BEA eLink™ Adapter for Mainframe

Reference Guide

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BEA eLink™ Adapter for Mainframe Reference Guide

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N/A	December 2001	4.1

Contents

About This Document

This document provides the following supplemental information for the BEA eLink Adapter for Mainframe product:

- "ATMI to CPI-C Function Mapping" provides information about how ATMI function call parameters map to CPI-C verbs.
- "Application-to-Application Programming Examples" provides scenarios that demonstrate how ATMI calls relate to CICS/ESA programming structures.

What You Need to Know

This document is intended mainly for system administrators and operators who will use the BEA eLink Adapter for Mainframe product.

e-docs Web Site

BEA product documentation is available on the BEA corporate Web site. From the BEA Home page, click on Product Documentation or go directly to the "e-docs" Product Documentation page at **http://edocs.bea.com/**.

How to Print the Document

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If you do not have the Adobe Acrobat Reader, you can get it for free from the Adobe Web site at **http://www.adobe.com/**.

Related Information

The following documents contain information that is relevant to using eLink Adapter for Mainframe:

- *BEA eLink Adapter for Mainframe Release Notes*
- *BEA eLink Adapter for Mainframe Installation Guide*
- *BEA eLink Adapter for Mainframe CRM Administration Guide*
- *BEA eLink Adapter for Mainframe User Guide*
- *BEA eLink Adapter for Mainframe Reference Guide*

Documentation Conventions

The following documentation conventions are used throughout this document:

Convention	Item
boldface text	Indicates terms defined in the glossary.

Convention	Item
blue text	Indicates hypertext links in PDF documents.
Ctrl+Tab	Indicates that you must press two or more keys simultaneously.
italics	Indicates emphasis or book titles.

`monospace text`	Indicates code samples, commands and their options, data structures and their members, data types, directories, and file names and their extensions. Monospace text also indicates text that you must enter from the keyboard.
	Examples:
	`#include <iostream.h> void main ( ) the pointer psz`
	`chmod u+w *`
	`\tux\data\ap`
	`.doc`
	`tux.doc`
	`BITMAP`
	`float`

`monospace boldface text`	Identifies significant words in code. *Example*: `void` **`commit`** `( )`
`monospace italic text`	Identifies variables in code. *Example*: `String` *`expr`*
UPPERCASE TEXT	Indicates device names, environment variables, and logical operators. *Examples*: LPT1 SIGNON OR
{ }	Indicates a set of choices in a syntax line. The braces themselves should never be typed.

Convention	Item
`[ ]`	Indicates optional items in a syntax line. The brackets themselves should never be typed. *Example*: `buildobjclient [-v] [-o name ] [-f file-list]... [-l file-list]...`
|	Separates mutually exclusive choices in a syntax line. The symbol itself should never be typed.
. . .	Indicates one of the following in a command line: ■ That an argument can be repeated several times in a command line ■ That the statement omits additional optional arguments ■ That you can enter additional parameters, values, or other information The ellipsis itself should never be typed. *Example*: `buildobjclient [-v] [-o name ] [-f file-list]... [-l file-list]...`
. . .	Indicates the omission of items from a code example or from a syntax line. The vertical ellipsis itself should never be typed.

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In your e-mail message, please indicate that you are using the documentation for the Communications Resource Manager, Document Edition 1.0.

If you have any questions about this version of the eLink Adapter for Mainframe, or if you have problems installing and running eLink Adapter for Mainframe, contact BEA Customer Support through BEA WebSupport at **www.bea.com**. You can also contact Customer Support by using the contact information provided on the Customer Support Card, which is included in the product package.

When contacting Customer Support, be prepared to provide the following information:

- Your name, e-mail address, phone number, and fax number
- Your company name and company address
- Your machine type and authorization codes
- The name and version of the product you are using
- A description of the problem and the content of pertinent error messages

1 ATMI to CPI-C Function Mapping

The following tables list the most common ATMI function calls and show how their parameters map to CPI-C verbs. The mappings are listed by function call in the following order:

- tpcall()
- tpacall() with or without reply
- tpgetrply()
- tpservice()
- tpreturn()
- tpcancel()
- tpconnect()
- tpsend()
- tprecv()
- tpdiscon()
- tpforward ()

The tables show the parameters of the ATMI call, the contents or meaning of the parameters, and notes on usage with the CPI-C verbs.

Table 1-1 tpcall

tpcall()	Parameters	Contents	CPI-C Notes
svc		Service Name	Used in CMALLC to identify the CICS transaction to be invoked.
idata		User data	This data is sent in CMSENDs until completely transmitted.
len		Length of User data	
odata		Reply data	CMRCV receives the data until it has been completely transmitted (data_received is set to CM_COMPLETE_DATA_RECEIVED) and return code is set to CM_OK or CM_DEALLOCATE_NORMAL.
olen		Reply data length	
flags	TPNOTRAN	Not part of a transaction	
	TPNOCHANGE	N/A	Local
	TPNOBLOCK	N/A	Local
	TPNOTIME	N/A	Local
	TPSIGRSTRT	N/A	Local

Table 1-2 tpacall

tpacall()	Parameter	Contents	CPIC Notes
svc		Service Name	Used in CMALLC to identify the CICS transaction to be invoked.
data		User data	This data is sent in CMSENDs until completely transmitted.
len		Length of user data	

Table 1-2 tpacall

tpacall()	Parameter	Contents	CPIC Notes
flags	TPNOREPLY	false	The last data is sent with a CMSEND with send_type set to CMSEND_AND_PREP_TO_RECEIVE. This changes the state of the conversation to receive and a CMRCV is issued to await the reply.
		true	Since no reply is expected, a CMDEAL deallocates the conversation after all data has been received.
	TPNOTRAN	Not part of a transaction	
	TPNOBLOCK	N/A	Local
	TPNOTIME	N/A	Local
	TPSIGRSTRT	N/A	Local

Table 1-3 tpgetrply

tpgetrply()	Parameters	Contents	CPIC Notes
cd		call descriptor	The call descriptor is mapped to the CONVID returned by the CMINIT when the LU6.2 was initiated.
data		User data	Data received from CMRCV if WHAT_RECEIVED set to DATA_COMPLETE.
len		Length of user data	

Table 1-3 tpgetrply

tpgetrply()	Parameters	Contents	CPIC Notes
flags	TPGETANY	If true, data is returned from any conversation. If false, data is returned from conversation associated with the cd	Data available on any conversation is returned to the requestor.
	TPNOCHANGE	Local to the requestor	Limited buffer types supported.
	TPNOBLOCK	N/A	Local
	TPNOTIME	N/A	Local
	TPSIGRSTRT	N/A	Local

Table 1-4 tpservice

tpservice()	Parameters	Contents	CPIC Notes
svcinfo		Service information and data	User Data captured from a CMRCV populates the TPSVCINFO structure user data area. Service characteristics are obtained from the service attributes in the DMCONFIG and UBBCONFIG files.
name		Service name	The service name associated with the 8 character RNAME sent from CICS.
data		User data	Data captured from CMRCV.
len		Length of user data	
cd		call descriptor	The call descriptor associated with the CONVID returned by the CMINIT when the LU6.2 was initiated.
appkey		32-bit key (if used)	For security.
cltid		set by BEA Tuxedo	For security.

Table 1-4 tpservice

tpservice()	Parameters	Contents	CPIC Notes
flags	TPCONV	If true, service is conversational.	
	TPTRAN	N/A	.
	TPNOREPLY	If true, requestor not expecting a reply.	The conversation is terminated with a CMDEAL normal.
	TPSENDONLY	N/A	If set, the CPIC conversation in CICS should be in receive state. If not set, the CICS CPIC conversation state will be in send state.
	TPRECVONLY	N/A	If set, the CPIC conversation in CICS remains in send state.

Table 1-5 tpreturn

tpreturn()	Parameters	Contents	CPIC Notes
rval		TPSUCCESS	Set to TPSUCCESS when conversation terminates with a normal deallocation.
		TPSVCERR	Set to TPESVCERR when the conversation has terminated with a non-normal deallocation type or other error.
rcode		Set by the application	N/A
data		User data	Data is returned to the CICS transaction from a successful CMRCV with data received set to CM_DATA_COMPLETE and return code of CM_DEALLOCATE_NORMAL. If the service fails, no data is returned to the caller and the conversation is deallocated abnormally.
len		Length of data returned	0 < data <= 32K
flags		N/A	N/A

Table 1-6 tpcancel

tpcancel()	Parameters	Contents	CPIC Notes
cd		The connection descriptor on which a `tpgetreply()` is waiting.	CMDEAL abnormal is issued on the conversation with CONVID mapped from call descriptor.

Table 1-7 tpconnect

tpconnect()	Parameters	Contents	CPIC Notes
svc		The local service name representing the service to be invoked. in CICS	The name is used to find the RNAME. The RNAME should match the TPName in CICS and will be used by CMINIT and CMALLC to initiate and allocate the conversation.
data		User data	This data is sent in CMSENDs until completely transmitted.
len		Length of User data	
flags	TPNOTRAN	True	
	TPSENDONLY	If true, the conversation stays in or changes to send state	The conversation remains in send state. This is the default.
	TPRECVONLY	If true, the conversation stays in or changes to receive state	Immediately after the allocate BEA Tuxedo sends a CMSEND with no data and send_type set to CM_SEND_AND_PREP_TO_RECEIVE.
	TPNOBLOCK	N/A	Local
	TPNOTIME	N/A	Local
	TPSIGRSTRT	N/A	Local

Table 1-8 tpsend

tpsend()	Parameters	Contents	CPIC Notes
cd		The connection descriptor	This locally assigned connection descriptor has been mapped to the CONVID returned in the CMINIT and CMALLC on behalf of the `tpconnect()`.
data		User data	ASCII/EBCDIC conversion may be required before sending to CICS.
len		Length of User data	
flags	`TPRECVONLY`	If true, the conversation changes to receive state.	The state of the conversation changes from send to receive. A CMSEND is sent with send_type set to CM_SEND_AND_PREP_TO_RECEIVE.
	`TPNOBLOCK`	N/A	Local
	`TPNOTIME`	N/A	Local
	`TPSIGRSTRT`	N/A	Local
revent	`TPEV_DISCONIMM`	If set, the LU6.2 conversation has been terminated abnormally.	If the return code from a CMRCV is deallocate_abnormal, the conversation is terminated. A disconnect event is sent to the sending process.
	`TPEV_SVCERR`	If set, the LU6.2 conversation has been terminated abnormally.	Any return code other than CM_OK or CM_DEALLOCATE_NORMAL is treated as a TPEV_SVCERR.
	`TPEV_SVCFAIL`	If set, the LU6.2 conversation has been terminated abnormally.	If the return code from CMRCV is CM_TP_NOT_AVAIL_NO_RETRY or CM_TP_RESOURCE_FAILURE_NO_RETRY, `revent` is set to TPEV_SVCFAIL .

Table 1-9 tprecv

tprecv()	Parameters	Contents	CPIC Notes
cd		The connection descriptor	This locally assigned connection descriptor has been mapped to the CONVID returned in the CMINIT and CMALLC issued by the initiator of this conversation.
data		User data	Date to be received using a CMRCV_immediate and returned to the BEA Tuxedo service.
len		Length of User data	
flags	TPNOCHANGE	Local	Must be a supported buffer type.
	TPNOBLOCK	N/A	Local
	TPNOTIME	N/A	Local
	TPSIGRSTRT	N/A	Local
revent	TPEV_DISCONIMM	If set, the LU6.2 conversation has been terminated abnormally.	If the return code from a CMSEND is deallocate_abnormal, the conversation is terminated. A disconnect event is sent to the sending process.
	TPEV_SENDONLY	If set, the LU6.2 conversation changes to send if partner allows it.	The sending partner has sent a CMSEND with send_type set to CM_SEND_AND_PREP_TO_RECEIVE.
	TPEV_SVCERR	If set, the LU6.2 conversation has been terminated abnormally.	Any return code other than CM_OK or CM_DEALLOCATE_NORMAL is treated as a TPEV_SVCERR.
	TPEV_SVCFAIL		If the return code from CMRCV is CM_TP_NOT_AVAIL_NO_RETRY or CM_TP_RESOURCE_FAILURE_NO_RETRY, revent is set to TPEV_SVCFAIL.
	TPEV_SVCSUCC	If set, the conversation has completed normally.	The return code from CMRCV was set to CM_DEALLOCATE_NORMAL. This indicates that the sending TP has completed and deallocated the conversation normally.

Table 1-10 tpdiscon

tpdiscon() Parameters	Contents	CPIC Notes
cd	The connection descriptor	This connection descriptor in mapped to the CONVID returned from CMINIT or CMACCP to the originator of the conversation.

Table 1-11 tpforward

tpforward () Parameters	Contents	CPIC Notes
svc	Service name	tpforward() is treated as if it were a `tpacall()`. A CMINIT and subsequent CMALLC are issued to initialize and allocate a session for a conversation. ClientID must be propagated to the CICS transaction in a TPSVCINFO record.
data	User data	Data is sent using CMSEND. The last CMSEND is sent with send_type of deallocate_normaL.
len	Length of data returned	
flags	Refer to `tpacall`()	

2 Application-to-Application Programming Examples

This section provides the following transaction scenarios for the programming environments supported by eLink Adapter for Mainframe:

- "Distributed Program Link (DPL) Examples"
- "Distributed Transaction Processing (DTP) Examples"
- "CPI-C Programming Examples"
- "CICS/ESA Mirror Transaction Examples"

Caution: The scenarios in this section demonstrate how ATMI calls relate to CICS/ESA programming structures. They are not intended for use in developing application code, or for the replacement of existing application code. The use of any of these examples in actual situations may have unpredictable results.

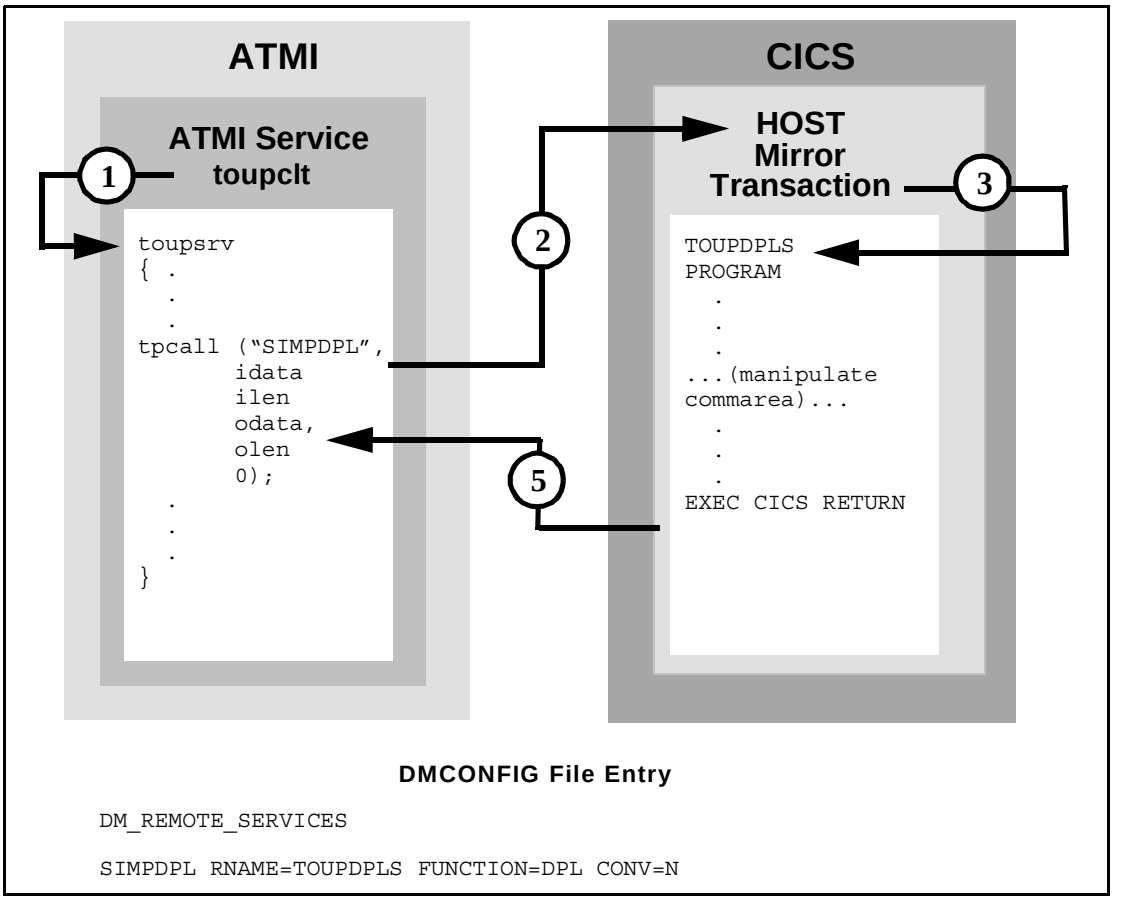
Each example provides a graphical illustration of the scenario followed by a description of each step of the scenario.

Distributed Program Link (DPL) Examples

The examples in this section represent a few of the many programming scenarios available for using DPL and ATMI service invocations. These examples employ the most natural and efficient approaches.

Note: To run transaction client/server scenarios, the eLink Adapter for Mainframe software must be licensed for sync-level 2 operations.

ATMI Client Request/Response to CICS/ESA DPL



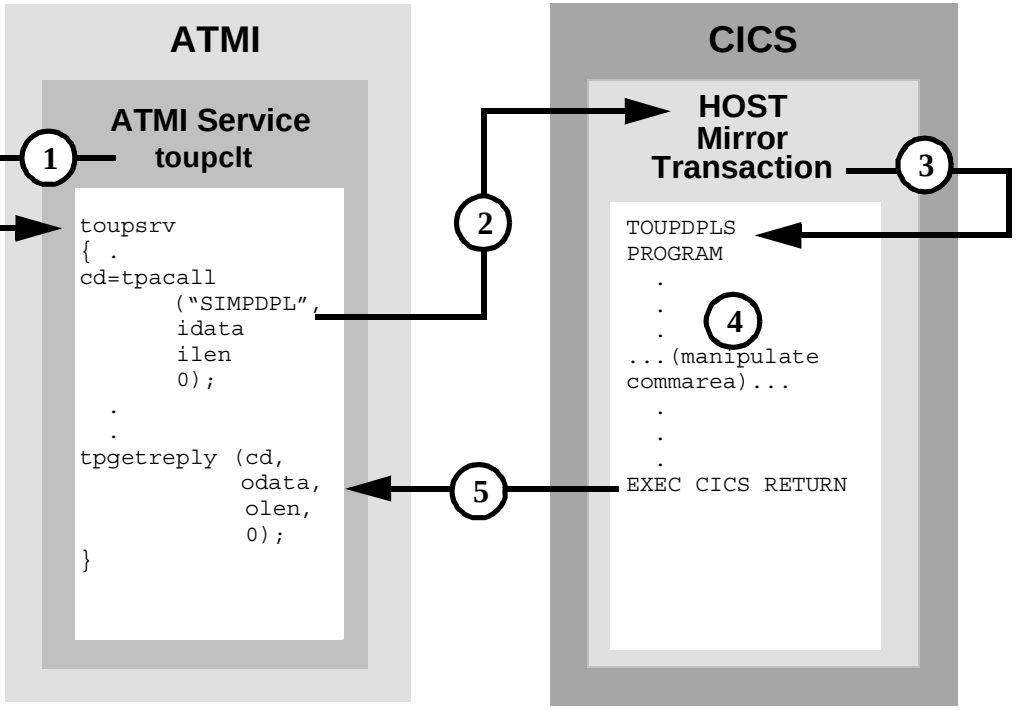
DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDPL RNAME=TOUPDPLS FUNCTION=DPL CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpcall` for `SIMPDPL`, which is advertised in the `DM_REMOTE_SERVICES` section of the DMCONFIG file.

3. Host mirror transaction starts `TOUPDPLS` program and passes `idata` buffer contents for processing.
4. The `TOUPDPLS` program processes data.
5. The CICS/ESA server returns the `commarea` into the client's `odata` buffer.

ATMI Client Asynchronous Request/Response to CICS/ESA DPL

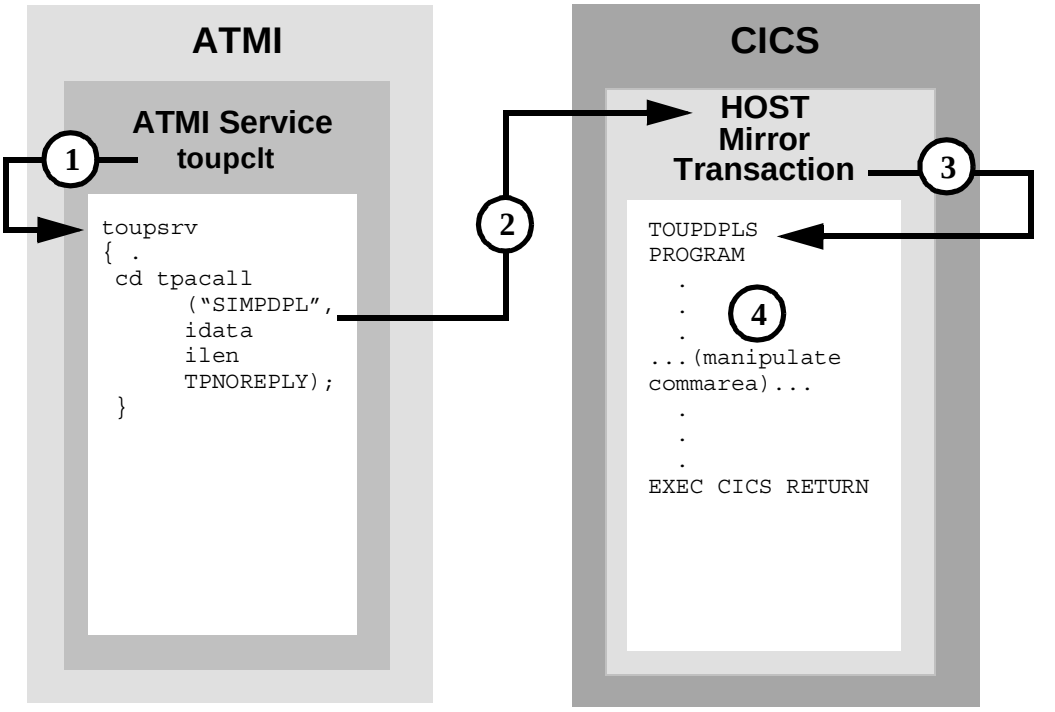


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDPL RNAME=TOUPDPLS FUNCTION=DPL CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpacall` for `SIMPDPL`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file.
3. Host mirror transaction starts `TOUPDPLS` program and passes `idata` buffer contents for processing.
4. The `TOUPDPLS` program processes data.
5. The CICS/ESA system returns the `commarea` into the client's `tpgetreply odata` buffer.

ATMI Client Asynchronous Request/Response with No Reply to CICS/ESA DPL



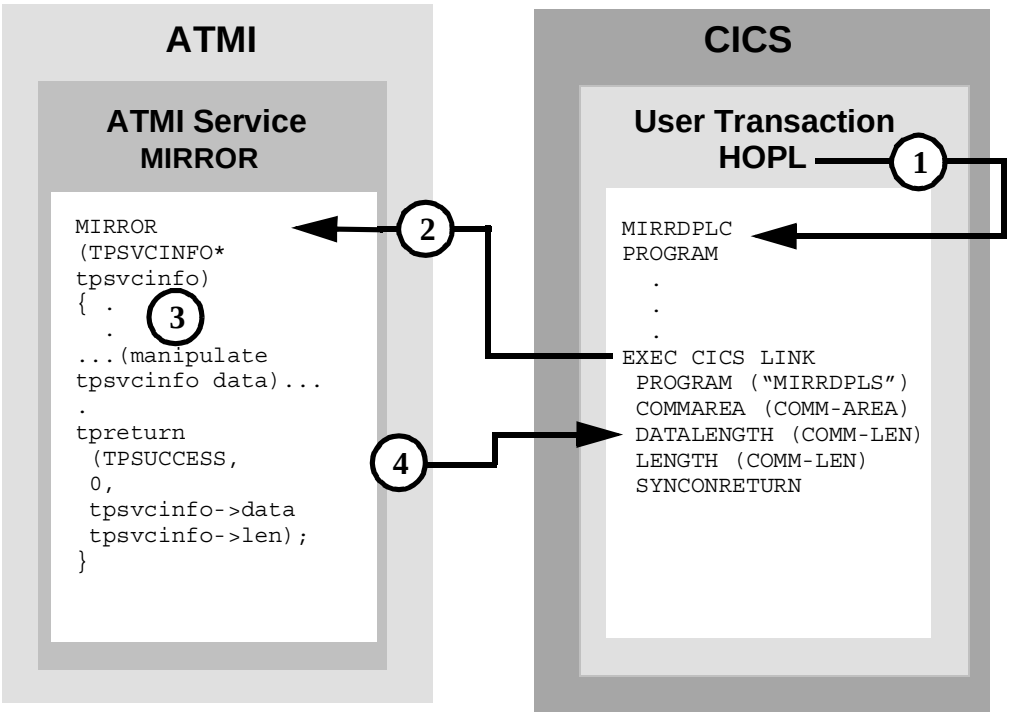
DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDPL RNAME=TOUPDPLS FUNCTION=DPL CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpacall` for `SIMPDPL`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file. The `toupsrv` service uses `TPNOREPLY` to specify that no reply is expected.

3. Host mirror transaction starts `TOUPDPLS` program and passes `idata` buffer contents for processing.
4. The `TOUPDPLS` program processes data.

CICS/ESA DPL to ATMI Request/Response Server

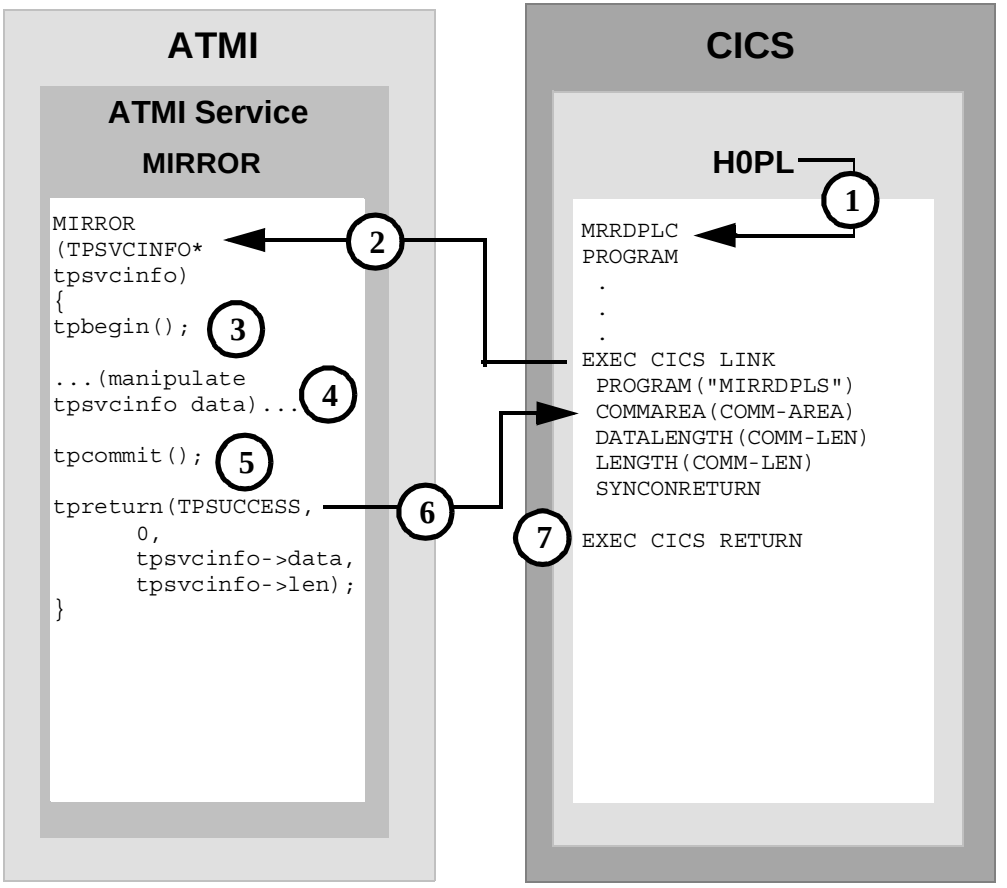


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRDPLS CONV=N
```

1. User-entered `HOPL` invokes `MIRRDPLC` program.
2. The `EXEC CICS LINK` command causes the advertised service mapped to `MIRRDPLS` (in the DM_LOCAL_SERVICES section of the DMCONFIG file) to execute.
3. The `MIRROR` service processes the data received in the service `TPSVCINFO` data buffer from the `EXEC CICS LINK`.
4. The `tpreturn` call returns the data into the `COMM-AREA` buffer.

CICS/ESA DPL to ATMI Request/Response Server, Service in Autonomous Transaction

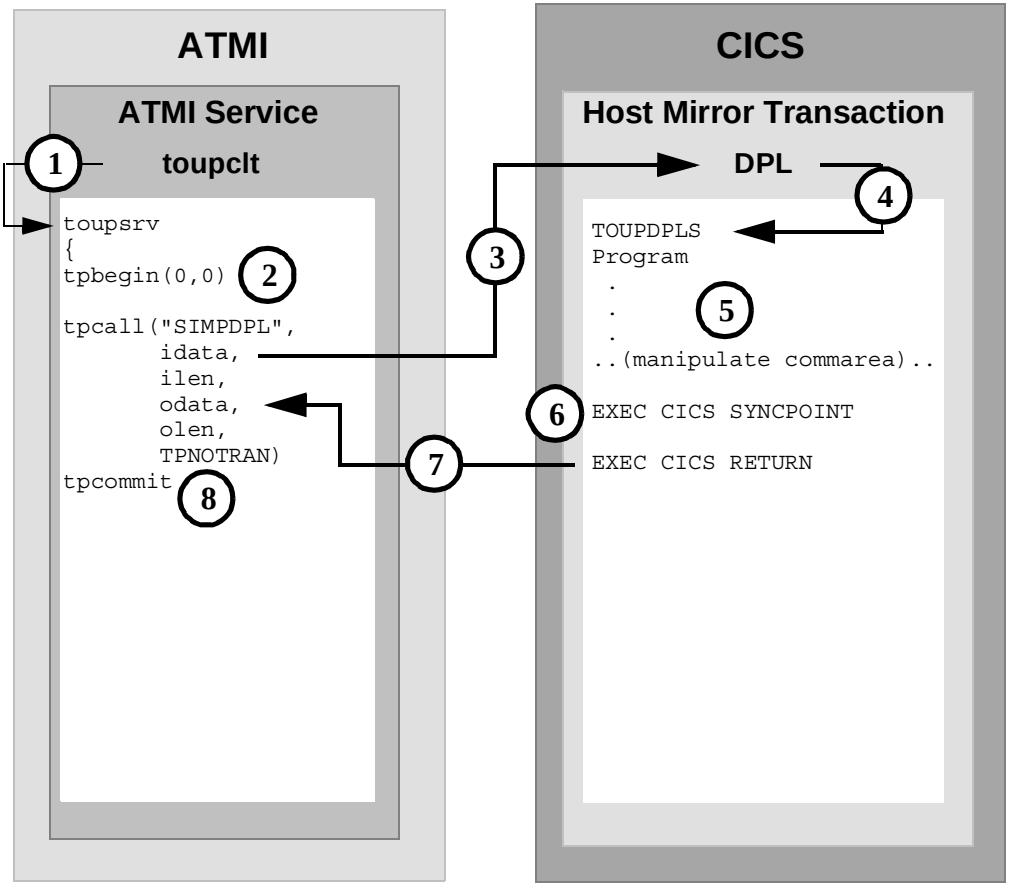


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRDPLC CONV=N
```

1. User-entered `H0PL` invokes `MIRRDPLC` program.
2. The `EXEC CICS LINK` command causes the advertised service mapped to `MIRRDPLS` (in the DM_LOCAL_SERVICES section of the DMCONFIG file) to execute. The `SYNCONRETURN` option indicates that the invoked service will not participate in the CICS/ESA transaction.
3. The `MIRROR` service request `tpbegin` incorporates all further operations in a transaction.
4. The `MIRROR` service processes the data.
5. The `tpcommit` indicates the end of the transaction; all updates performed within the service transaction are to be committed.
6. The `tpreturn` call returns the data into the `commarea` buffer.
7. The `EXEC CICS SYNCPOINT` is an explicit commit request. All updated resources in the CICS/ESA transaction are committed.

ATMI Client Request/Response to CICS/ESA DPL, Autonomous Transaction

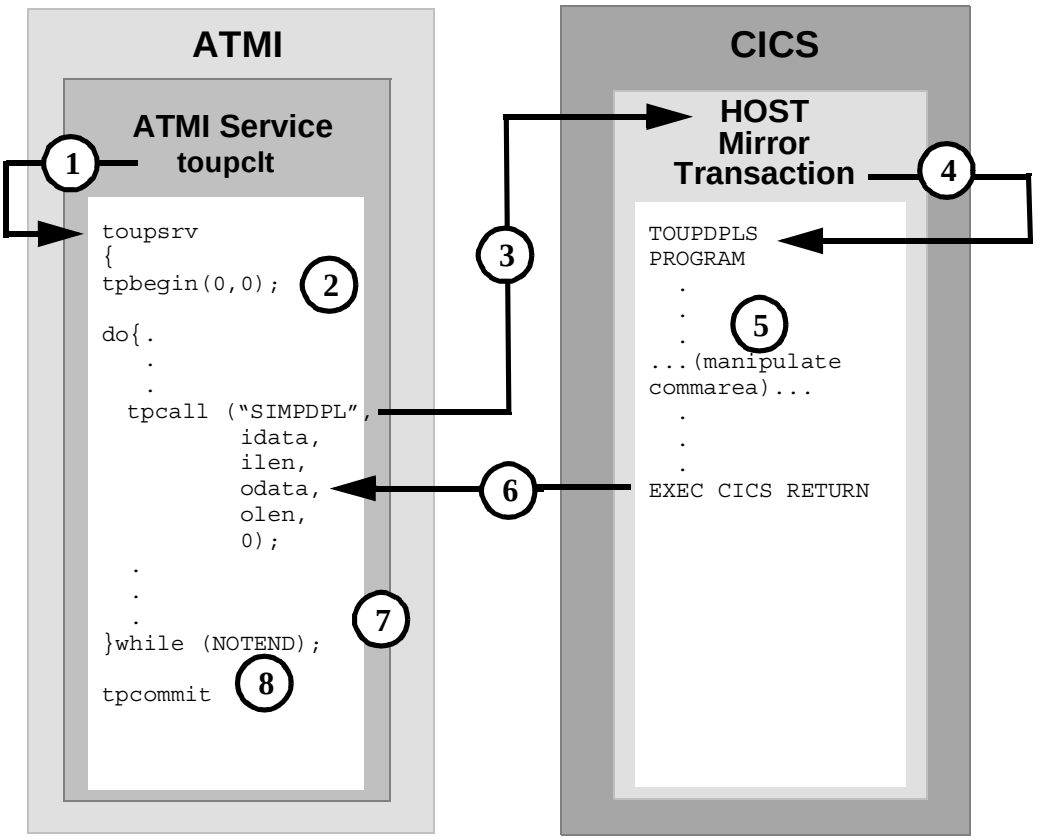


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDPL RNAME=TOUPDPLS FUNCTION=DPL CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpbegin` to start the transaction.
3. The `toupsrv` service issues `tpcall` for `SIMPDPL`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. The `TPNOTRAN` parameter indicates the CICS/ESA application does not participate in the service transaction.
4. Host mirror transaction starts `TOUPDPLS` program and passes `idata` buffer contents for processing.
5. The `TOUPDPLS` program processes data.
6. The `EXEC CICS SYNCPOINT` is an explicit commit request. All updated resources in the CICS/ESA transaction are committed.
7. The CICS/ESA server returns the `commarea` into the client's `odata` buffer.
8. The `toupsrv` service `tpcommit` request signals the successful completion of the transaction, causing a commit of its own updated resources.

Transactional ATMI Client Multiple Requests/Responses to CICS/ESA DPL

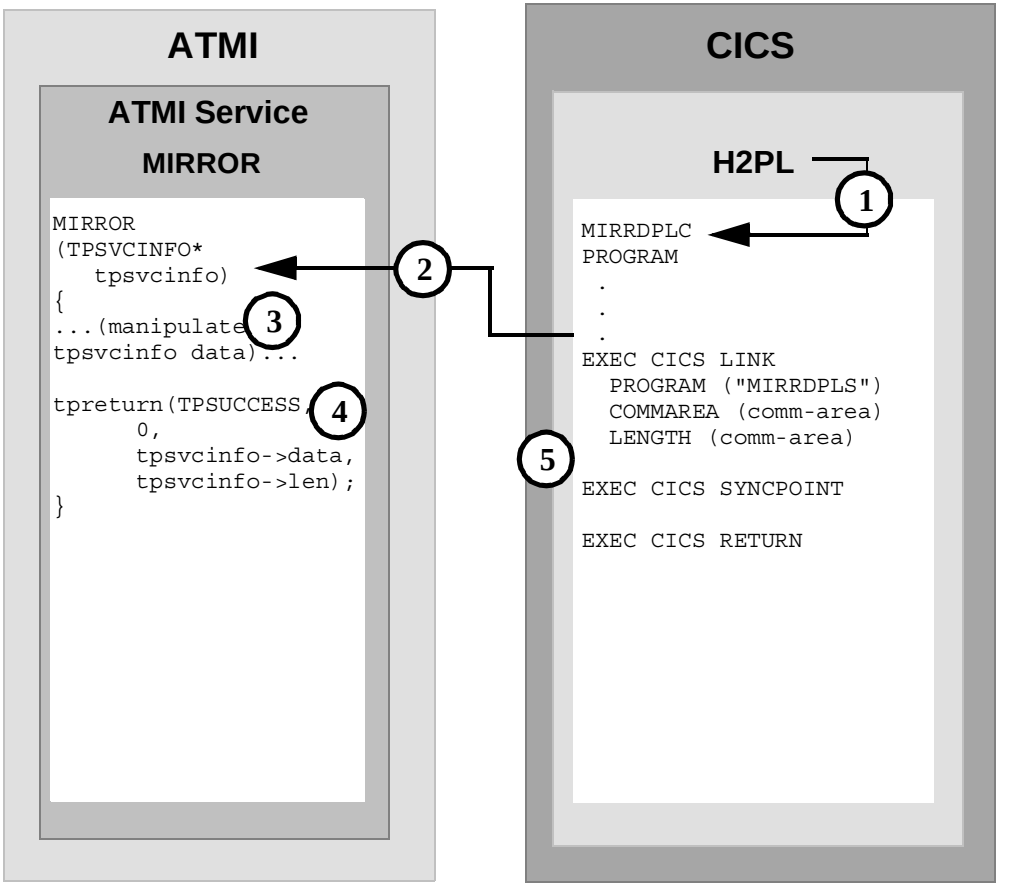


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDPL RNAME=TOUPDPLS FUNCTION=DPL CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpbegin` to start the transaction.
3. The `toupsrv` service issues `tpcall` for `SIMPDPL`, which is advertised in the `DM_REMOTE_SERVICES` section of the DMCONFIG file. The `tpcall` is requested multiple times within the same transaction.
4. Host mirror transaction starts `TOUPDPLS` program and passes `idata` buffer contents for processing. The host mirror transaction remains as a long-running task to service all further requests on the transaction.
5. The `TOUPDPLS` program processes data.
6. The CICS/ESA system returns the `commarea` into the client's `odata` buffer.
7. Step 3 through Step 6 are repeated until the `toupsrv` service loop end conditions are met.
8. The `tpcommit` request indicates the successful completion of the transaction, causing a commit of its own resources and the resources held by the host mirror transaction.

Transactional CICS/ESA DPL to ATMI Request/Response Server



DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=N
```

1. User-entered `H2PL` invokes `MIRRDPLC` program.
2. The `EXEC CICS LINK` command causes the advertised service mapped to `MIRRDPLS` (in the DM_LOCAL_SERVICES section of the DMCONFIG file) to execute. The invoked service participates in the CICS/ESA transaction.
3. The `MIRROR` service processes the data.
4. The `tpreturn` call returns the data into the `commarea` buffer.
5. The `EXEC CICS SYNCPOINT` is an explicit commit request indicating a successful end of the conversation. All updated resources in the transaction are committed.

Distributed Transaction Processing (DTP) Examples

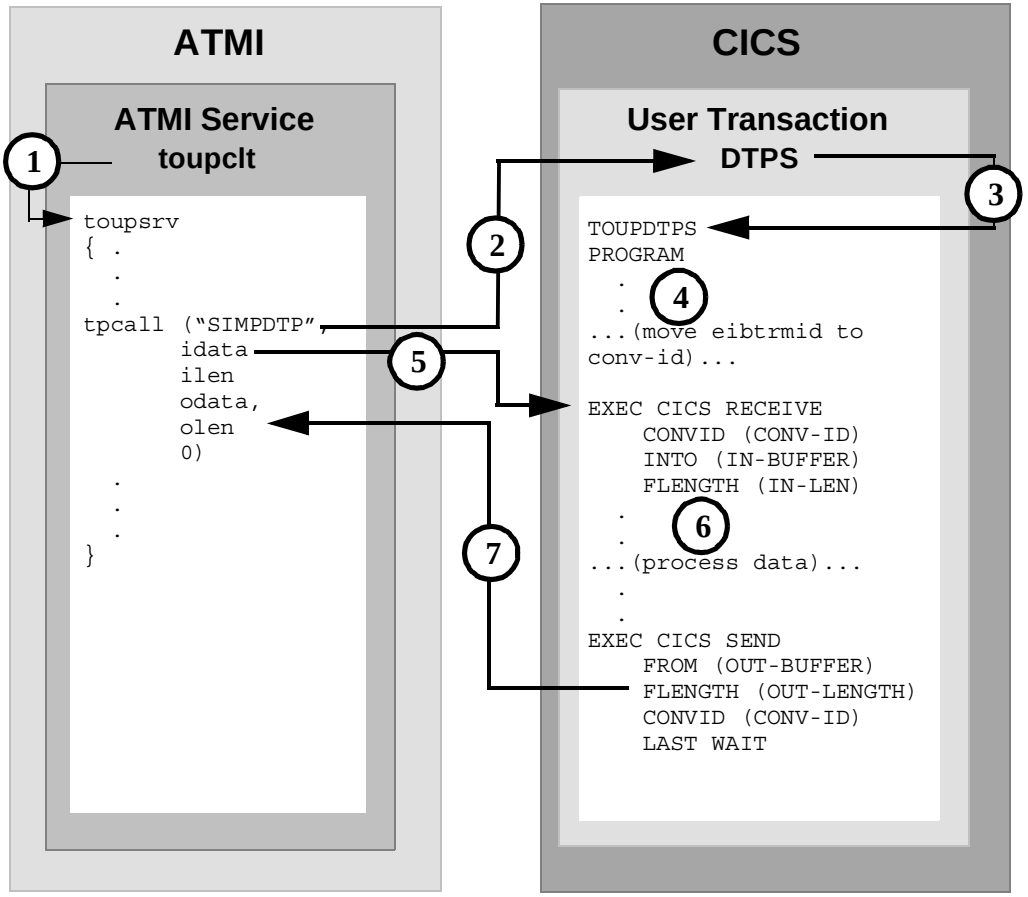
The following examples represent programming scenarios for using DTP and ATMI service invocations.

Although it is most suited for the DPL environment, the `tpcall` is usually used for the DPL environment, it can also be used for a request/response to a DTP server.

The examples in this section represent some of the programming scenarios available for using DTP and ATMI service invocations. These examples employ the most natural and efficient approaches.

Note: To run transactional client/server scenarios, the eLink Adapter for Mainframe software must be licensed for sync-level 2 operations.

ATMI Client Request/Response to CICS/ESA DTP

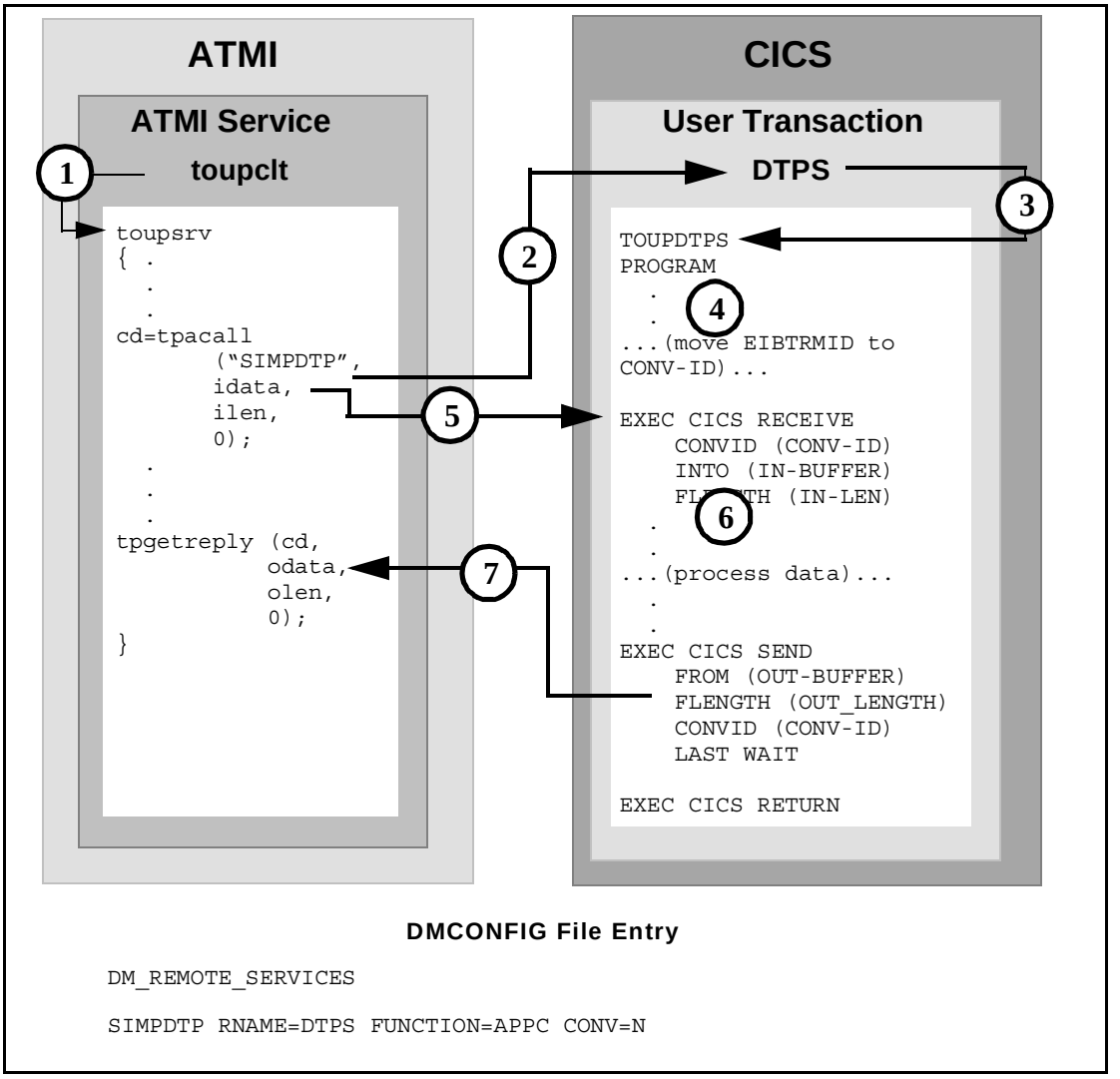


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpcall` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file.
3. User transaction `DTPS` starts `TOUPDTPS` program.
4. It is recommended you save the `eibtrmid` to a program variable. This value may be used to identify the specific conversation in your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
6. The `TOUPDTPS` program processes data.
7. The `EXEC CICS SEND` command returns the `OUT-BUFFER` contents into the clients `odata` buffer. LAST indicates the conversation is finished. WAIT suspends processing until the data has successfully been received.

ATMI Client Asynchronous Request/Response to CICS/ESA DTP

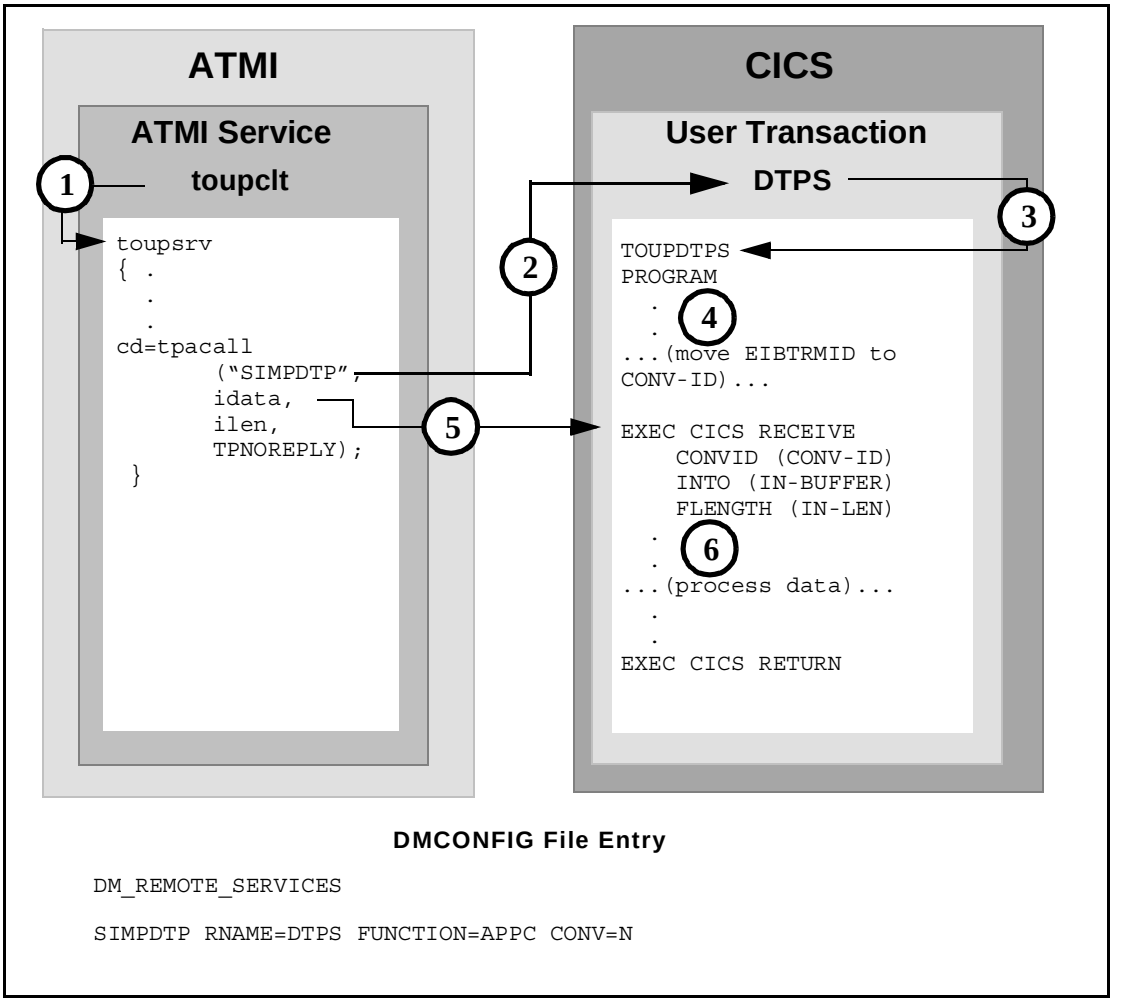


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpacall` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of the DMCONFIG file.
3. User transaction DTPS starts `TOUPDTPS` program.
4. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation in your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
6. The `TOUPDTPS` program processes data.
7. The `EXEC CICS SEND` command returns the `OUT-BUFFER` contents into the clients `tpgetreply odata` buffer. `LAST` indicates the conversation is finished. `WAIT` suspends processing until the data has successfully been received.

ATMI Client Asynchronous Request/Response with No Reply to CICS/ESA DTP

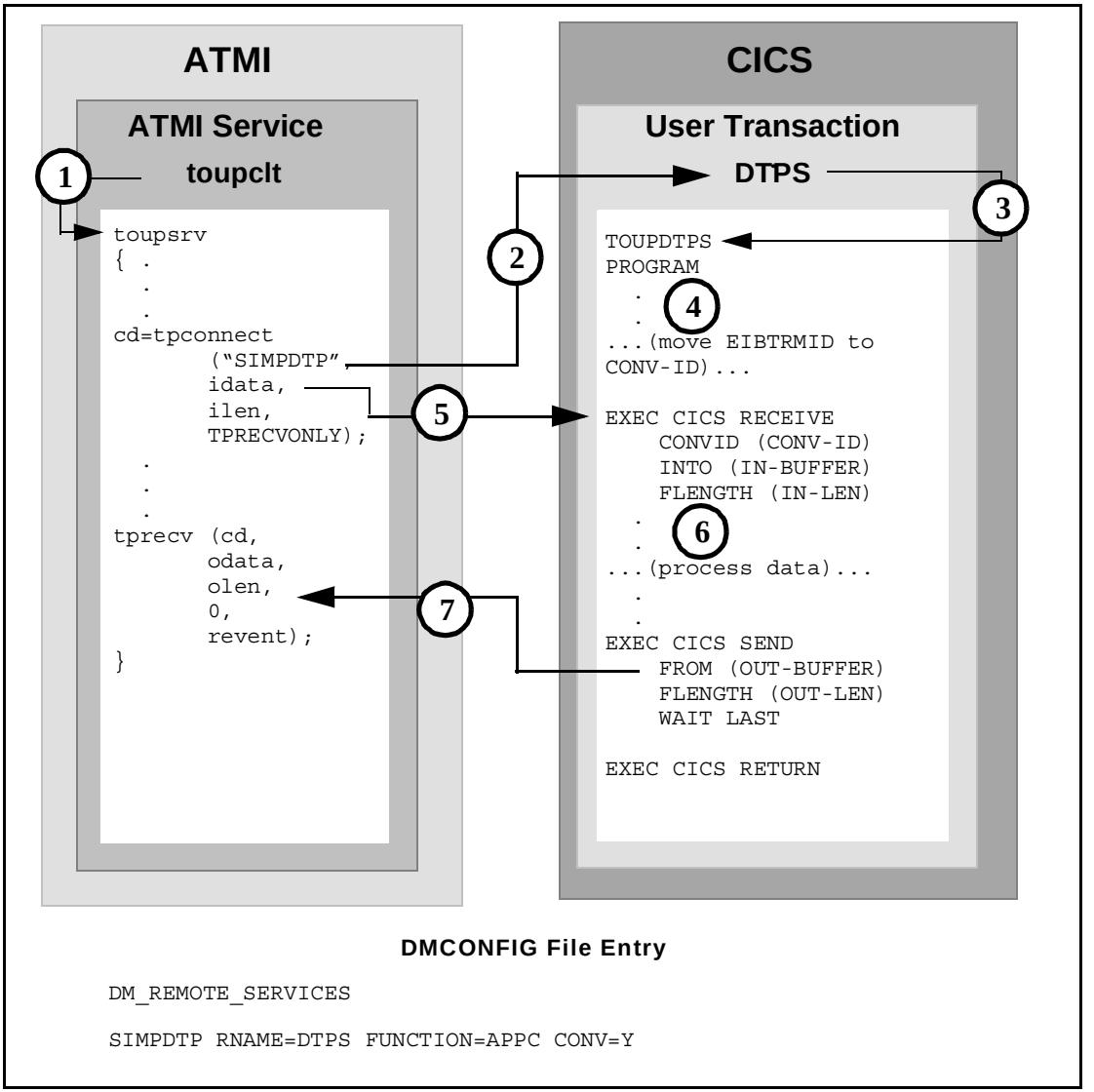


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpacall` with a `TPNOREPLY` request for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file.
3. User transaction DTPS starts `TOUPDTPS` program.
4. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation on your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
6. The `TOUPDTPS` program processes data.

ATMI Conversational Client to CICS/ESA DTP, Server Gets Control

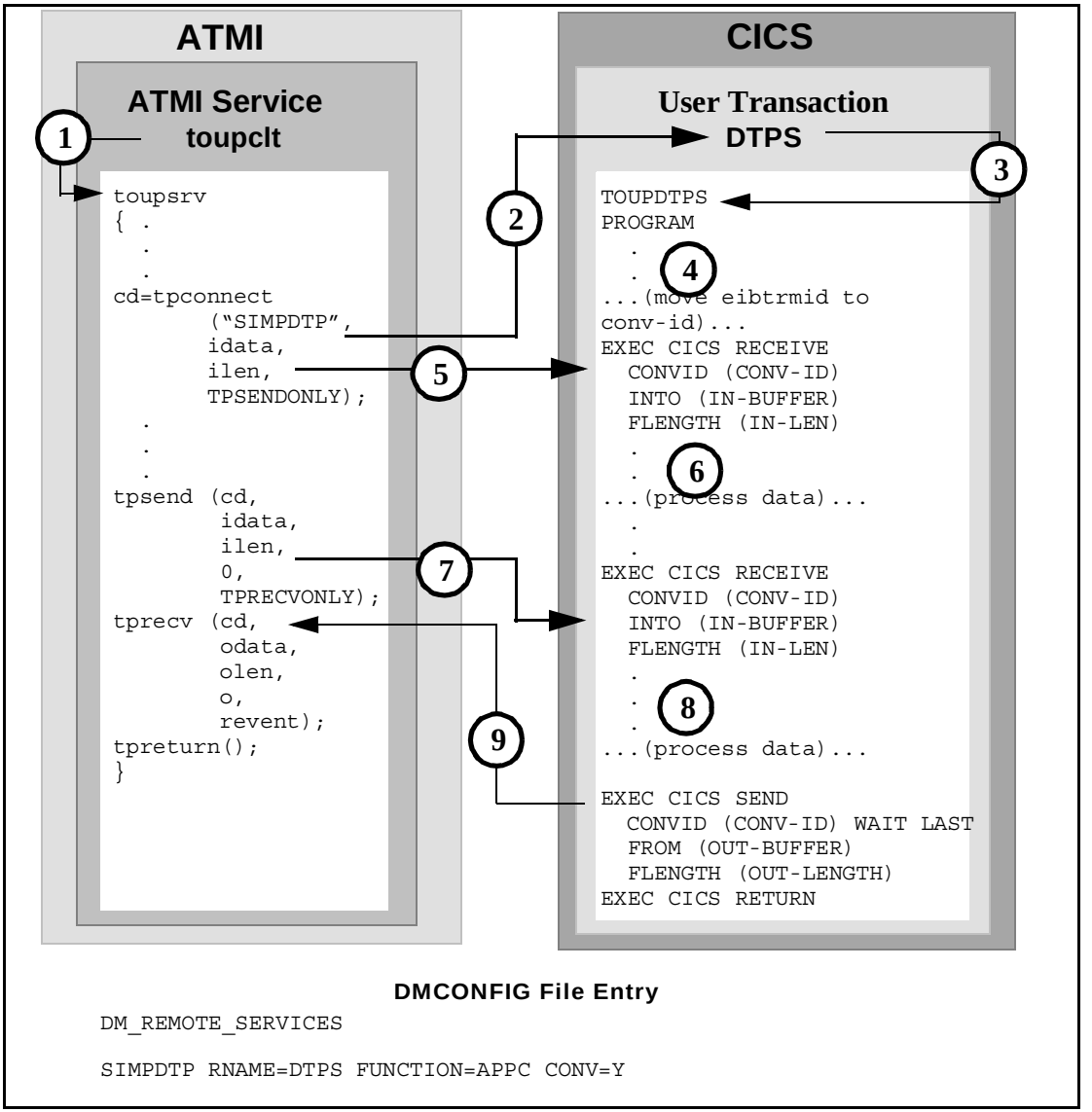


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file. The `TPRECVONLY` flag indicates the server gets control and the first conversation verb `toupsrv` can issue is `tprecv`. Data is sent on the `tpconnect` in the `idata` buffer.
3. User transaction DTPS starts `TOUPDTPS` program.
4. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation on your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
6. The `TOUPDTPS` program processes data.
7. The `EXEC CICS SEND` command returns the `OUT-BUFFER` contents into the clients `tprecv odata` buffer. `WAIT` suspends processing in `TOUPDTPS` until the data has successfully been received. `LAST` indicates the conversation is finished and is communicated to the `tprecv` as `TPEV_SVCSUCC`.

ATMI Conversational Client to CICS/ESA DTP, Client Sends/Receives Data

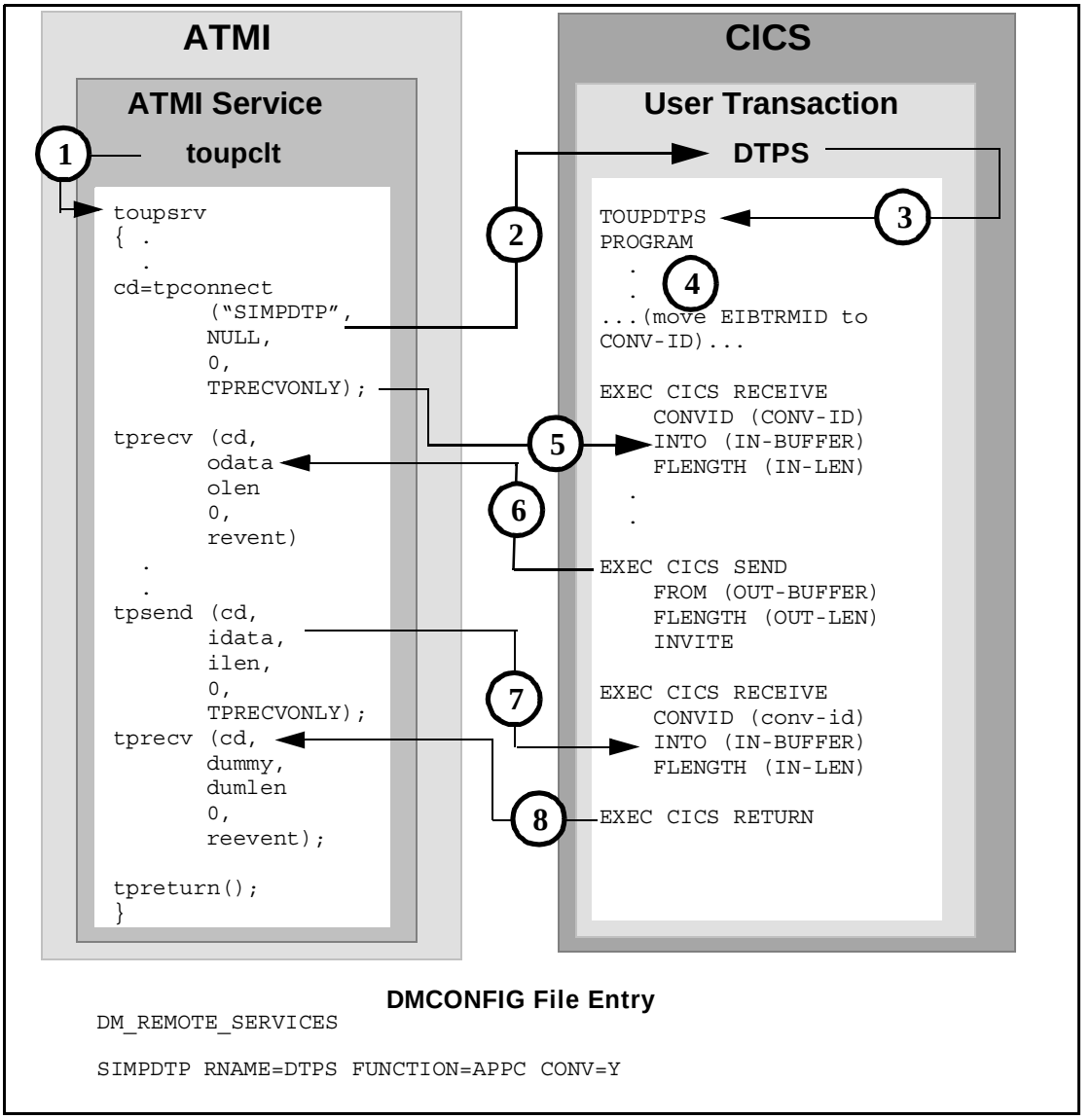


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file. The `TPSENDONLY` indicates the client retains control and continues to send data. Data is sent on the `tpconnect` in the `idata` buffer.
3. User transaction DTPS starts `TOUPDTPS` program.
4. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation on your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives the `tpconnect idata` buffer contents for processing.
6. The `TOUPDTPS` program processes data.
7. The `EXEC CICS RECEIVE` command receives the `tpsend idata` contents into the server's `IN-BUFFER`.
8. The server processes the data.
9. The `EXEC CICS SEND WAIT LAST` returns `OUT-BUFFER` data in the `tprecv odata` buffer, along with notification that the conversation is over.

ATMI Conversational Client to CICS/ESA DTP, Client Grants Control

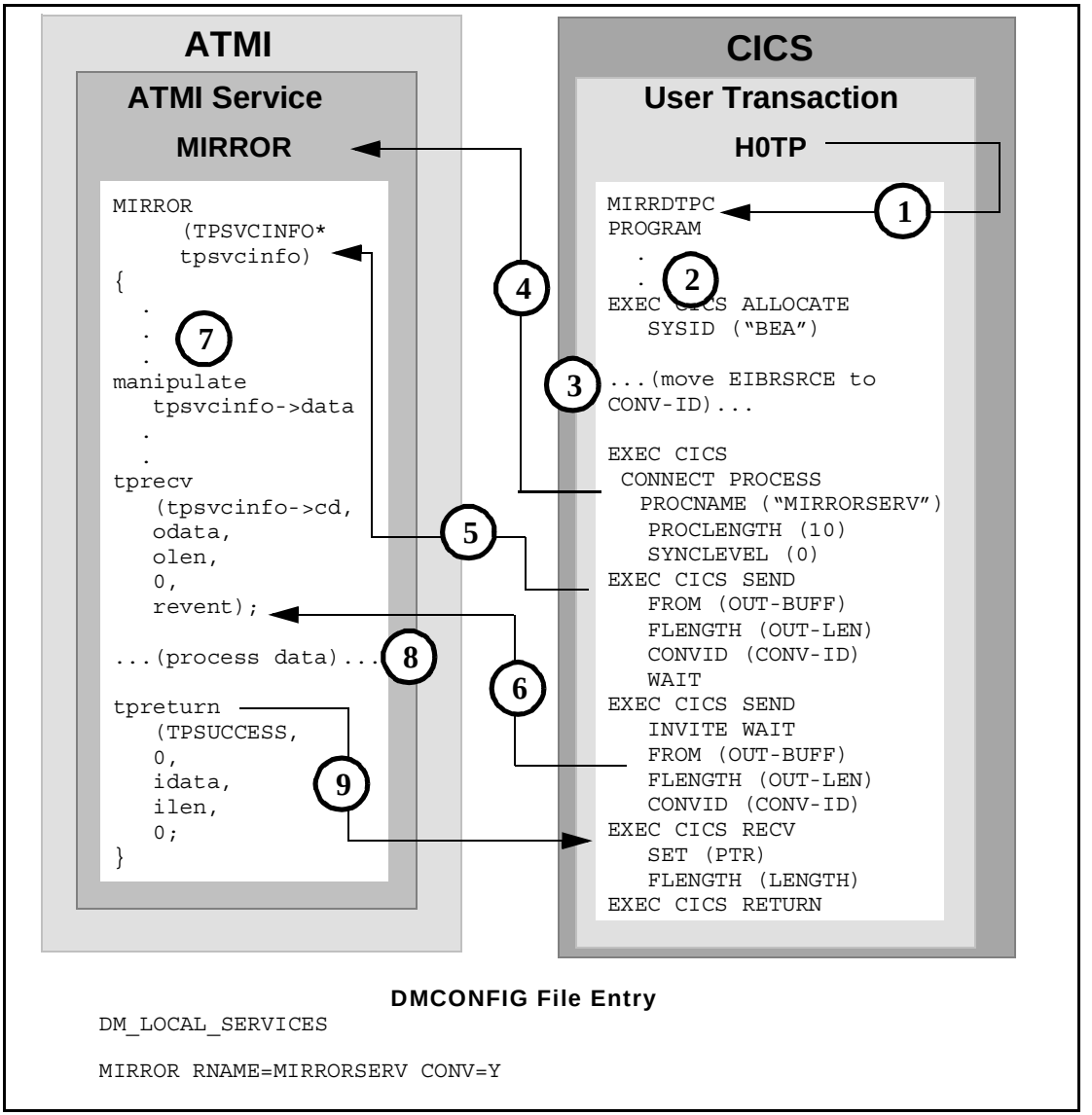


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file. The `TPRECVONLY` indicates the server gets control and the first conversation verb `toupsrv` can issue is `tprecv`.
3. User transaction DTPS starts `TOUPDTPS` program.
4. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation on your CICS/ESA APPC verbs.
5. The `EXEC CICS RECEIVE` command receives a `send state` indicator from the `tpconnect TPRECVONLY` flag. No data is received into the `INBUFFER`.
6. The `EXEC CICS SEND` command returns the `OUT-BUFFER` contents into the clients `tprecv odata` buffer. The `EXEC CICS SEND` command relinquishes control to the client by using the `INVITE` option. This is communicated to the `tprecv` as `TPEV_SENDONLY`.
7. The `EXEC CICS RECEIVE` command receives the `tpsend idata` contents into the server's `IN-BUFFER`, along with notification that the server has relinquished control.
8. The `EXEC CICS RETURN` ends the conversation, communicated to the `tprecv` as `TPEV_SVCSUCC`.

CICS/ESA DTP to ATMI Conversational Server, Client Retains Control

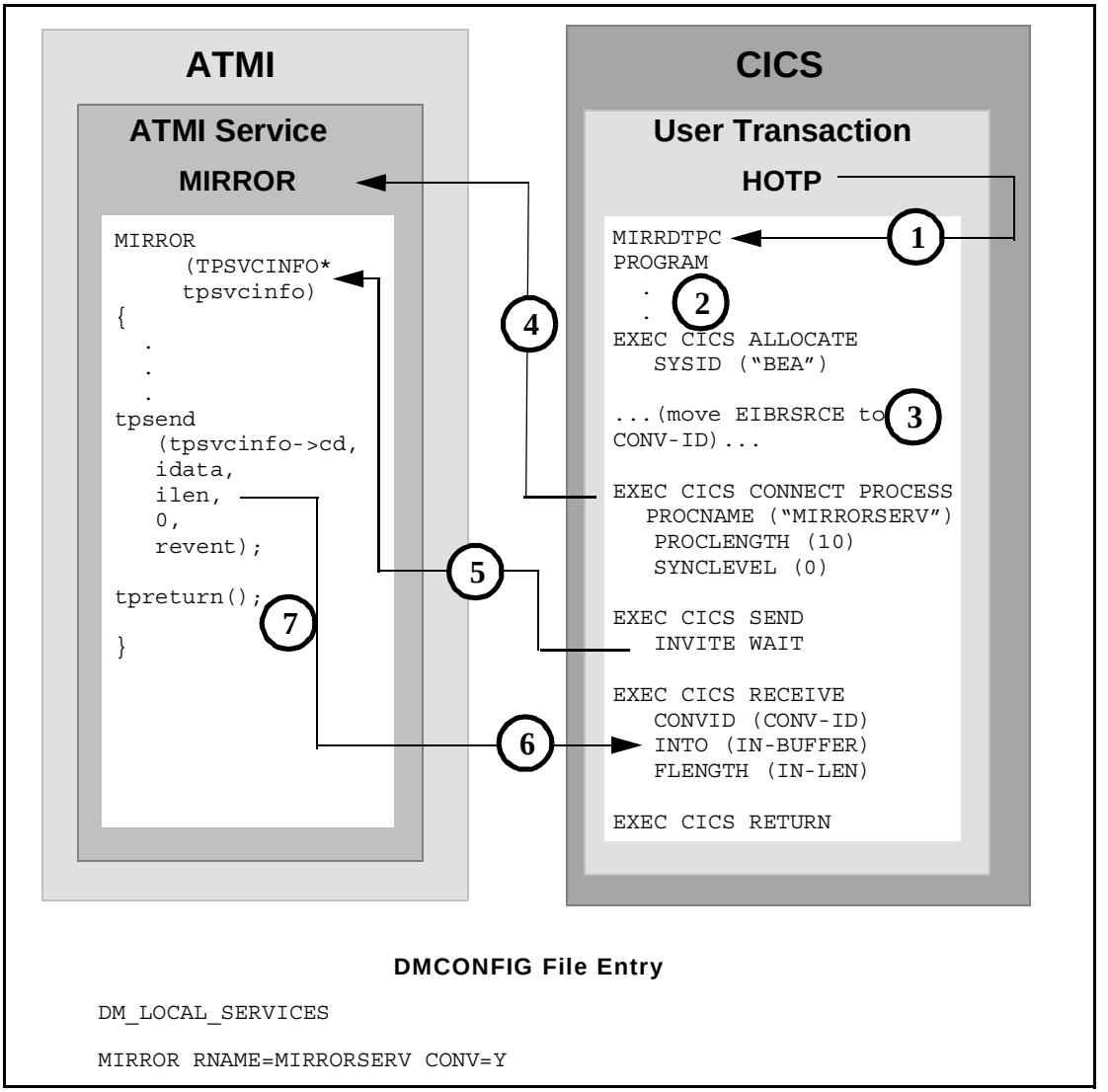


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=Y
```

1. User-entered `H0TP` invokes `MIRRDTPC` program.
2. The `EXEC CICS ALLOCATE` acquires a session to the remote Tuxedo domain.
3. Save the conversation ID returned in `EIBRSRCE` to a program variable. This value is used to identify the specific conversation in your CICS/ESA APPC verbs.
4. The `EXEC CICS CONNECT PROCESS` command initiates the advertised service mapped to `MIRROR` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
5. Execute the `EXEC CICS SEND` command to send the contents of the `OUT-BUFFER` to the Tuxedo service in the `tpsvcinfo->data` buffer. The contents might be sent immediately.
6. The `EXEC CICS SEND INVITE WAIT` command sends `out-buff` contents into the `tprecv odata` buffer. The `INVITE` parameter relinquishes control of the conversation, seen as a `TPEV_SENDONLY` in the `reevent` parameter on the `tprecv` command. The data is sent immediately, along with the data from the previous `SEND` operation.
7. The Tuxedo service processes data.
8. The CICS/ESA server processes data.
9. The ATMI `tpreturn` data returns data to the `EXEC CICS RECEIVE`, along with notification that the conversation completed successfully.

CICS/ESA DTP to ATMI Conversational Server, Client Relinquishes Control

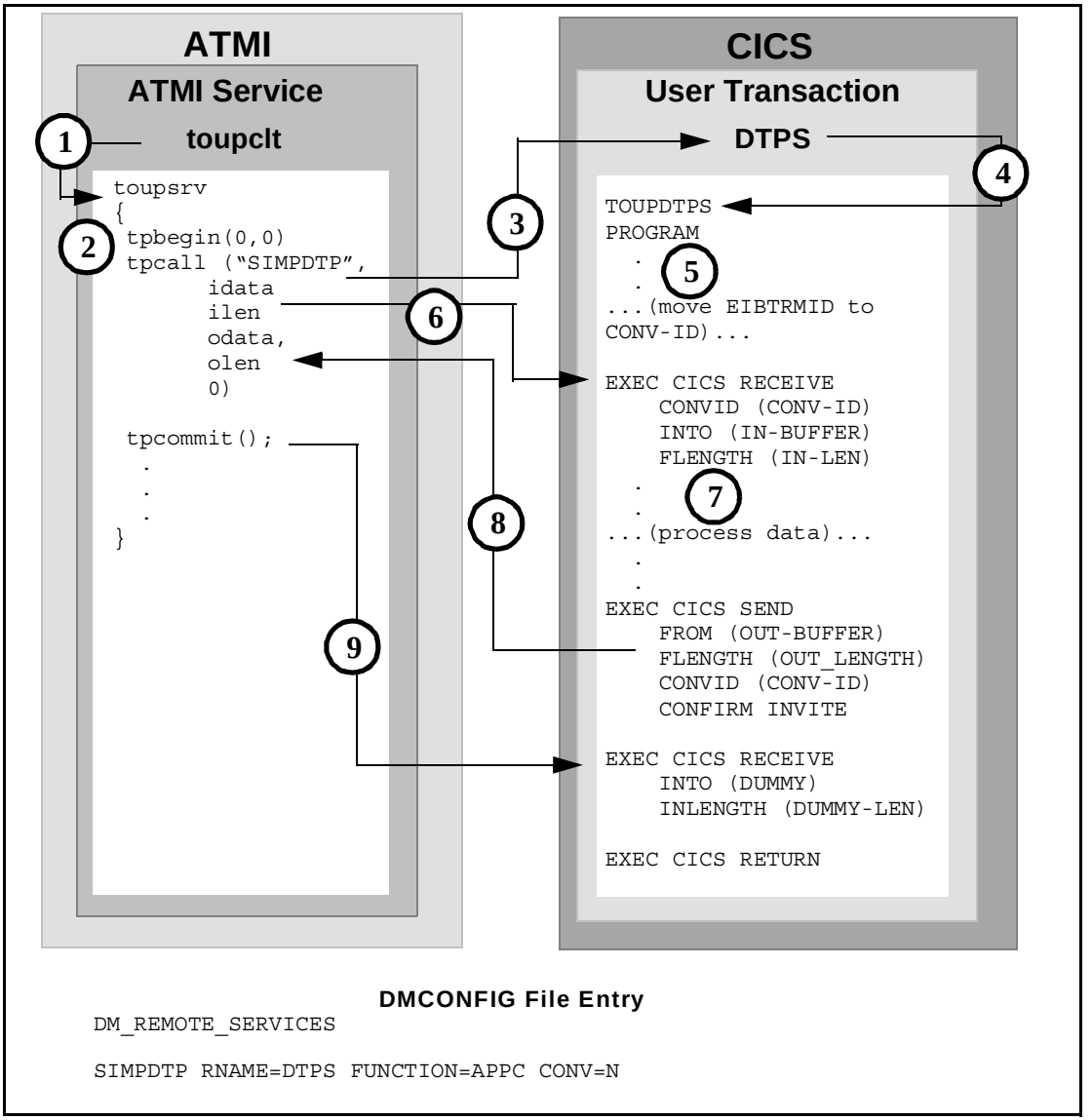


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=Y
```

1. User-entered HOTP invokes `MIRRDTPC` program.
2. The `EXEC CICS ALLOCATE` acquires a session to the remote Tuxedo domain.
3. Save the conversation ID returned in `EIBRSRCE` to a program variable. This value is used to identify the specific conversation in your CICS/ESA APPC verbs.
4. The `EXEC CICS CONNECT PROCESS` command initiates the advertised service mapped to `MIRROR` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
5. The `EXEC CICS SEND` command relinquishes control with the `INVITE WAIT` option.
6. The `EXEC CICS RECEIVE` command receives the `tpsend idata` buffer contents into the `IN-BUFFER`.
7. The `tpreturn` request tears down the conversation and indicates on the `EXEC CICS RECEIVE` that the conversation is over.

Transactional ATMI Client Request/Response to CICS/ESA DTP



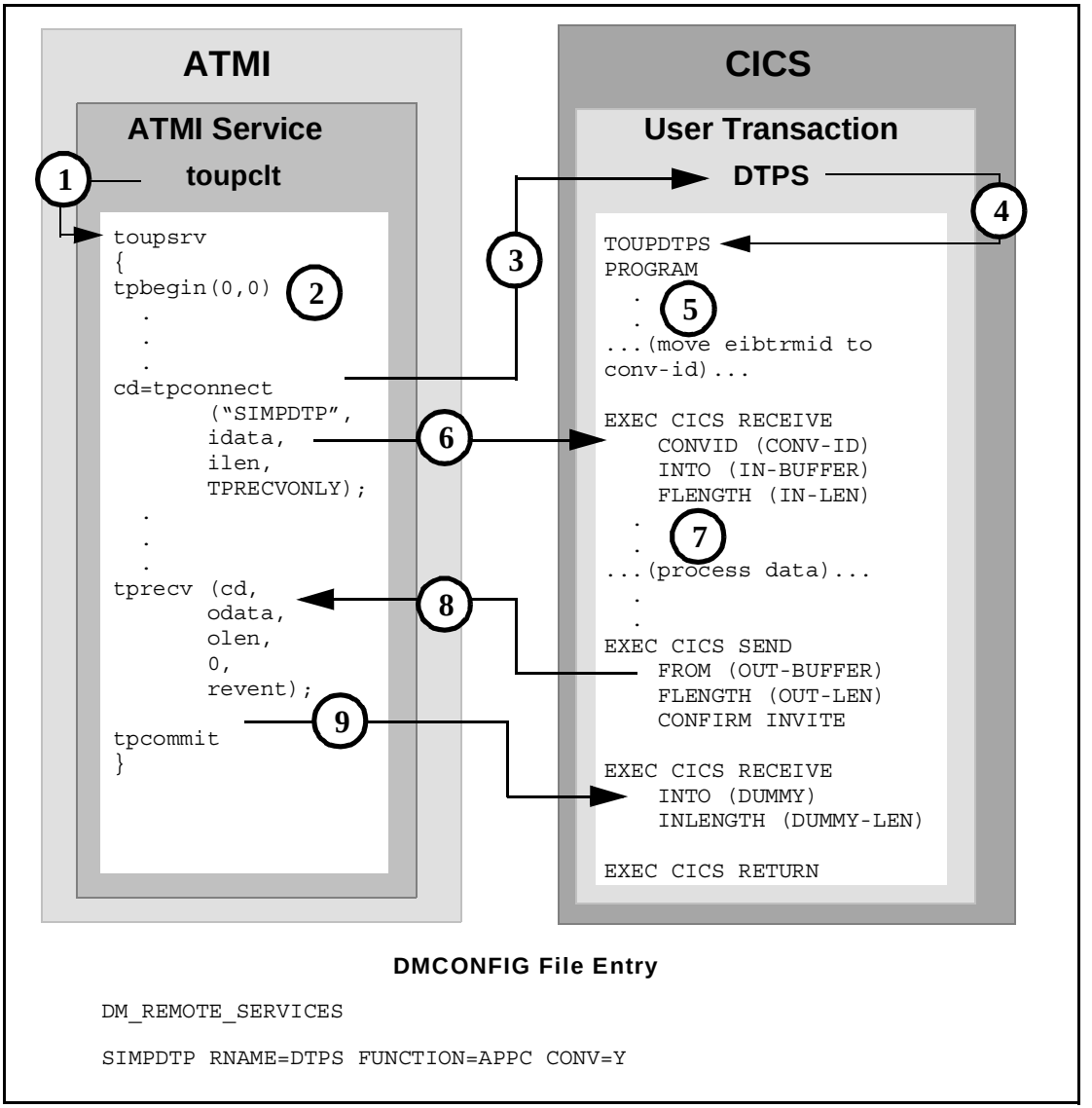
DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=N
```

Note: This is not the recommended method of performing a DTP transactional service. Please refer to the transactional DPL using request/response for the recommended method.

1. ATMI client `toupclt` invokes `toupsrv` service. (Note that each `tpcall` made in the program must be bookended with a `tpbegin` and a `tpcommit`.)
2. The service issues `tpbegin` to start a transaction.
3. The `toupsrv` service issues `tpcall` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of the DMCONFIG file.
4. User transaction DTPS starts `TOUPDTPS` program.
5. Save the `EIBTRMID` to a program variable. This value is used to identify the specific conversation on your CICS/ESA APPC verbs.
6. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
7. The `TOUPDTPS` program processes data.
8. The `EXEC CICS SEND` command returns the `OUT-BUUFER` contents into the clients `odata` buffer. `CONFIRM` indicates the conversation is finished. `INVITE` allows the client to respond with a `COMMIT` request.
9. The `toupsrv` service issues `tpcommit` to end the transaction. The `COMMIT` is received on the `EXEC CICS RECEIVE` verb and the server issues `EXEC CICS RETURN` to commit the resources, terminate the transaction, and free the outstanding conversation.

Transactional ATMI Conversational Client to CICS/ESA DTP, Server Gets Control

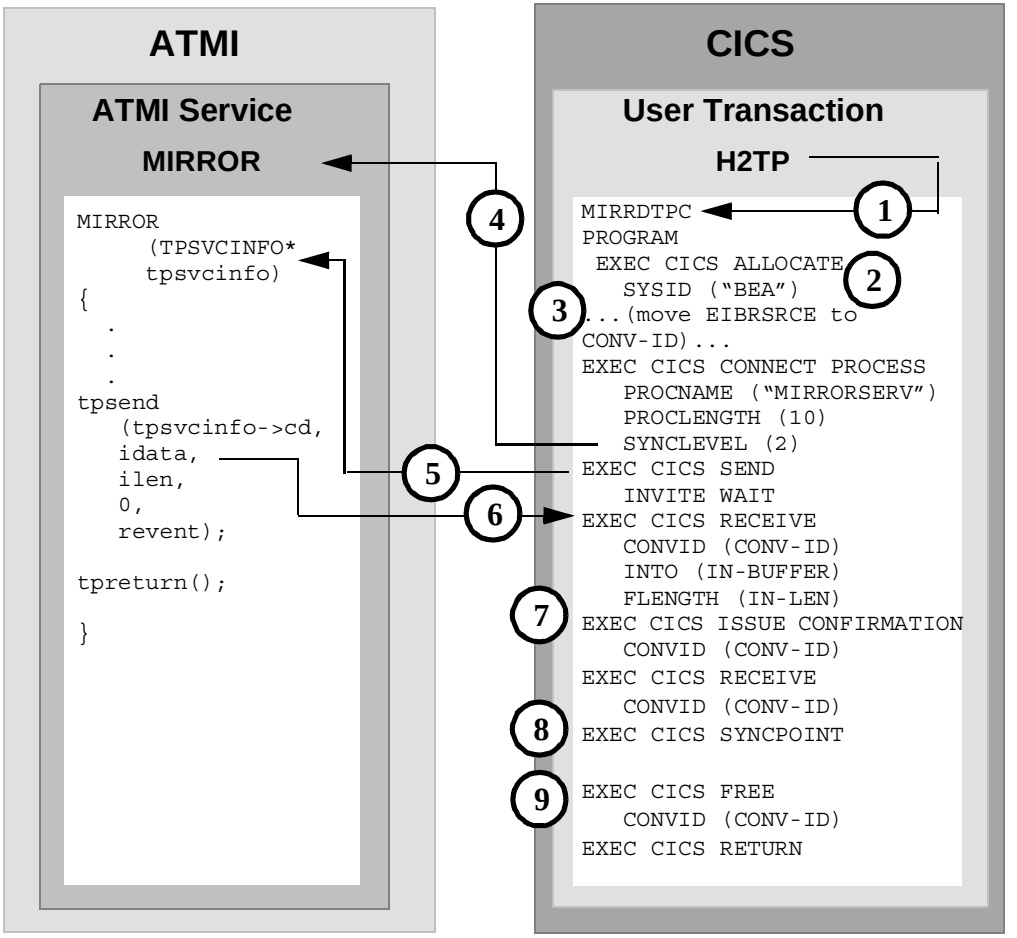


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPDTP RNAME=DTPS FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpbegin` to start the transaction.
3. The `toupsrv` service issues `tpconnect` for `SIMPDTP`, which is advertised in the `DM_REMOTE_SERVICES` section of DMCONFIG file. The `TPRECVONLY` indicates the server gains control and the first conversation verb `toupsrv` can issue is `tprecv`. Data is sent on the `tpconnect` in the `idata` buffer.
4. User transaction DTPS starts `TOUPDTPS` program.
5. It is recommended you save the `EIBTRMID` to a program variable. This value may be used to identify the specific conversation on your CICS/ESA APPC verbs.
6. The `EXEC CICS RECEIVE` command receives the `idata` buffer contents for processing.
7. The `TOUPDTPS` program processes data.
8. The `EXEC CICS SEND` command returns the `OUT-BUFFER` contents into the clients `tprecv odata` buffer. `CONFIRM` indicates that the conversation is finished and is communicated to the `tprecv` as `TPEV_SVCSUCC`. `INVITE` enables the client to respond with a `COMMIT` request.
9. The `toupsrv` service issues `tpcommit` to end the transaction. The `COMMIT` is received on the `EXEC CICS RECEIVE` verb and the server issues `EXEC CICS RETURN` to commit the resources, terminate the transaction, and free the outstanding conversation.

Transactional CICS/ESA DTP to ATMI Conversational Server, Host Client Relinquishes Control



DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=Y
```

1. User-entered H2TP invokes `MIRRDTPC` program.
2. The `EXEC CICS ALLOCATE` acquires a session to the remote Tuxedo domain.
3. Save the conversation ID returned in `EIBRSRCE` to a program variable. This value is used to identify the specific conversation on your CICS/ESA APPC verbs.
4. The `EXEC CICS CONNECT PROCESS` command initiates the advertised service mapped to `MIRRDTPS`. The `SYNCLEVEL(2)` parameter indicates the inclusion of the ATMI service in the CICS/ESA transaction.
5. The `EXEC CICS SEND INVITE WAIT` command causes the client to immediately relinquish control to the Tuxedo server. This is communicated to the service in `TPSVCINFO` as `TPSENDONLY`. No data is sent to the server on this request.
6. The `EXEC CICS RECEIVE` command receives the `tpsend` idata buffer contents into the `IN-BUFFER`. The `EXEC CICS RECEIVE` command receives a confirm request indicating the conversation should be terminated.
7. The `EXEC CICS ISSUE CONFIRMATION` verb responds positively to the confirm request.
8. The `EXEC CICS SYNCPOINT` is an explicit commit request to end the conversation and update all resources in the transaction.
9. The `EXEC CICS FREE` verb explicitly frees the outstanding conversation.

CPI-C Programming Examples

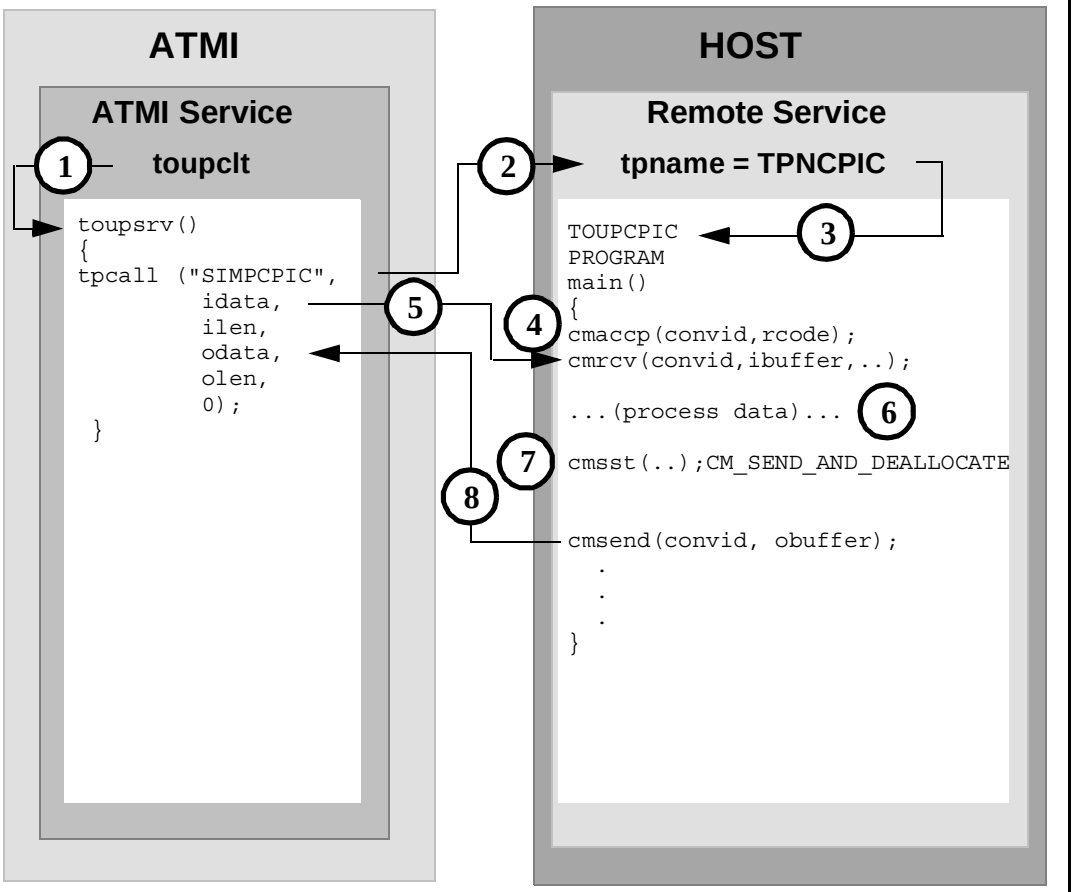
The examples in this section show the protocol exchanges between the local ATMI platform and remote host application program. The type of ATMI service request determines the nature of the client/server communication model. For requests initiated by the host application, the configuration information for the local service determines the protocol exchanges on the conversation.

Although it is most suited for the DPL environment, the `tpcall` is usually used in the DPL environment but can also be used for a request/response to an APPC server.

The examples in this section represent a few of the many programming scenarios available for using CPI-C and ATMI service invocations. These examples employ the most natural and efficient approaches.

Note: To run transactional client/server scenarios or the CPI Resource Recovery interface, the eLink Adapter for Mainframe software must be licensed for sync-level 2 operations.

ATMI Client Request/Response to Host CPI-C

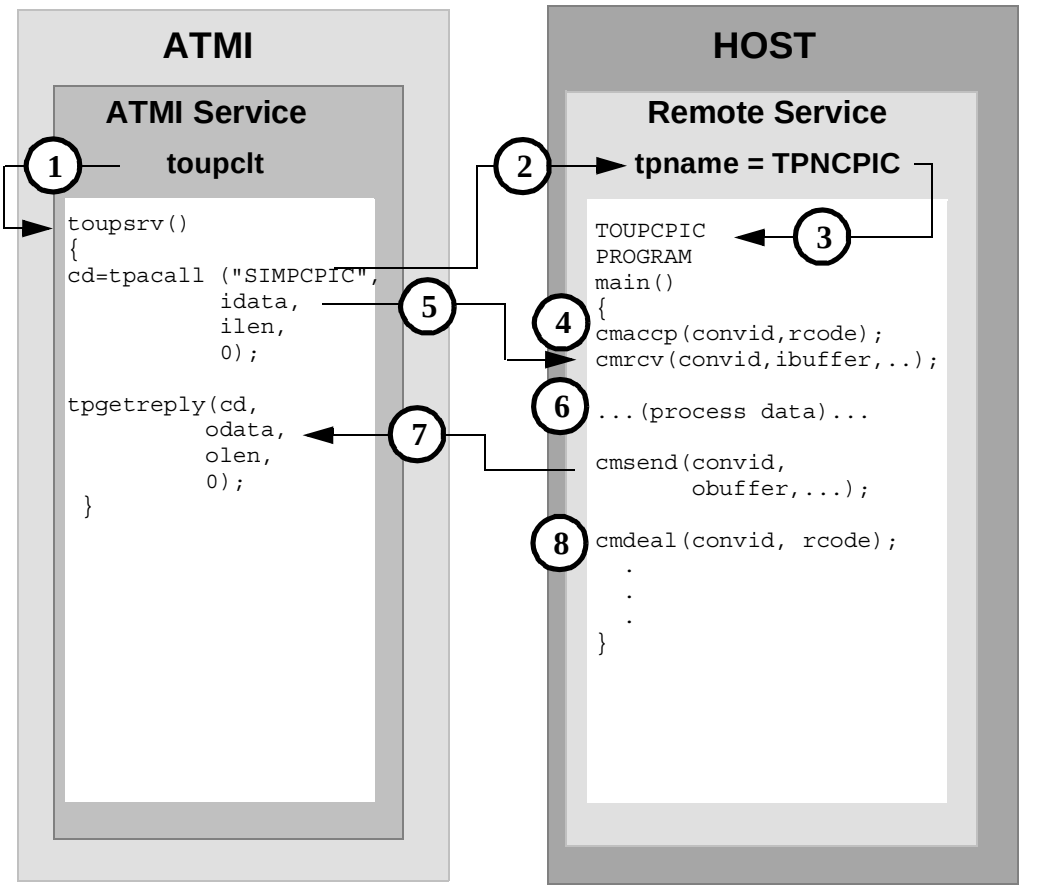


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpcall` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file.
3. The remote service with the `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` call. The conversation id returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` request receives the `idata` buffer contents for processing
6. The `TOUPCPIC` program processes data.
7. The `cmsst` request prepares the next send request by setting the send type to `CM_SEND_AND_DEALLOCATE`.
8. The `cmsend` request returns the `obuffer` contents into the client `odata` buffer. The buffer is flushed, and the conversation ended.

ATMI Client Asynchronous Request/Response to Host CPI-C

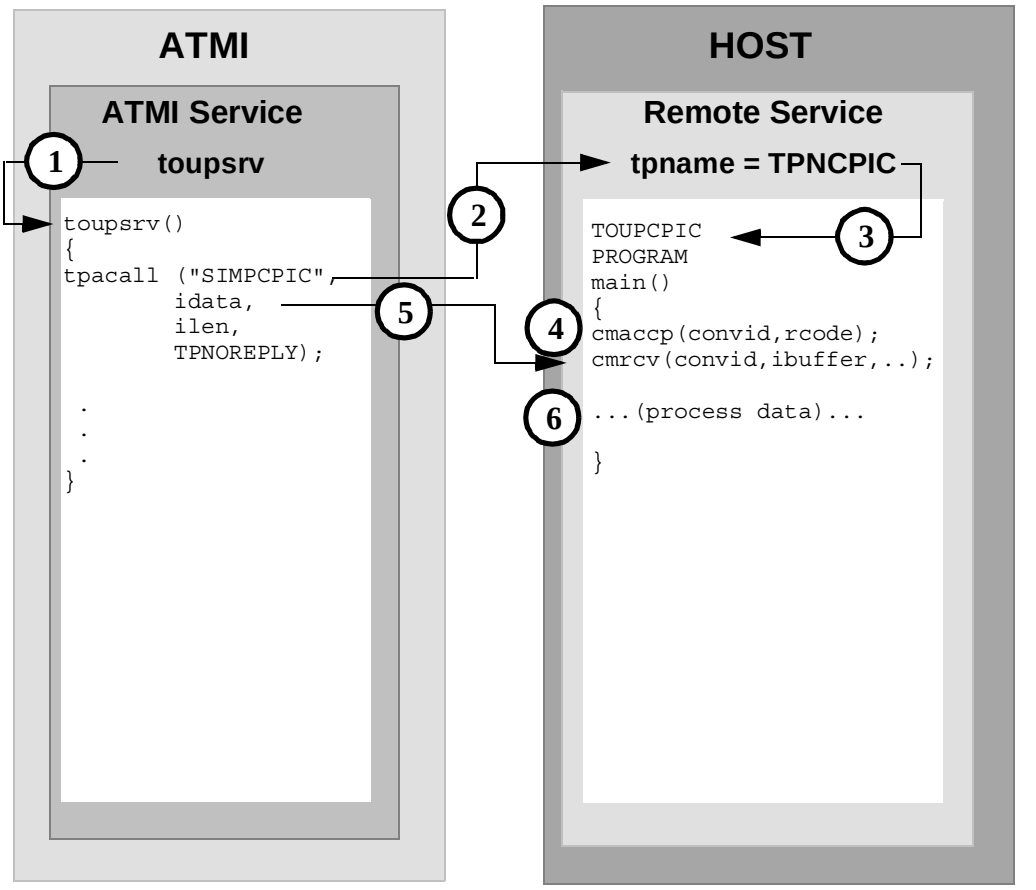


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpacall` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file.
3. The remote service with `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` call. The conversation id returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` request receives the `idata` buffer contents for processing.
6. The `TOUPCPIC` program processes data.
7. The `cmsend` command returns the `obuffer` contents into the client `tpgetreply odata` buffer. The data may not be immediately sent to the `tpgetreply odata` buffer on this request.
8. The `cmdeal` flushes the data to the client, and indicates the conversation is finished.

ATMI Client Asynchronous Request/Response to Host CPI-C with No Reply

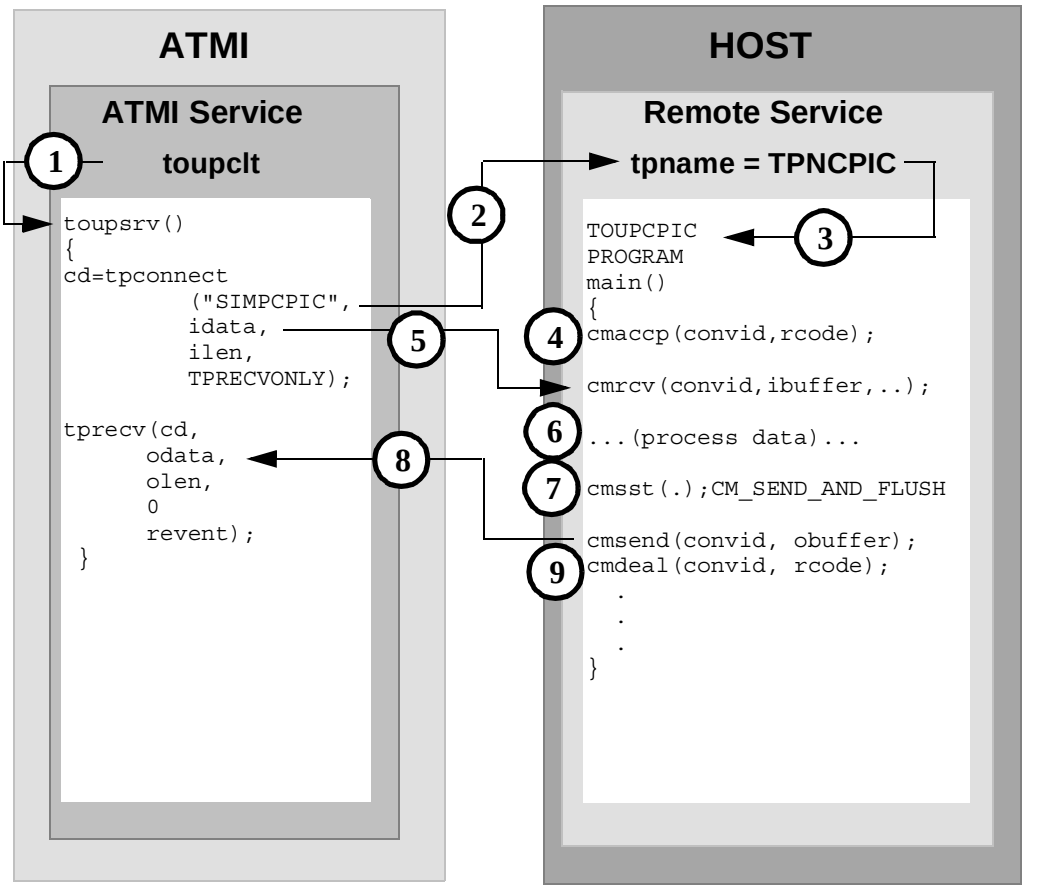


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues tpacall with a `TPNOREPLY` request for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file.
3. The remote service with `tpname TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` call. The conversation id returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` request receives the `idata` buffer contents for processing, and notification that the conversation has ended with the return code value of `CM_DEALLOCATED_NORMAL`.
6. The `TOUPCPIC` program processes data.

ATMI Conversational Client to Host CPI-C, Server Gets Control

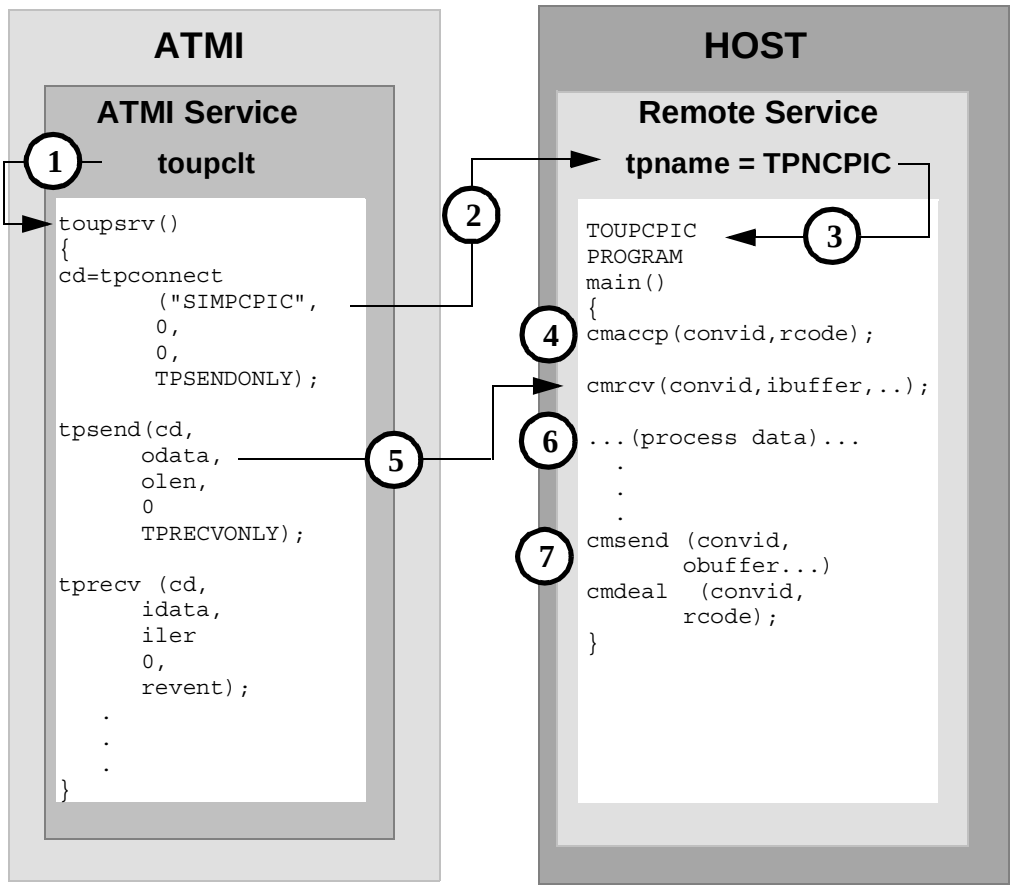


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. The `TPRECVONLY` indicates the server gains control and the first conversation verb the `toupsrv` can issue is `tprecv`. Data is sent on the `tpconnect` in the `idata` buffer.
3. The remote service with `tpname TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` call. The conversation ID returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` request receives the `idata` buffer contents for processing.
6. The `TOUPCPIC` program processes data.
7. The `cmsst` request prepares the next send request by setting the send type to `CM_SEND_AND_FLUSH`.
8. The `cmsend` command returns the `obuffer` contents into the client `tprecv odata` buffer. The data is immediately flushed on the send request.
9. The `cmdeal` request ends the conversation.

ATMI Conversational Client To Host CPI-C, Client Retains Control

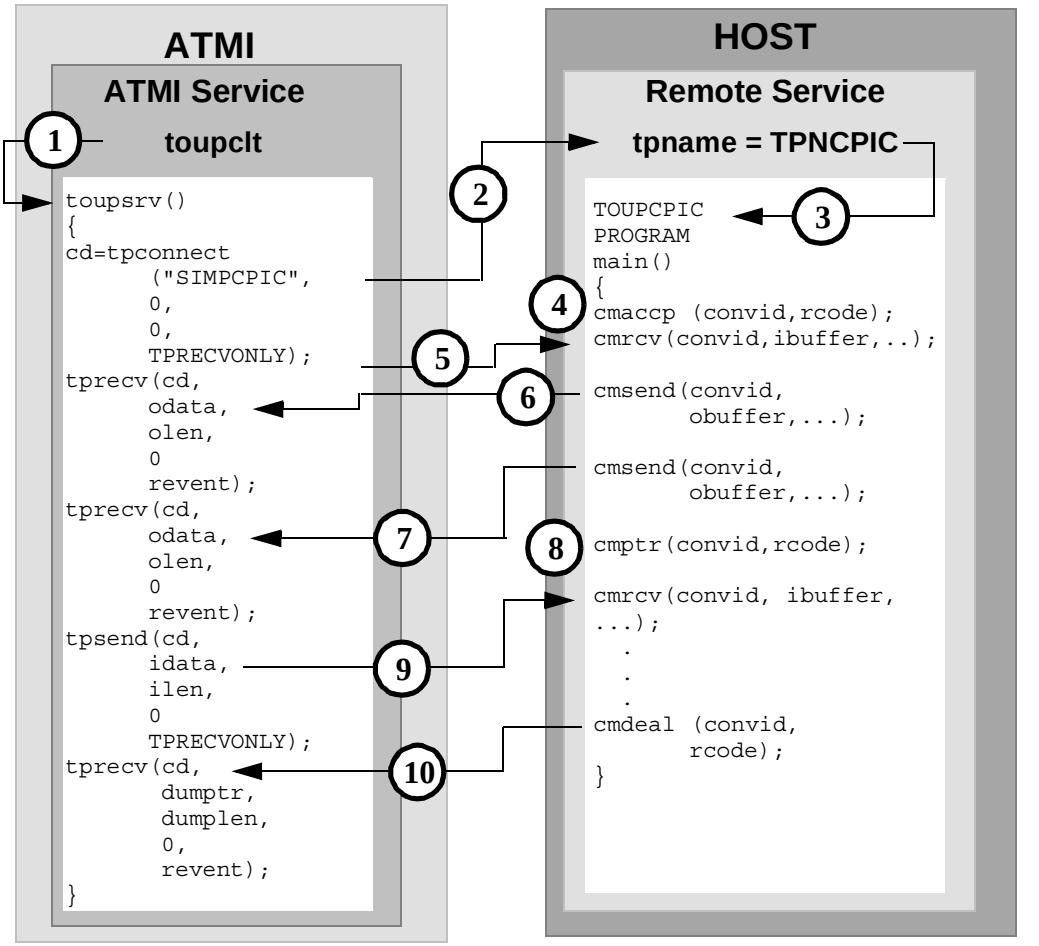


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. The TPSENDONLY indicates the client retains control and continues to send data. No data is sent with the `tpconnect`.
3. The remote service with `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` call. The conversation id returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` request receives the `tpsend` `idata` buffer contents for processing. The conversation is relinquished with the `TPRECVONLY` flag.
6. The `TOUPCPIC` program processes data.
7. The `cmsend` returns a response in the `tprecv` `idata` buffer, along with notification from the `cmdeal` command that the conversation is over. The `cmdeal` flushes the data buffer and the `tprecv reevent` parameter is set to `TPEV_SUCCESS`.

ATMI Conversational Client to Host CPI-C, Client Grants/gets Control

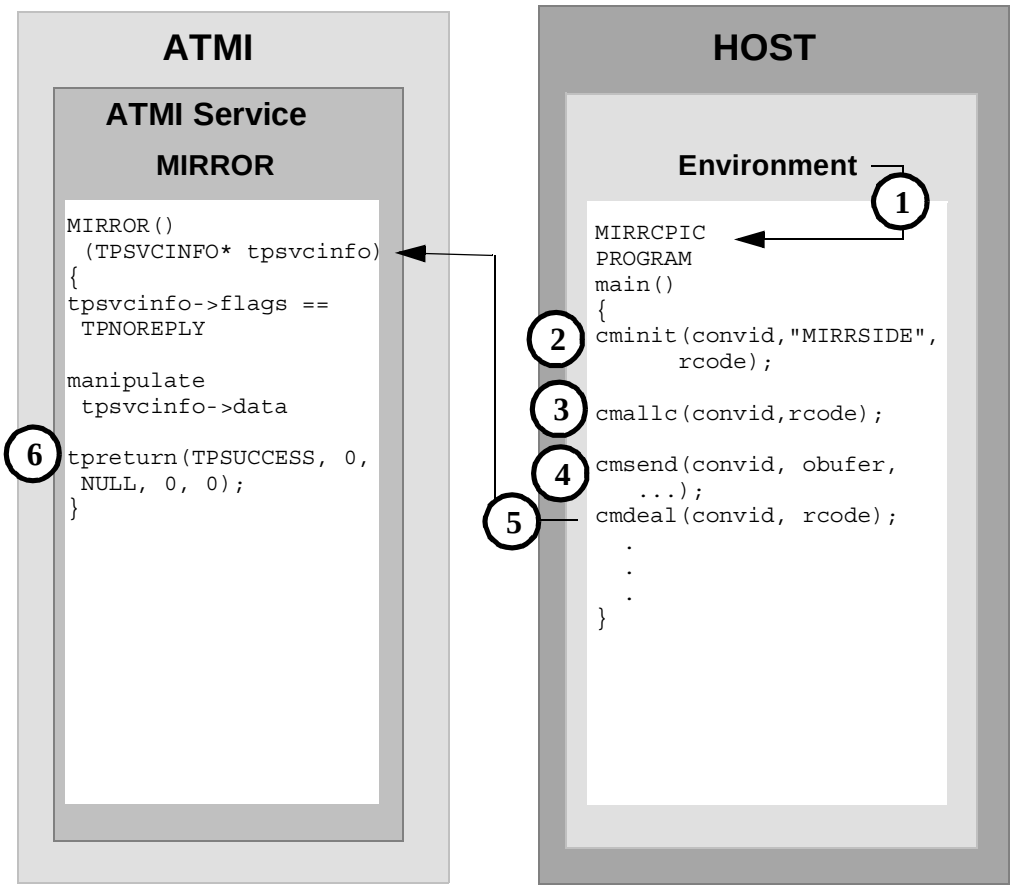


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpconnect` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. The TPRECVONLY indicates the server gains control and the first conversation verb the `toupsrv` can issue is `tprecv`.
3. The remote service with `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
4. The server accepts the conversation with the `cmaccp` request. The conversation id returned on the request in `convid` is used for all other requests on this conversation.
5. The `cmrcv` requests receives the indicator that control has been granted to the server.
6. The `cmsend` request returns its `obuffer` contents into the first client `tprecv odata` buffer. The data may not immediately be sent.
7. The `cmsend` request returns its `obuffer` contents into the second client `tprecv odata` buffer. The data may not immediately be sent.
8. The `cmptr` request flushes the data to the client, and grants control to the client.
9. The `cmrcv` request receives the `tpsend idata` buffer contents for processing. The `TPRECVONLY` is passed to the `tprecv`, relinquishing control of the conversation.
10. The `cmdeal` indicates a successful completion of the conversation to the `tprecv`; no data is passed.

Host CPI-C to ATMI Asynchronous Request/Response Server with No Reply

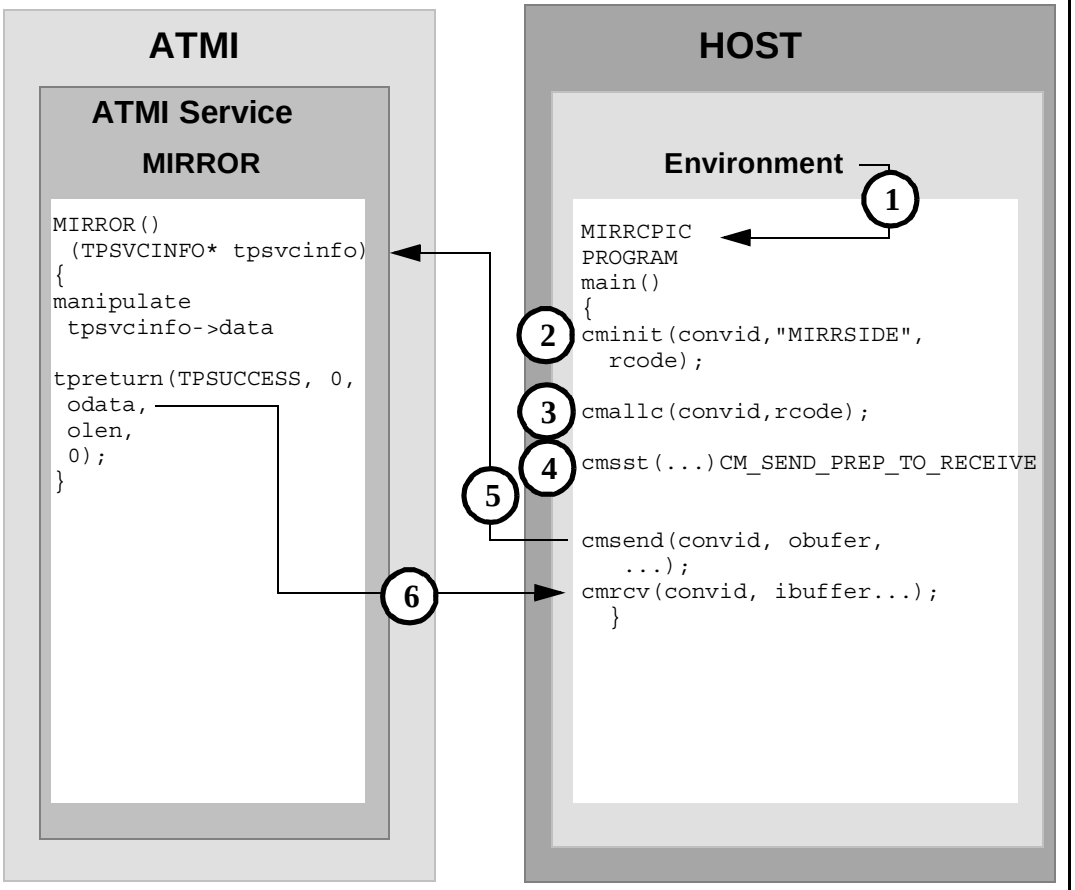


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=N
```

1. The CPI-C application program `MIRRCPIC` is invoked using environment start-up specifications.
2. The `MIRRCPIC` client requests `cminit` to establish conversation attributes and receive a conversation ID that will be used on all other requests on this conversation. The remote server and service are named in the CPI-C side information entry `MIRRSIDE`.
3. The `cmallc` request initiates the advertised service mapped to `MIRRORSERV` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
4. The `cmsend` request sends the contents of `obuffer` to the ATMI service in the `tpsvcinfo->data` buffer.
5. The `cmdeal` request flushes the data, and indicates the conversation is finished with the TPNOREPLY in the `tpsvcinfo->flag` field.
6. The service completes with the `tpreturn`.

Host CPI-C to ATMI Server Request/Response

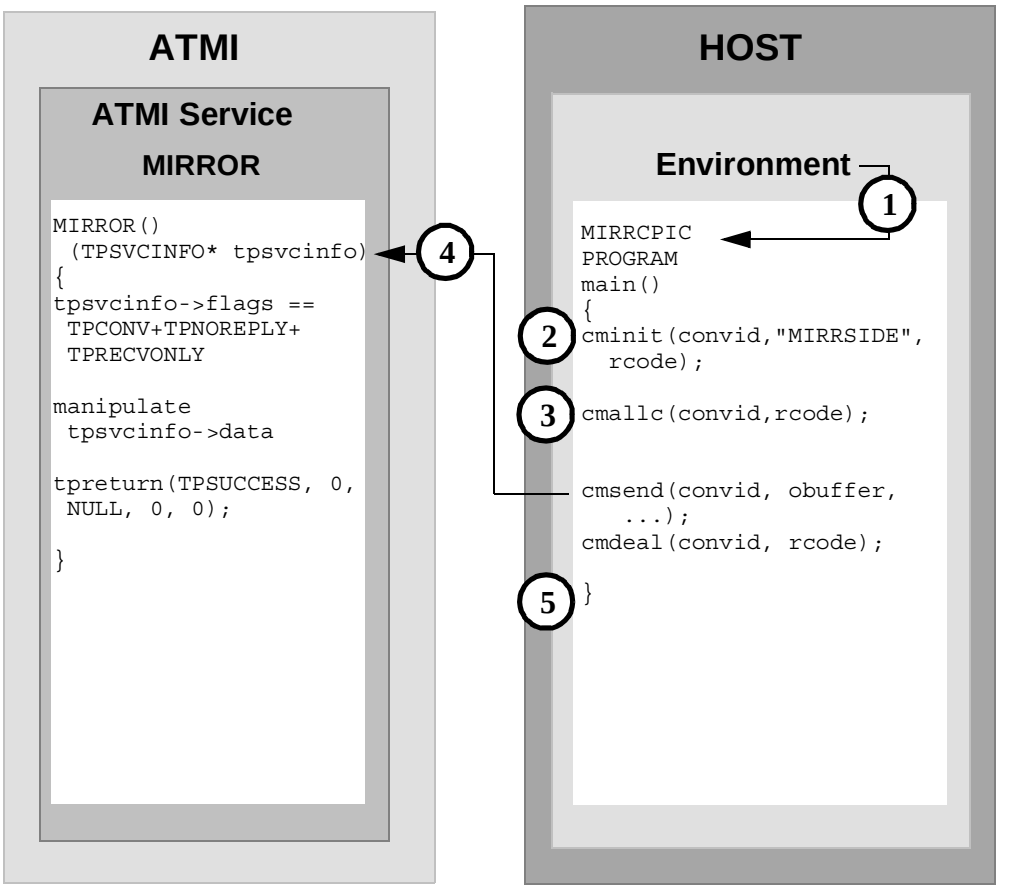


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=N
```

1. The CPI-C application program MIRRCPIC is invoked using environment start-up specifications.
2. The `MIRRCPIC` client requests `cminit` to establish conversation attributes and receive a conversation id that will be used on all other requests on this conversation. The remote server and service are named in the CPI-C side information entry `MIRRSIDE`.
3. The `cmallc` request initiates the advertised service mapped to `MIRRORSERV` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
4. The `cmsst` request prepares the next send request by setting the send type to `CM_SEND_AND_PREP_TO_RECEIVE`.
5. The `cmsend` request immediately sends the contents of `obuffer` to the ATMI service in the `tpsvcinfo->data` buffer and relinquishes control to the `mirrorserv` service.
6. The `cmrcv` request receives the contents of the `odata` returned on the ATMI `tpreturn` service, and notification that the conversation has ended with the return code value of `CM_DEALLOCATED_NORMAL`.

Host CPI-C to ATMI Conversational Service, Client Retains Control

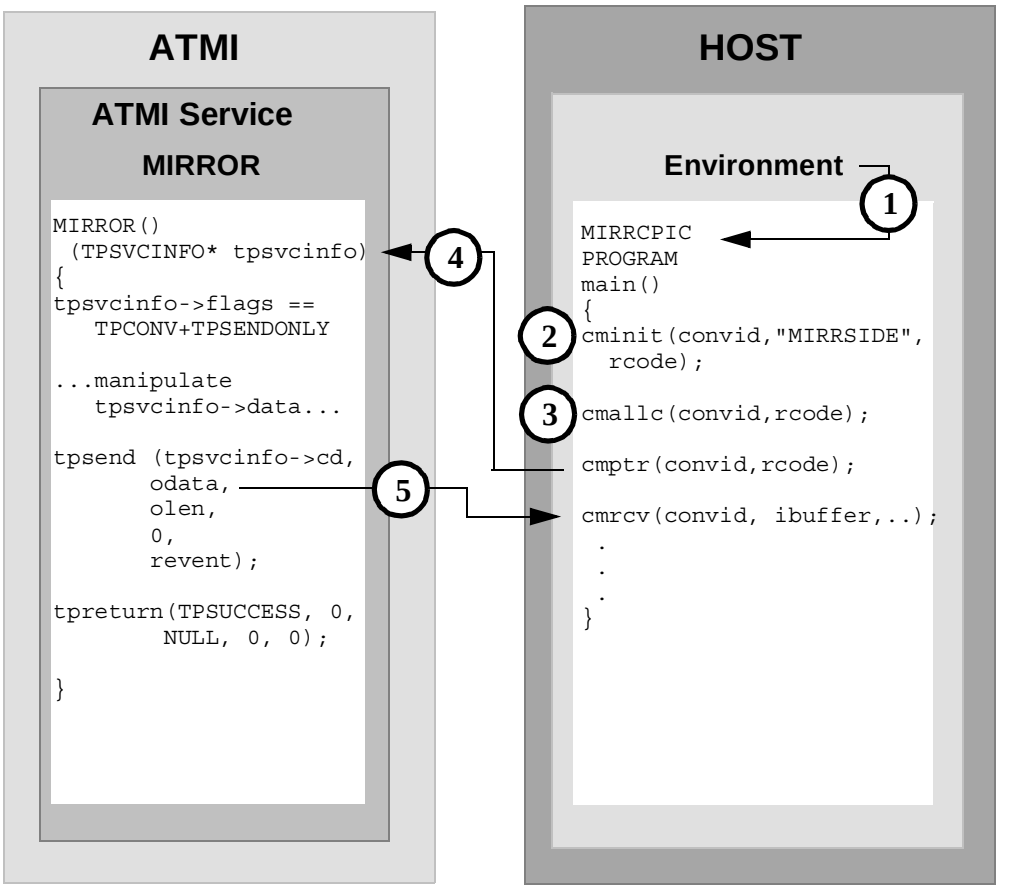


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=N
```

1. The CPI-C application program MIRRCPIC is invoked using environment start-up specifications.
2. The `MIRRCPIC` client requests `cminit` to establish conversation attributes and receive a conversation id that will be used on all other requests on this conversation. The remote server and service are named in the CPI-C side information entry `MIRRSIDE`.
3. The `cmallc` request initiates the advertised service mapped to `MIRRORSERV` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
4. The `cmsend` request sends the contents of `obuffer` to the ATMI service in the `tpsvcinfo->data` buffer.
5. The `cmdeal` request flushes the data and ends the conversation, as indicated by `TPNOREPLY` in the `tpsvcinfo->flag` field.

Host CPI-C ATMI to Conversational Service, Client Grants Control

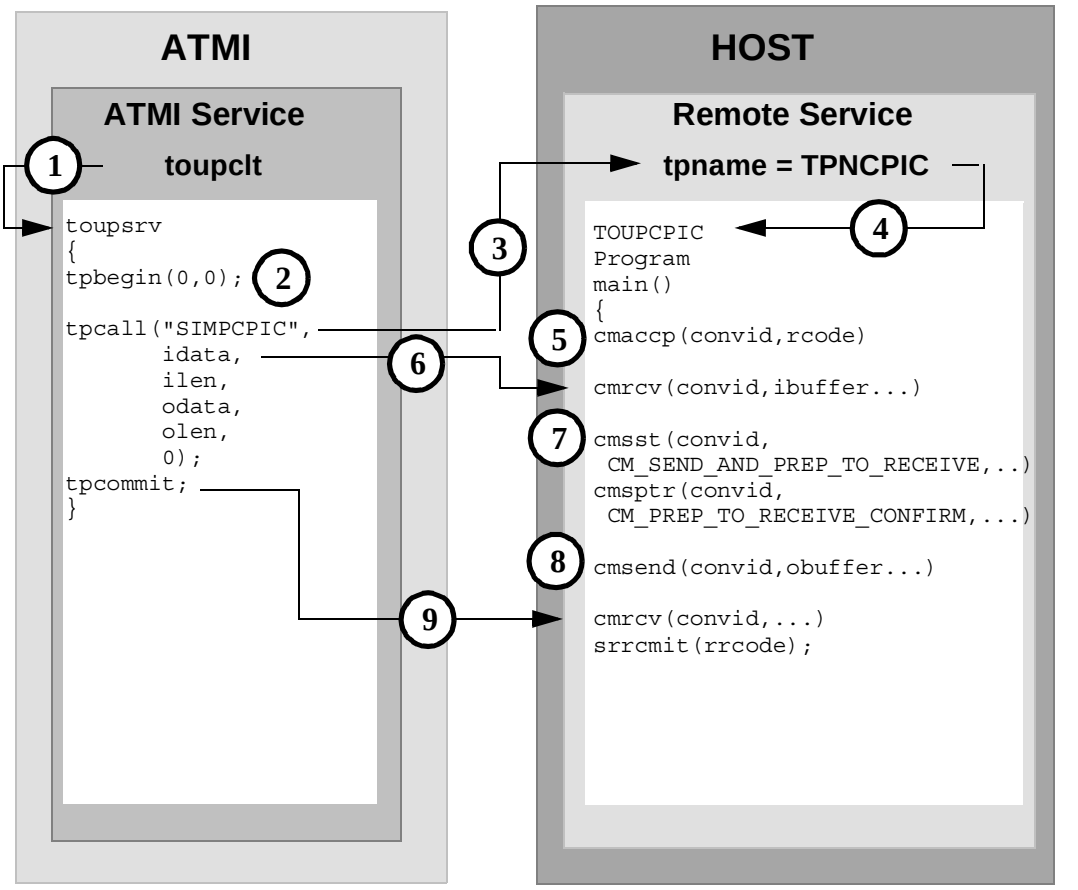


DMCONFIG File Entry

```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=Y
```

1. The CPI-C application program `MIRRCPIC` is invoked using environment start-up specifications.
2. The `MIRRCPIC` client requests `cminit` to establish conversation attributes and receive a conversation ID that will be used on all other requests on this conversation. The remote server and service are named in the CPI-C side information entry `MIRRSIDE`.
3. The `cmallc` request initiates the advertised service mapped to `MIRROR` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
4. The `cmptr` relinquishes control of the conversation to the ATMI service indicated as `TPSENDONLY` in the `tpsvcinfo->flag` field. No data is passed in the `tpsvcinfo->data` field.
5. The `cmrcv` receives the contents of the `tpsend odata` into the `ibuffer`. The end of the conversation is passed from the `tpreturn` service as return code value `CM_DEALLOCATED_NORMAL`.

Transactional ATMI Client Request/Response to Host CPI-C

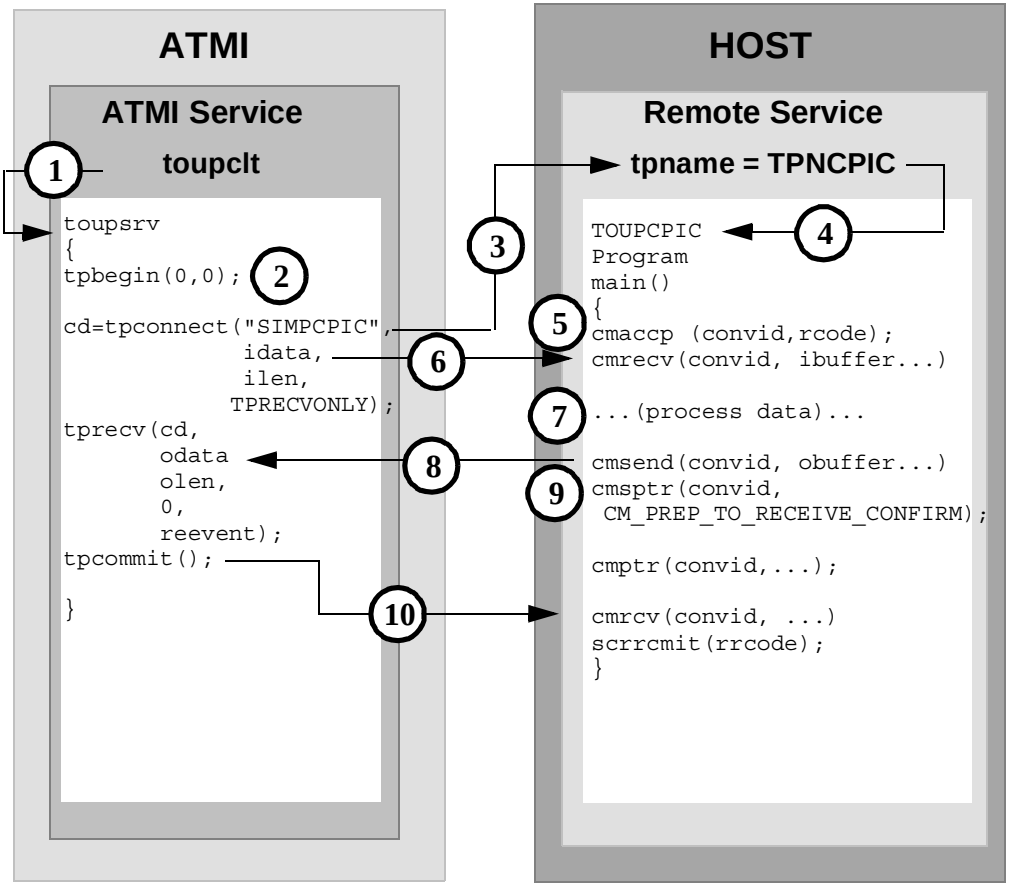


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=N
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpbegin` to start the transaction.
3. The `toupsrv` service issues `tpcall` for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. Data is sent from the `idata` buffer on the `tpconnect`.
4. The remote service with `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
5. The server accepts the conversation with the `cmaccp` call. The conversation ID returned on the request in `convid` is used for all other requests during this conversation.
6. The `cmrcv` request receives the `idata` buffer contents for processing.
7. The `cmsst` and `cmsptr` prepare the next send request by setting the send type to `CM_SEND_AND_PREP_TO_RECEIVE` and by setting the prepare-to-receive type to `CM_PREP_TO_RECEIVE_CONFIRM`.
8. The `cmsend` request immediately returns the `obuffer` contents into the client's `odata` buffer. The server relinquishes control to the server and indicates the end of the conversation with the `CONFIRM` request.
9. The `toupsrv` issues the `tpcommit` to successfully complete the transaction and commit all updated resources. The `cmrcv` request receives the commit request, and responds explicitly to the request with the SAA Resource/Recovery commit call `srrcmit`. The conversation is ended after the successful commit exchange.

Transactional ATMI Conversational Client to Host CPI-C, Server Gets Control

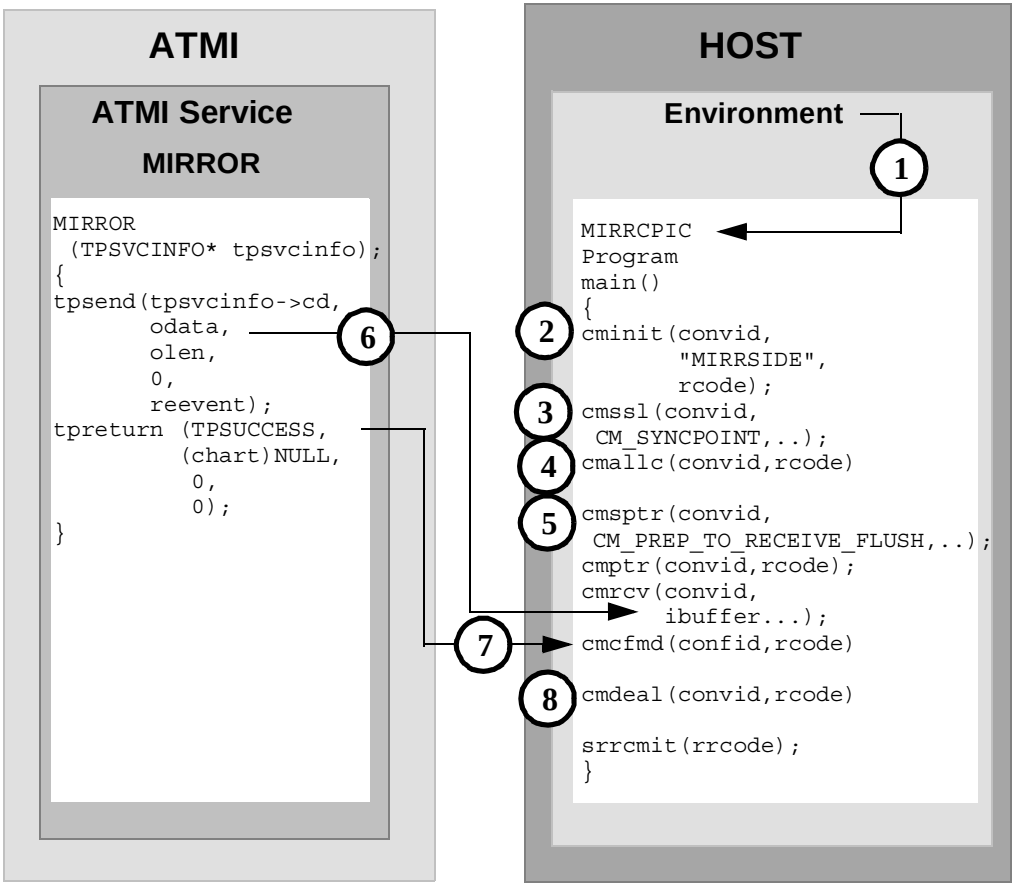


DMCONFIG File Entry

```
DM_REMOTE_SERVICES

SIMPCPIC RNAME=TPNCPIC FUNCTION=APPC CONV=Y
```

1. ATMI client invokes `toupsrv` service.
2. The `toupsrv` service issues `tpbegin` to start the transaction.
3. The `toupsrv` service issues a `tpconnect` service request for `SIMPCPIC`, which is advertised in the DM_REMOTE_SERVICES section of the DMCONFIG file. Data is sent in the `idata` buffer on the `tpconnect`.
4. The remote service with `tpname` `TPNCPIC` invokes `TOUPCPIC` program.
5. The server accepts the conversation with the `cmaccp` call. The conversation ID returned on the request in `convid` is used for all other requests during this conversation.
6. The `cmrcv` request receives the `idata` buffer contents sent on the `tpconnect` for processing.
7. The `TOUPCPIC` program processes the data.
8. The `cmsend` returns the `obuffer` contents into the client's `tprecv` `odata` buffer. The buffer contents may not be sent immediately.
9. The `cmsptr` prepares the prepare-to-receive request with `CM_PREP_TO_RECEIVE_CONFIRM`. The `cmptr` request with `CONFIRM` indicates that the conversation is finished and is communicated to the `tprecv` as `TPEV_SVCSUCC`.
10. The `toupsrv` issues the `tpcommit` to successfully complete the transaction and commit all updated resources. The `cmrcv` request receives the commit request and responds explicitly to the request with the SAA Resource/Recovery commit call `srrcmit`. The conversation is ended after the successful commit exchange.

Transactional Host CPI-C to ATMI Conversational Server, Client Grants Control



DMCONFIG File Entry

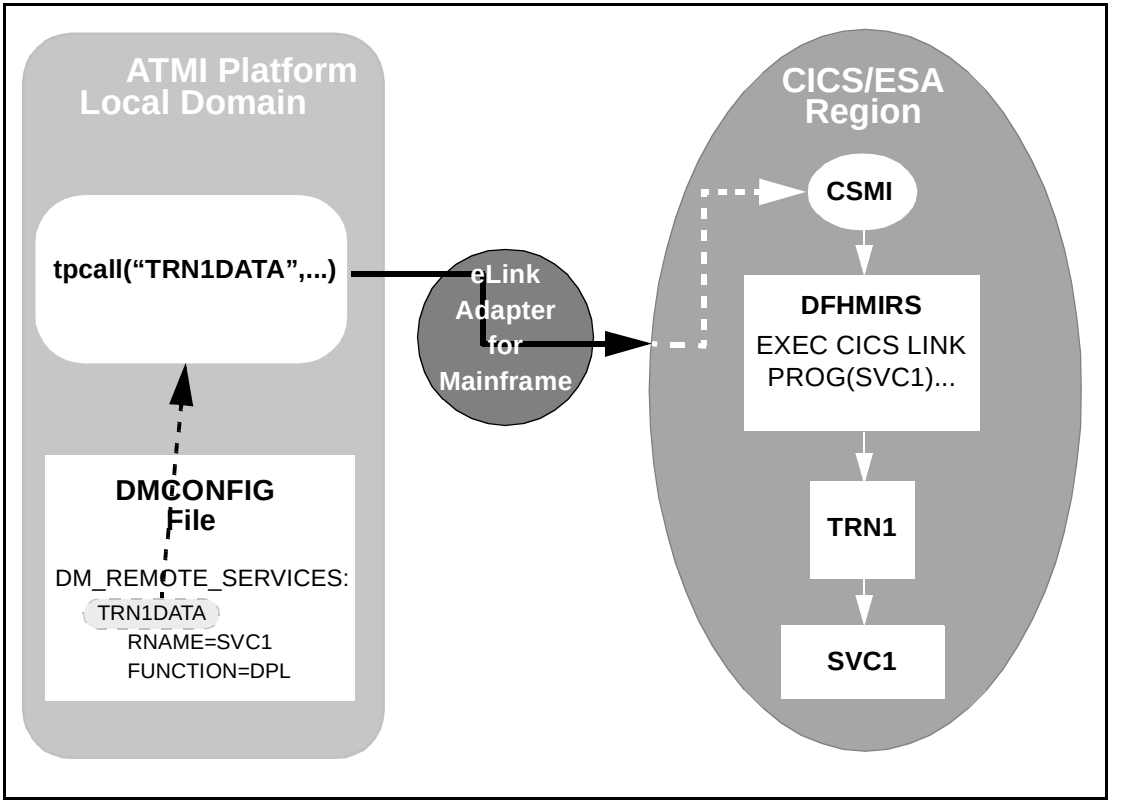
```
DM_LOCAL_SERVICES

MIRROR RNAME=MIRRORSERV CONV=Y
```

1. The CPI-C application program `MIRRCPIC` is invoked using environment start-up specifications.
2. The `MIRRCPIC` client requests `cminit` to establish conversation attributes and receive a conversation ID that will be used on all other requests on this conversation. The remote server and service are named in the CPI-C side information entry `MIRRSIDE`.
3. The `cmssl` sets the conversation attributes to sync-level 2 with `CM_SYNCPOINT`. This allows the ATMI service to participate in the transaction.
4. The `cmallc` request initiates the advertised service mapped to `MIRRORSERV` in the DM_LOCAL_SERVICES section of the DMCONFIG file.
5. The MIRRCPIC causes the client to relinquish control to the ATMI server with a prepare-to-receive request. The `cmsptr` sets the prepare-to-receive type to CM_RECEIVE_AND_FLUSH. The `cmptr` request immediately relinquishes control.
6. The `MIRROR` service sends the data contents of the `odata` buffer to the `cmrcv ibuffer`. The `cmrcv` receives a confirm request from the server indicating the conversation should be terminated.
7. The client replies positively to the confirm request with `cmcfmd`.
8. The `MIRRCPIC` client prepares to free the conversation with the `cmdeal` request. The conversation in CM_DEALLOCATE_SYNC_LEVEL commits all updated resources in the transaction and waits for the SAA resource recovery verb, `srrcmit`. After the `commit` sequence has completed, the conversation terminates.

CICS/ESA Mirror Transaction Examples

Implicit Attachment of TRANSID (Outbound Requests Only)

Figure 2-1 Implicit Attachment of TRANSID (Outbound Requests Only)

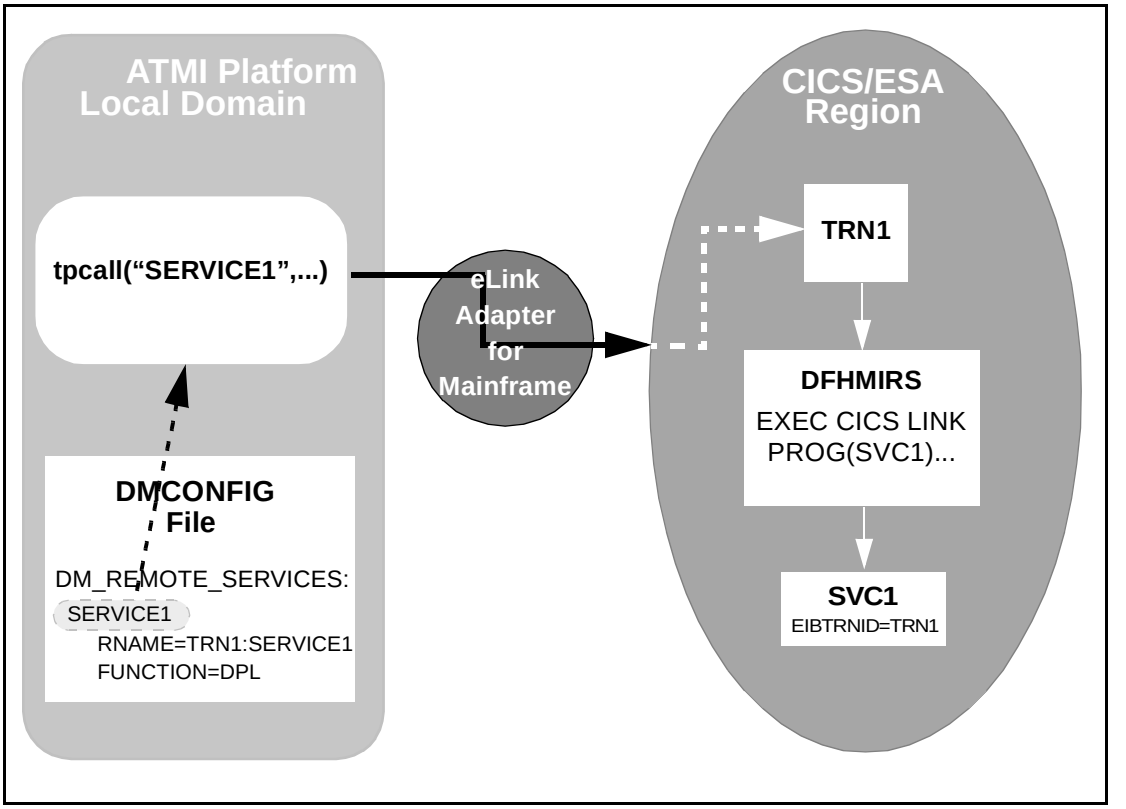


The following list describes the process for implicit attachment as illustrated in Figure 2-1:

1. The ATMI service makes a request to the service TRN1DATA, which is advertised as a remote service in the DMCONFIG file. It is a DPL request to a program named SVC1 in the CICS/ESA region.
2. The first four characters of the remote service tag name (TRN1) are extracted and passed to the CICS/ESA region as the invoking TRANSID. No CICS/ESA resource definition for the TRANSID is required in the region.
3. The mirror transaction CSMI is attached in the CICS/ESA region, starting the mirror program DFHMIRS. The program performs the DTP requests for the service.
4. The mirror program now attaches the invoking TRANSID (TRN1) and then invokes the application service program SVC1.The program can interrogate the EIBTRNID field to find this value.

Explicit Attachment of TRANSID for Outbound Requests

Figure 2-2 Explicit Attachment of TRANSID for Outbound Requests

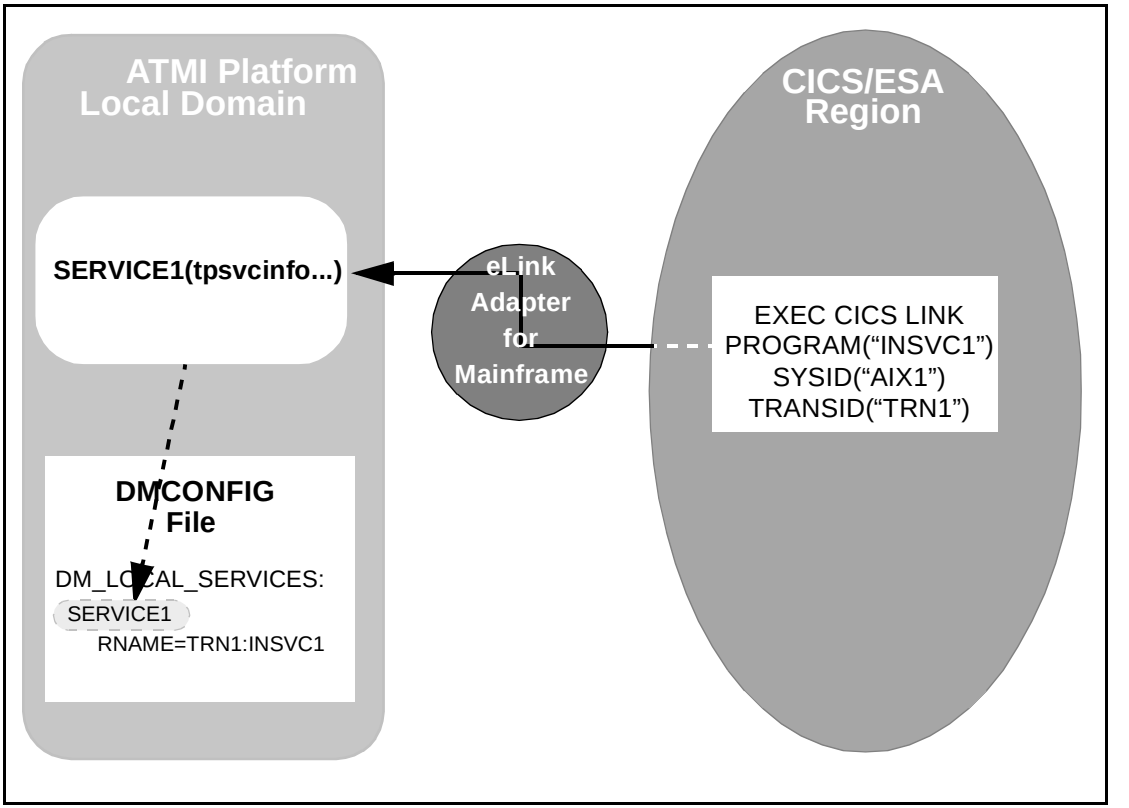


The following list describes the process for explicit attachment as illustrated in Figure 2-2:

1. The ATMI program makes a service request for SERVICE1, which is advertised as a remote service in the DMCONFIG file. The FUNCTION option indicates the remote service is invoked as a DPL.
2. The request extracts TRN1 as an alternate mirror transaction ID for the remote region, along with the remote program name SERVICE1.
3. The TRN1 ID is attached instead of the default mirror transaction, CSMI or CVMI. The TRN1 ID must be defined as a transaction resource in the remote region and must point to the mirror transaction program DFHMIRS.
4. The mirror program DFMMIRS calls the server application program, passing the TRN1 ID in the EIBTRNID field.

Explicit Attachment of TRANSID for Inbound Requests

Figure 2-3 Explicit Attachment of TRANSID for Inbound Requests



The following list describes the process for implicit attachment as illustrated in Figure 2-3:

1. The CICS/ESA program makes a request to `INSVC1`, which is a local ATMI service. The `SYSID` and `PROGRAM` values in the request identify the local system and the name of the local service. The `TRANSID` option indicates the mirror transaction to be initiated.

2. The `PROGRAM` and mirror `TRANSID` are extracted from the DPL request and are used to find an exact `RNAME` match in the `DM_LOCAL_SERVICES` section of the `DMCONFIG` file.

3. The service `SERVICE1`, which is advertised locally in the ATMI platform application, is initiated.

Additional Information

Additional information about CICS/ESA Intersystem Communications may be found in the following IBM publications:

- *CICS/ESA Intercommunication Guide*, IBM publication No. SC33-0657
- *CICS/ESA Distributed Transaction Programming Guide*, IBM publication No. SC33-00783
- *CICS/ESA Recovery and Restart Guide*, IBM publication No. SC33-0658

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