(1) 01 CLIENT-RESPONSE.
       05 CRR-LL               PIC 9(04) COMP VALUE 0.
       05 CRR-ZZ               PIC 9(04) COMP VALUE 0.
       05 CRR-TRANCODE         PIC X(08) VALUE SPACES.
       05 FILLER               PIC X(01) VALUE SPACES.
       05 BEA-RESERVED-1       PIC X(03) VALUE LOW-VALUES.
       05 CRR-HEADER-LEN       PIC 9(08) COMP.
       05 CRR-CONTEXT-DATA-LEN PIC 9(08) COMP.


(7) 05 CRR-RESPONSE-DATA-LEN PIC 9(08) COMP.
(7) 05 CRR-MAX-RESPONSE-LEN  PIC 9(08) COMP.
       05 CRR-REQUEST-TYPE     PIC 9(08) COMP.
(3) 05 CRR-RESPONSE-FORMAT   PIC 9(08) COMP.
       05 CRR-ERROR-CODE       PIC S9(08) COMP.
       05 CRR-REASON-CODE      PIC S9(08) COMP.
       05 CRR-SERVICE-NAME     PIC X(16) VALUE LOW-VALUES.
       05 CRR-RESPONSE-TRAN    PIC X(08) VALUE LOW-VALUES.
       05 CRR-ORIGIN-TERMINAL  PIC X(08) VALUE LOW-VALUES.
       05 BEA-RESERVED-2       PIC X(16) VALUE LOW-VALUES.
(6) 05 CRR-CONTEXT-AREA.
         10 CRR-CONTEXT-DATA  PIC X(31) VALUE SPACES.
       05 CRR-RESPONSE-AREA.
```

```
       10 CRR-RESPONSE-DATA  PIC X(100) VALUE SPACES.


    LINKAGE SECTION.


    01 IOPCB.
    05 LTERM                 PIC   X(08).
    05 FILLER                PIC   X(02).
    05 IOPCB-STATUS          PIC   X(02).
    05 FILLER                PIC   X(28).
    01 ALTPCB
    05 ALTPCB-DEST           PIC   X(08).
    05 FILLER                PIC   X(02).
    05 ALTPCB-STATUS         PIC   X(02).
    05 FILLER                PIC   X(10).
    01 IOPCB.


    PROCEDURE DIVISION.
    ENTRY 'DLITCBL' USING IOPCB, ALTPCB.

(2) CALL 'CBLTDLI' USING GU, IOPCB, CLIENT-RESPONSE.
    IF IOPCB-STATUS NOT = SPACES
    GO TO 9999-RETURN.

(4) IF CRR-ERROR-CODE EQUAL 0 AND

(5) CRR-REASON-CODE EQUAL 0
    THEN MOVE 'PASSED' TO MO-DATA
    ELSE MOVE 'FAILED' TO MO-DATA.
    MOVE CRR-TRANCODE TO MO-TRANCODE.
    MOVE 84 TO MO-LL.

    CALL 'CBLTDLI' USING CHNG, ALTPCB, CRR-ORIGIN-TERMINAL.
    IF ALTPCB-STATUS NOT = SPACES
    GO TO 9999-RETURN.

(8) CALL 'CBLTDLI' USING ISRT, ALTPCB, MSG-OUT.
    IF ALTPCB-STATUS NOT = SPACES
    GO TO 9999-RETURN.
```

```
CALL 'CBLTDLI' USING PURG, ALTPCB.
IF ALTPCB-STATUS NOT = SPACES
GO TO 9999-RETURN.


9999-RETURN.

GOBACK.
```

Notes

1. Although not used in the previous example, the format of the TMA TCP for IMS client request/response message header is supplied by a COBOL copybook, CLIENT. The equivalent C language header is provided by the BEATCPI.H header file. Both are available in the TMA TCP for IMS INCLUDE distribution library.

2. A GU (Get Unique) call is issued to retrieve the client response message from the IMS message queue.

3. CRR-RESPONSE-FORMAT indicates the response format: single segment or multiple-segment, as specified in the original request. If multi-segment response format is specified, the response message consists of three segments: response header, context data, and response data.

4. CRR-ERROR-CODE indicates whether or not an error occurred. If this field is zero, it indicates that the request was successfully processed. Otherwise, an error occurred and the error code identifies the type of error. The error code should always be checked before processing a response.

5. CRR-REASON-CODE may provide additional information when an error is indicated. A value of zero indicates that no additional information is available.

6. Context data, if present, is preserved from the original request message. Typically, the context data is used by the response transaction to correlate the response with the original request.

7. CRR-RESPONSE-DATA-LEN contains the length of any response data returned. However, if a truncation error occurred, this field contains the actual (pretruncated) length of the response data. The amount of response data returned is truncated to the length specified by CRR-MAX-RESPONSE-LEN.

8. A response indicating success or failure (based on the error and reason codes) is written to the original (requesting) terminal, using the LTERM preserved in CRR-ORIGIN-TERMINAL. Note that a modifiable, alternate PCB must be used for this purpose.

BEACRR01 - A Sample IMS Client Request/Response Transaction

If desired, the functionality of the IMS client request and response transactions can be combined into a single application transaction. However, logic must be added to perform the appropriate (request or response) processing based upon the dynamic execution context.

Listing E-4   Sample IMS Request/Response Transaction

```
CBL APOST
    IDENTIFICATION DIVISION.
    PROGRAM-ID. BEACRR01.
    ENVIRONMENT DIVISION.
    CONFIGURATION SECTION.
    SOURCE-COMPUTER. IBM-370.
    OBJECT-COMPUTER. IBM-370.
    DATA DIVISION.
    WORKING-STORAGE SECTION.

    77 GU          PIC X(04) VALUE 'GU '.
    77 CHNG        PIC X(04) VALUE 'CHNG'.
    77 ISRT        PIC X(04) VALUE 'ISRT'.
    77 PURG        PIC X(04) VALUE 'PURG'.

01 MSG-IN.
    05 MI-LL       PIC S9(04) COMP VALUE +0.
    05 MI-ZZ       PIC S9(04) COMP VALUE +0.
    05 MI-TRANCODE PIC X(08) VALUE SPACES.
    05 FILLER      PIC X(01) VALUE SPACES.
    05 MI-AREA.
       10 MI-DATA  PIC X(91) VALUE SPACES.
 01 MSG-OUT.
    05 MO-LL       PIC S9(04) COMP VALUE +0.
```

```
   05 MO-ZZ       PIC S9(04) COMP VALUE +0.
   05 MO-TRANCODE PIC X(08) VALUE SPACES.
   05 FILLER      PIC X(01) VALUE SPACES.
   05 MO-AREA.
      10 MO-DATA  PIC X(91) VALUE SPACES.


(1) 01 CLIENT-REQUEST-RESPONSE.
   05 CRR-LL               PIC 9(04) COMP VALUE 0.
   05 CRR-ZZ               PIC 9(04) COMP VALUE 0.
   05 CRR-TRANCODE         PIC X(08) VALUE SPACES.
   05 FILLER               PIC X(01) VALUE SPACES.
   05 BEA-RESERVED-1       PIC X(03) VALUE LOW-VALUES.
   05 CRR-HEADER-LEN       PIC 9(08) COMP.
   05 CRR-CONTEXT-DATA-LEN PIC 9(08) COMP.
   05 CRR-REQUEST-DATA-LEN PIC 9(08) COMP.
   05 CRR-MAX-RESPONSE-LEN PIC 9(08) COMP.
   05 CRR-REQUEST-TYPE     PIC 9(08) COMP.
   05 CRR-RESPONSE-FORMAT  PIC 9(08) COMP.
   05 CRR-ERROR-CODE       PIC 9(08) COMP.
   05 CRR-REASON-CODE      PIC 9(08) COMP.
   05 CRR-SERVICE-NAME     PIC X(16) VALUE LOW-VALUES.
   05 CRR-RESPONSE-TRAN    PIC X(08) VALUE LOW-VALUES.
   05 CRR-ORIGIN-TERMINAL  PIC X(08) VALUE LOW-VALUES.
   05 BEA-RESERVED-2       PIC X(16) VALUE LOW-VALUES.
   05 CRR-CONTEXT-AREA.
      10 CRR-CONTEXT-DATA  PIC X(31) VALUE SPACES.
   05 CRR-REQUEST-AREA.
      10 CRR-REQUEST-DATA  PIC X(100) VALUE SPACES.


   LINKAGE SECTION.
01  IOPCB.
   05 LTERM                PIC  X(08).
   05 FILLER               PIC  X(02).
   05 IOPCB-STATUS         PIC  X(02).
   05 FILLER               PIC  X(28).
01  01 ALTPCB.
   05 ALTPCB-DEST          PIC  X(08).
   05 FILLER               PIC  X(02).
```

```
    05 ALTPCB-STATUS         PIC  X(02).
    05 FILLER                PIC  X(10).

    PROCEDURE DIVISION.
    ENTRY 'DLITCBL' USING IOPCB, ALTPCB.
(3) IF LTERM = SPACES OR LOW-VALUES
    THEN PERFORM RESPONSE-MESSAGE THRU RESPONSE-MESSAGE-EXIT
    ELSE PERFORM REQUEST-MESSAGE THRU REQUEST-MESSAGE-EXIT.

    9999-RETURN.
        GOBACK.

    REQUEST-MESSAGE.
    CALL 'CBLTDLI' USING GU, IOPCB, MSG-IN.
    IF IOPCB-STATUS NOT = SPACES
    GO TO REQUEST-MESSAGE-EXIT.

    MOVE 'BEATCPI' TO CRR-TRANCODE.
    MOVE 96 TO CRR-HEADER-LEN.
    MOVE 1 TO CRR-REQUEST-TYPE.
    MOVE 0 TO CRR-RESPONSE-FORMAT.
    MOVE LTERM TO CRR-ORIGIN-TERMINAL.
    MOVE 'TOUPPER' TO CRR-SERVICE-NAME.
    MOVE MI-TRANCODE TO CRR-RESPONSE-TRAN.
    MOVE ALL 'A' TO CRR-REQUEST-DATA.
    MOVE LENGTH OF CRR-REQUEST-AREA TO CRR-REQUEST-DATA-LEN.
    MOVE CRR-REQUEST-DATA-LEN TO CRR-MAX-RESPONSE-LEN.
    MOVE ALL 'B' TO CRR-CONTEXT-DATA.
    MOVE LENGTH OF CRR-CONTEXT-AREA TO CRR-CONTEXT-DATA-LEN.
    COMPUTE CRR-LL = CRR-REQUEST-DATA-LEN +
                    CRR-CONTEXT-DATA-LEN +
                    CRR-HEADER-LEN.

    CALL 'CBLTDLI' USING CHNG, ALTPCB, CRR-TRANCODE.
    IF ALTPCB-STATUS NOT = SPACES
    GO TO REQUEST-MESSAGE-EXIT.

    CALL 'CBLTDLI' USING ISRT, ALTPCB,CLIENT-REQUEST-RESPONSE.
```

```
IF ALTPCB-STATUS NOT = SPACES
GO TO REQUEST-MESSAGE-EXIT.

CALL 'CBLTDLI' USING PURG, ALTPCB.
IF ALTPCB-STATUS NOT = SPACES
GO TO REQUEST-MESSAGE-EXIT.

REQUEST-MESSAGE-EXIT.
EXIT.

RESPONSE-MESSAGE.

CALL 'CBLTDLI' USING GU, IOPCB, CLIENT-REQUEST-RESPONSE.
IF IOPCB-STATUS NOT = SPACES
GO TO RESPONSE-MESSAGE-EXIT.
IF CRR-ERROR-CODE EQUAL 0 AND
CRR-REASON-CODE EQUAL 0
THEN MOVE 'PASSED' TO MO-DATA
ELSE MOVE 'FAILED' TO MO-DATA.
MOVE CRR-TRANCODE TO MO-TRANCODE.
MOVE 84 TO MO-LL.

CALL 'CBLTDLI' USING CHNG, ALTPCB, CRR-ORIGIN-TERMINAL.
IF ALTPCB-STATUS NOT = SPACES
GO TO RESPONSE-MESSAGE-EXIT.

CALL 'CBLTDLI' USING ISRT, ALTPCB, MSG-OUT.
IF ALTPCB-STATUS NOT = SPACES
GO TO RESPONSE-MESSAGE-EXIT.

CALL 'CBLTDLI' USING PURG, ALTPCB.
IF ALTPCB-STATUS NOT = SPACES
GO TO RESPONSE-MESSAGE-EXIT.

RESPONSE-MESSAGE-EXIT.
EXIT.
```

Notes

1. Although not used in the previous example, the format of the TMA TCP for IMS client request/response message header is supplied by a COBOL copybook, CLIENT. The equivalent C language header is provided by the BEATCPI.H header file. Both are available in the TMA TCP for IMS INCLUDE distribution library.

2. The actual request processing is otherwise identical to that performed by BEACRQ01.

3. The actual response processing is otherwise identical to that performed by BEACRP01.

Error and Reason Codes

The Oracle Tuxedo Mainframe Adapter for TCP (IMS) (hereafter referenced as TMA TCP for IMS) client response message header contains error and reason codes used to return error information to an IMS client. When an error occurs while processing an IMS client request, the error code is set to a unique, nonzero value that indicates the type of error that occurred. Depending on the particular error, the reason code may also contain a value that provides additional information about the error.

Error Code (Decimal Values)	Description
0	**Normal Return** The request completed successfully (no errors occurred).
4	**Response Data Truncated** The user response data was truncated because it exceeded the maximum response length specified in the request. When this error occurs, the user response data is truncated to the maximum response length specified, but the actual length of the user response data (before truncation) is returned in the data length field.
8	**Remote System Unavailable** The TMA TCP for IMS gateway cannot establish a session with the remote gateway required to service the request.

Error Code (Decimal Values)	Description
12	**Remote System Busy** All existing sessions with the required remote gateway are busy and TMA TCP for IMS cannot establish a new session (due to session limits).
16	**Request Timed Out** A required response was not received from the remote host within the specified time limit. This may indicate a connectivity problem or a problem with the remote system.
20	**Service Not Defined** The requested service name is not defined to TMA TCP for IMS. This error can also occur if the requested service name is currently out of service.
24	**Internal Error** An internal error occurred and TMA TCP for IMS could not allocate storage required to process the request.
28	**Invalid Request** An error was detected while validating the request. When this error occurs, the reason code indicates the specific reason for the error. 0=No additional information is available for this error. 4=The request header length is not valid. 8=The combined header length, context length, and data length exceed the length of the request message (LL). 12=The specified request type is not valid. 16=A response transaction is not specified (that is, the response transaction field is spaces or binary zero). 20=The context length is not valid. The length of user context data cannot be greater than 32,767 bytes. 24=The data length is not valid. The length of user request data cannot be greater than 32,767 bytes. 28=The maximum response length is not valid. The maximum length of user response data cannot be greater than 32,767 bytes. 32=A service name is not specified (that is, the service name field is spaces or binary zero). 36=The requested service name is not defined to TMA TCP for IMS.

Error Code (Decimal Values)	Description
32	**Remote System Error** An error was detected by the remote gateway. When this error occurs, the reason code contains the gateway error code returned by the remote system.
36	**Remote Service Error** An error indication (TPERROR) was returned by the remote service. When this error occurs, the reason code contains the TPERRNO value returned by the remote service.
40	**Internal Logic Error** An internal logic error was detected by TMA TCP for IMS. If this error occurs, notify the systems programmer responsible for TMA TCP for IMS.
44	**Service Not Available** The remote service is currently unavailable.
48	**Service Failed** The remote service returned a TPFAIL return code.
52	**Security Error** The user is not authorized to execute the remote service.

Glossary

A

account ID

A 1-8 character name that is exchanged between Oracle Tuxedo Mainframe Adapter gateways as part of an authentication mechanism during `CONNECT` processing.

alternate PCB

Program Control Block that allows an IMS transaction to write output messages to a destination other than that from which input was received.

API

See *application programming interface*.

application programming interface (API)

A set of well-defined programming interfaces (entry points, calling parameters, and return values) by which one software program utilizes the services of another.

B

(No terms begin with the letter "B.")

C

CHKP (Checkpoint)

An IMS API call that commits the changes a program has made to a database and establishes restart places within a program.

CHNG (Change)

An IMS API call that changes (sets) the destination associated with a program control block (PCB). Subsequent messages inserted into the IMS message queue using the PCB are directed to the specified destination.

CICS

See *Customer Information Control System*.

client

A software program that makes a request for a service in a client/server architecture.

client request

A request by an IMS client request transaction to Oracle TMA TCP for IMS for a service provided by remote system.

client request transaction

A user-written IMS application transaction that requests a service via Oracle TMA TCP for IMS that is offered by a remote system.

client response

The response to a previously issued IMS client request, processed by an IMS client response transaction.

client response transaction

A user-written IMS application transaction that processes the response to an IMS client request for a service offered by a remote system.

client/server model

A systems or application programming model in which *servers* provide architected services and *clients* request those services. Some components in the client/server model can function only as servers; others may function only as clients; still others can function both as clients and servers.

CLIENTSHUTDOWN

An option that can be specified in the Oracle TMA TCP for IMS configuration file that allows shutdown processing to be initiated by a remote client request, or as a response to a remote client request.

COBOL

A standard programming language widely used for business applications, especially on IBM mainframe systems.

configuration file

A text file used by Oracle TMA TCP for IMS to define the network configuration of Oracle Tuxedo Mainframe Adapter gateways and services.

Customer Information Control System (CICS)

An IBM transaction processing monitor that runs on IBM mainframe systems.

D

DASD

See *direct access storage device*.

direct access storage device (DASD)

Any storage device, such as a hard disk, that offers random access or direct access to the stored data.

DNS

See *domain name server*.

domain name server (DNS)

A program that runs on an Internet-connected computer system (called a DNS server) and provides an automatic translation between domain names and IP addresses.

dotted decimal notation

A convention for expressing IP addresses, consisting of a series of 4 decimal numbers (0-255), separated by periods. Example: 123.205.23.99.

E

(No terms begin with the letter "E.")

F

(No terms begin with the letter "F.")

G

gateway

A software program that allows dissimilar systems to communicate and exchange information. A gateway normally handles communication between systems and performs all necessary protocol translation such that the end applications communicate transparently.

gateway message

A Oracle Tuxedo Mainframe Adapter architected data structure used to exchange requests and responses over a TCP/IP link connecting two Oracle Tuxedo Mainframe Adapter gateways.

GN (Get Next)

An IMS API call that retrieves the next segment of a multisegment message from the IMS message queue.

GU (Get Unique)

An IMS API call that retrieves the first (or only segment) of a message from the IMS message queue.

H

(No terms begin with the letter "H.")

I

IMS

See *Information Management System*.

IMS message

An IMS-architected data structure used to implement communications between components in an IMS system.

inbound session

A logical communications path between Oracle TMA TCP for IMS and another (remote) Oracle Tuxedo Mainframe Adapter gateway. An inbound session is used by the remote gateway to send client requests to the local (IMS) gateway for processing.

Information Management System (IMS)

An IBM high-performance, high-volume transaction processing monitor that runs on IBM mainframe systems.

input/output program control block

An API control block used by an IMS transaction to retrieve its input and write output back to the input source (e.g., a terminal).

Interactive System Productivity Facility (ISPF)

An IBM program product used by system and application programmers to manipulate data (edit, browse, copy, etc.) on an IBM mainframe system.

Internet protocol address (IP address)

A numeric value that uniquely identifies a node in a TCP/IP network. IP addresses are usually expressed in "dotted decimal notation", a series of 4 decimal numbers (0-255), separated by periods. Example: 123.205.23.99.

I/O PCB

See *input/output program control block*.

ISPF

See *Interactive System Productivity Facility*.

IP address

See *Internet protocol address*.

ISRT (Insert)

An IMS API call used to insert a message segment into the IMS message queue.

J

JCL

See *job control language*.

job control language (JCL)

A language used to define and submit batch jobs on an IBM mainframe system.

K

(No terms begin with the letter "K.")

L

Language Environment /370 (LE/370)

An IBM program product which provides common runtime support for a variety of high-level IBM mainframe programming languages, including COBOL, C/C++, and PL/I.

LE/370

See *Language Environment / 370*.

listener

A special TCP/IP socket that is dedicated to "listening" for incoming TCP/IP connection requests at a specific port number.

LMID

See *logical machine ID*.

local gateway

The Oracle TMA TCP for IMS gateway.

local service name

A 1-16 character name that identifies a service that can be requested by an IMS client transaction.

logical machine ID (LMID)

A symbolic name for a Oracle Tuxedo Mainframe Adapter gateway (corresponding to a specific IP address and port combination).

logical terminal (LTERM)

A terminal attached to an IMS system, used by end users to enter transactions and receive responses.

LTERM

See *logical terminal*.

M

message level

An attribute associated with messages issued by Oracle TMA TCP for IMS that classifies each message as informational, error-related, etc.

message log

A dataset (usually allocated on disk) to which Oracle TMA TCP for IMS logs all messages issued.

message processing program (MPP)

A user-written application program that processes transactions in an IMS system. MPPs typically confine their I/O operations to the IMS message queue (e.g., retrieving terminal input and writing terminal output) and a database.

message queue

The message storage and retrieval mechanism used by IMS components to exchange messages. For example, end-user input at a terminal causes a message to be placed into the message queue. A transaction processing program retrieves the message (containing the user input) from the message queue.

message segment

IMS messages are made up of "pieces" called message *segments*. A message can consist of a single segment, or multiple segments. A message segment is the basic unit of I/O when inserting messages into and retrieving messages from the IMS message queue.

MPP

See *message processing program*.

Multiple Virtual Storage

An IBM operating system used by IBM mainframe computers.

MVS

See *Multiple Virtual Storage*.

MVS Console

A terminal device used by the MVS operating system and other software components to display informational and error messages for the system operator. MVS consoles can also be used by the system operator to enter commands or to inquire on and modify system status.

N

(No terms begin with the letter "N.")

O

online transaction processing

A form of data processing in which users at terminals or workstations send messages to application programs that update databases in real time.

OTMA

Open Transaction Manager Access is a transaction-based, connectionless client/server protocol.

outbound session

A logical communications path between Oracle TMA TCP for IMS and another (remote) Oracle Tuxedo Mainframe Adapter gateway. An outbound session is used by the local (IMS) gateway to send client requests to the remote gateway for processing.

P

password

A 1-8 character name that is exchanged between Oracle Tuxedo Mainframe Adapter gateways as part of an authentication mechanism during CONNECT processing.

PCB

See *program control block*.

port number

The entity on a TCP/IP host that identifies a logical communications channel and distinguishes one connection from another. A TCP/IP server application "listens" for incoming connection requests at a designated port. A TCP/IP client application initiates a connection with the server by specifying the host's IP address and the server's designated port number.

program control block (PCB)

An IMS API control block used in conjunction with application program I/O (e.g., inserting messages into and retrieving messages from the IMS message queue).

program specification block (PSB)

A control block that defines a transaction processing program to IMS.

protocol

The set of "rules" followed by two systems to communicate and exchange information.

PSB

See *program specification block*.

PURG (Purge)

An IMS API call that indicates that insertion of a message into the IMS message queue is complete (that is, there are no additional message segments).

Q

(No terms begin with the letter "Q.")

R

remote gateway

A Oracle Tuxedo Mainframe Adapter gateway (TUX, CICS, or IMS) to which a local Oracle TMA TCP for IMS gateway is connected.

remote service name

A 1-16 character name that identifies a service offered by a remote system and which can be accessed through a remote gateway.

request phase

IMS client requests are processed in two "phases" – a request phase (in which transaction T1 issues an IMS client request), and a corresponding response phase (in which transaction T2 processes the response to the request).

response phase

IMS client requests are processed in two "phases" – a request phase (in which transaction T1 issues an IMS client request), and a corresponding response phase (in which transaction T2 processes the response to the request).

S

server

A software program that provides a service in a client/server architecture.

server request

A request (issued by a client located on a remote system) for a service provided by an IMS server transaction.

server response

The response to a request (issued by a client located on a remote system) for a service provided by an IMS server transaction.

server response log

A dataset to which Oracle TMA TCP for IMS logs all IMS server responses not correlated with a pending IMS server request.

server transaction

A user-written IMS application transaction that provides a service that can be requested by a remote client through Oracle Tuxedo Mainframe Adapter.

shutdown

The process of terminating (or "shutting down") a Oracle Tuxedo Mainframe Adapter gateway.

sleep time

The amount of time that Oracle TMA TCP for IMS "waits" before polling the IMS message Queue for new work.

socket

The logical end point of a TCP/IP connection. An application accesses a TCP/IP connection through a socket.

socket descriptor

A TCP/IP-assigned number that uniquely identifies a socket and TCP/IP connection. An application must specify the socket descriptor in TCP/IP API calls to identify the socket/connection.

socket ID

See *socket descriptor*.

socket number

See *socket descriptor*.

T

TCP/IP

See *Transmission Control Protocol Internet Protocol*.

timeout

When a request is sent to a remote system or to an IMS server transaction and no response is received within a specified period of time, the request "times out" and an error is recognized.

TRANCODE

See *transaction code*.

transaction code (TRANCODE)

A name that uniquely identifies a transaction in an IMS environment.

Transmission Control Protocol Internet Protocol (TCP/IP)

An open communications protocol supported by most systems, including UNIX, personal computers, and IBM mainframes. TCP/IP can be used to exchange information between dissimilar computing platforms.

U

(No terms begin with the letter "U.")

V

(No terms begin with the letter "V.")

W

Write-To-Operator-with-Reply (WTOR)

A persistent message displayed on a z/OS console which solicits operator input. A system operator replies to the message by entering the associated *reply ID* and the text of the reply.

WTOR

See *Write-To-Operator-with-Reply*.

X

XCF

See *cross-system coupling facility*.

Y

(No terms begin with the letter "Y.")

Z

(No terms begin with the letter "Z.")