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About This Document

This document explains what the BEA Tuxedo ATMI Workstation component is, how to use the Workstation component on both Windows and UNIX systems, and how to bring up the bankapp sample application on a workstation.

This document covers the following topics:

- **Chapter 1, “Workstation Overview,”** provides a brief overview of the BEA Tuxedo ATMI Workstation component.

- **Chapter 2, “Using the Workstation Component,”** provides information on writing Workstation client programs for Windows and UNIX systems, using BEA Tuxedo system-supplied clients, and running BEA Tuxedo system clients on a workstation.

- **Chapter 3, “Using Workstation on a Windows System,”** describes additional information about using the BEA Tuxedo ATMI Workstation component on a Windows system.

- **Chapter 4, “Bringing Up bankapp on Workstations,”** describes the procedure for bringing up bankapp, the BEA Tuxedo system sample application, on a Windows or UNIX workstation.

What You Need to Know

This document is intended mainly for application developers who are interested in using the Workstation component in their applications. It provides an overview of the Workstation component, how to write and build client programs using the Workstation component, and how to bring up the bankapp application on a workstation.
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://e-docs.bea.com.

How to Print the Document

You can print a copy of this document from a Web browser, one file at a time, by using the File—>Print option on your Web browser.

A PDF version of this document is available on the BEA Tuxedo documentation Home page on the e-docs Web site (and also on the documentation CD). You can open the PDF in Adobe Acrobat Reader and print the entire document (or a portion of it) in book format. To access the PDFs, open the BEA Tuxedo documentation Home page, click the PDF files button and select the document you want to print.

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 BEA Tuxedo documents contain information that is relevant to the BEA Tuxedo ATMI Workstation component:

- *Introducing BEA Tuxedo ATMI*
- *Using BEA Tuxedo ATMI on Windows*

For more information about BEA Tuxedo ATMI and transaction processing, see *Bibliography*.

Contact Us!

Your feedback on the BEA Tuxedo documentation is important to us. Send us e-mail at docsupport@bea.com if you have questions or comments. Your comments will be reviewed directly by the BEA professionals who create and update the BEA Tuxedo documentation.

In your e-mail message, please indicate that you are using the documentation for the BEA Tuxedo 9.0 release.

If you have any questions about this version of BEA Tuxedo, or if you have problems installing and running BEA Tuxedo, contact BEA Customer Support through BEA WebSupport at
http://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

### Documentation Conventions

The following documentation conventions are used throughout this document.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface text</strong></td>
<td>Indicates terms defined in the glossary.</td>
</tr>
<tr>
<td>Ctrl+Tab</td>
<td>Indicates that you must press two or more keys simultaneously.</td>
</tr>
<tr>
<td><em>italics</em></td>
<td>Indicates emphasis or book titles.</td>
</tr>
</tbody>
</table>
| **monospace text** | Indicates code samples, commands and their options, data structures and their members, data types, directories, and filenames 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 ( )
  ```
<table>
<thead>
<tr>
<th>Convention</th>
<th>Item</th>
</tr>
</thead>
</table>
| **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. |
| [ ] | 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. |
CHAPTER 1

Workstation Overview

The following sections provide a brief overview of the BEA Tuxedo ATMI Workstation component:

- What Is the Workstation Component?
- Workstation Administration

What Is the Workstation Component?

The Workstation component of the BEA Tuxedo system allows application clients to reside on a machine that does not have a full server-side installation, that is, a machine that does not support any administration or application servers. As shown in the following figure, all communication between a Workstation client—an application client running on a Workstation component—and the server application takes place over the network.
A Workstation client communicates with a server application through a workstation handler (WSH) process.

A Workstation client, whether run on a Windows or UNIX system, has access to most of the client ATMI, although a Workstation client does not have all the access privileges available to a native client (that is, a client running on the same machine on which the server program is running). However, both types of clients can do the following:

- Send and receive messages
- Begin, end, and commit transactions
- Send and receive unsolicited messages
- Meet application security requirements
- Communicate information about remote clients through the `tmadmin()` command (for details, see `tmadmin(1)` in *BEA Tuxedo Command Reference*)
Limitations of Workstation Clients

Workstation clients do not have access to all the functionality available to native clients. For example, unlike a native client, a Workstation client cannot join an application as tpsysadm, which means that the client cannot subsequently subscribe to an event that issues a service call.

See Also

- “BEA Tuxedo Workstation Servers” on page 3-8 in Introducing BEA Tuxedo ATMI
- “About Workstation Clients” in Setting Up a BEA Tuxedo Application

Workstation Administration

To integrate a Workstation client into a BEA Tuxedo application, you must define any required and desired parameters for that client in the application configuration file. For details, see “Setting Up Workstation Clients” in Setting Up a BEA Tuxedo Application.

See Also

- buildwsh(1) in BEA Tuxedo Command Reference
- WSL(5) in BEA Tuxedo File Formats, Data Descriptions, MIBs, and System Processes Reference
Using the Workstation Component

The following sections describe using the BEA Tuxedo ATMI Workstation component on both Windows and UNIX systems:

- Writing Client Programs
- Using BEA Tuxedo System-Supplied Clients
- Running BEA Tuxedo System Clients on a Workstation
- How a Multithreaded or Multicontexted Workstation Client Joins an Application

Writing Client Programs

You can develop client programs targeted for workstations in the same way that you develop client programs within the BEA Tuxedo system administrative domain (that is, native clients). With a few exceptions, all ATMI and FML functions available to the native client are also available to the Workstation client.

**Note:** `tpadmcall()` is an example of an ATMI function that is available to the native client but not to the Workstation client.

Interoperability Restrictions for Workstation Clients

Interoperability between BEA Tuxedo release 7.1 or later Workstation clients and applications based on pre-7.1 releases of the BEA Tuxedo system is supported in any of the following situations:
The client is neither multithreaded nor multicontexted.

The client is multicontexted.

The client is multithreaded and each thread is in a different context.

A BEA Tuxedo release 7.1 or later Workstation client with multiple threads in a single context cannot interoperate with a pre-7.1 release of the BEA Tuxedo system.

Building Client Programs

You compile and link-edit Workstation client programs using the `buildclient(1)` command. If you are building a Workstation client on a native node (that is, one on which the complete BEA Tuxedo system is installed), use the `-w` option to indicate the client should be built using the workstation libraries. Otherwise, on a native node, where both native and workstation libraries are present, the default is to use the native libraries. In this case, using the `-w` option ensures that the correct libraries for a Workstation client are used. On a workstation, where only the workstation libraries are present, it is not necessary to use the `-w` option.

The following listing shows an example of the `buildclient(1)` command line on a native node.

Listing 2-1  `buildclient` Command Line

```
TUXDIR=/var/opt/tuxedo CC=ncc; export TUXDIR CC
buildclient -w -o wsclt -f wsclt.c -f "userlib1.a userlib2.a"
```

The `-o` option provides a name for your output file. Input files are specified with the `-f` `firstfiles` option to indicate that they are link-edited before system libraries. As indicated in the example, you must define the `TUXDIR` environment variable to ensure that the `buildclient` command can locate system libraries. `CC` defaults to `cc` but can be set to another compiler, as shown in the example.

See Also

- “Writing Clients” on page 4-1 in *Programming a BEA Tuxedo ATMI Application Using C* and *Programming a BEA Tuxedo ATMI Application Using COBOL*
- “COBOL Language Bindings for the Workstation Component” on page 12-1 in *Programming a BEA Tuxedo ATMI Application Using COBOL*
Using BEA Tuxedo System-Supplied Clients

- “Writing Security Code So Client Programs Can Join the ATMI Application” on page 3-4 in Using Security in CORBA Applications
- `buildclient(1)` in BEA Tuxedo Command Reference

Using BEA Tuxedo System-Supplied Clients

`wud` and `wud32` are BEA Tuxedo system-supplied driver programs provided for workstations. These driver programs are based on the standard BEA Tuxedo client programs, `ud` and `ud32`, that have been built using the workstation libraries.

Use `wud(1)` to send FML buffers to BEA Tuxedo system servers. Use `wud32` with fielded FML32 buffers of type `FBFR32`.

Using `wud` in a Security Application

If `wud` is run in a security application, it requires an application password to access the application. If standard input is from a terminal, `wud` prompts the user for an application password. If you are running the client program from a script, which is a common occurrence with `wud`, the password is retrieved from the environment variable `APP_PW`. If this environment variable is not specified and an application password is required, then `wud` fails.

Do not confuse the `APP_PW` environment variable with the similar configuration file parameter, `SECURITY`, for which the value `APP_PW` enables the security feature.

See Also

- `ud`, `wud(1)` in BEA Tuxedo Command Reference

Running BEA Tuxedo System Clients on a Workstation

After the client programs have been developed and tested, they can be moved to the workstations where they will be available to users.

Verifying the Directory Structure on Workstation Clients

The following table describes the directory structure on a Workstation client after you have installed the Workstation component of the BEA Tuxedo system.
Setting Environment Variables

Workstation clients make use of several environment variables. The following table shows the environment variables that are checked by `tpinit(3c)` or `TPINITIALIZE(3cbl)` when the Workstation client attempts to join the application. For details on setting these environment variables, see “Defining Workstation Clients” on page 12-1 in Setting Up a BEA Tuxedo Application.
<table>
<thead>
<tr>
<th>Environment Variable</th>
<th>Description</th>
</tr>
</thead>
</table>
| **TPMBENC**          | Specifies the code-set encoding name that the workstation machine running BEA Tuxedo 8.1 or later includes in an allocated MBSTRING typed buffer. When a Workstation client allocates and sends an MBSTRING buffer, the code-set encoding name defined in **TPMBENC** is automatically added as an attribute to the buffer and sent with the buffer data to the destination server process.  
When the workstation machine receives an MBSTRING buffer, and assuming another environment variable named **TPMBACONV** is set, the code-set encoding name defined in **TPMBENC** is automatically compared to the code-set encoding name in the received buffer; if the names are not the same, the MBSTRING buffer data is automatically converted to the encoding defined in **TPMBENC** before being delivered to the Workstation client.  
**TPMBENC** has no default value. For a Workstation client using MBSTRING typed buffers, **TPMBENC** must be defined on the workstation machine.  
**Note:** **TPMBENC** is used in a similar way for  
**FLD_MSTRING** fields in an FML32 typed buffer. |
| **TPMBACONV**        | Specifies whether the workstation machine running BEA Tuxedo 8.1 or later automatically converts the data in a received MBSTRING buffer to the encoding defined in **TPMBENC**. By default, the automatic conversion is turned off, meaning that the data in the received MBSTRING buffer is delivered to the Workstation client as is—no encoding conversion. Setting **TPMBACONV** to any non-NULL value, say Y (yes), turns on the automatic conversion.  
**Note:** **TPMBACONV** is used in a similar way for  
**FLD_MSTRING** fields in an FML32 typed buffer. |
| **URLENTITYCACHING** | Specifies whether the workstation machine running BEA Tuxedo 8.1 or later caches Document Type Definition (DTD), XML schema, and entity files; specifically, whether the Apache Xerces-C++ parser running on the Workstation client caches the DTD and XML schema files when validation is required, or caches external entity files called out in the DTD. By default, the caching is turned on (Y). Setting **URLENTITYCACHING** to N (no) turns off the caching. |
### Environment Variable Description

<table>
<thead>
<tr>
<th>Environment Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>URLENTITYCACHEDIR</td>
<td>Applies only if <code>URLENTITYCACHING=Y</code> (yes) or is not set; for details, see the description of <code>URLENTITYCACHING</code> in this table. Specifies the directory in which the workstation machine running BEA Tuxedo 8.1 or later caches DTD, schema, and entity files; specifically, where the Apache Xerces-C++ parser running on the Workstation client caches the DTD, XML schema, and entity files. The <code>URLENTITYCACHEDIR</code> variable specifies the absolute pathname for the cached files. If <code>URLENTITYCACHEDIR</code> is not specified, the default directory becomes <code>URLEntityCachedir</code>, which will be created in the current working directory of the Workstation client process provided that the appropriate write permissions are set.</td>
</tr>
<tr>
<td>WSINTOPRE71</td>
<td>Specifies whether the workstation machine running BEA Tuxedo 7.1 or later is allowed to interoperate with pre-release 7.1 BEA Tuxedo applications. Setting the variable to <code>Y</code> (<code>WSINTOPRE71=Y</code>) allows interoperability.</td>
</tr>
<tr>
<td>WSBUFFERS</td>
<td>The number of packets per application.</td>
</tr>
<tr>
<td>WSDEVICE</td>
<td>Device name to be used to access the network. This variable is only required when the BEA Tuxedo system is using the TLI networking interface.</td>
</tr>
<tr>
<td>WSENVFILE</td>
<td>Name of a file containing environment variable settings to be set in the client’s environment.</td>
</tr>
<tr>
<td>WSFADDR</td>
<td>The network address used by the Workstation client when connecting to the workstation listener or workstation handler. This variable, along with the <code>WSFRANGE</code> variable, determines the range of TCP/IP ports to which a Workstation client will attempt to bind before making an outbound connection. This address must be a TCP/IP address.</td>
</tr>
<tr>
<td>WSFRANGE</td>
<td>The range of TCP/IP ports to which a Workstation client process attempts to bind before making an outbound connection. The <code>WSFADDR</code> parameter specifies the base address of the range. The default is 1.</td>
</tr>
</tbody>
</table>
Other environment variables may be needed by Workstation clients on a UNIX workstation depending on the BEA Tuxedo system features being used. Reference page compilation(5) in BEA Tuxedo File Formats, Data Descriptions, MIBs, and System Processes Reference explains which variables are needed under what circumstances.

### Creating an Environment File

If you have created an environment file, it is read when tpinit(3c) or TPINITIALIZE(3cbl) is called. The following listing shows a sample file that could be used for two different applications.
Listing 2-2  Environment File

TUXDIR=/opt/tuxedo
[application1]
;this is a comment
/* this is a comment */
#this is a comment
//this is a comment
set FIELDTBLS=app1_flds
set FLDTBLDIR=/opt/app1/udataobj
[application2]
FIELDTBLS=app2_flds
FLDTBLDIR=/opt/app2/udataobj

The format of the file is as follows:

- Any leading space and tab characters on each line are ignored and are not considered in the following points.
- Lines containing variables to be put into the environment are of the following form:
  
  variable=value
  
  or

  set variable=value

  where variable must begin with an alphabetic or underscore character and contain only alphanumeric or underscore characters, and value may contain any character except newline.

- Within the value, strings of the form ${env} are expanded using variables already in the environment. Forward referencing is not supported and if a value is not set, the variable is replaced with the empty string. Backslash (\) may be used to escape the dollar sign and itself. All other shell quoting and escape mechanisms are ignored and the expanded value is placed into the environment.

- Lines beginning with slash (/), pound sign (#), or exclamation point (!) are treated as comments and ignored. Lines beginning with other characters besides these comment characters, a left square bracket, or an alphabetic or underscore character are reserved for future use; their use is undefined.

- The file is partitioned into sections by lines of the form
[label]

where label is the name of the section and follows the same rules for variable above. The label is silently truncated if longer than 31 characters.

- Variable lines between the top of the file and the first label are put into the environment for all applications; this is the global section. A label of [] also indicates the global section.
- Other variables are put into the environment only if the label matches the application label specified for the application.

Using tuxreadenv

When you call the tuxreadenv(3c) function, it reads the environment file and adds the environment variables to the environment for the entire process, independent of platform. These variables are available using tuxgetenv(3c) and can be reset using tuxputenv(3c).

```c
void tuxreadenv(char *file, char *label)
```

If file is NULL, then a default filename is used. The default filenames for various platforms are as follows:

- %TUXDIR%/TUXEDO.ENV (Windows)
- $TUXDIR/TUXEDO.env (UNIX)

If the value of label is NULL, then only variables in the global section are put into the environment. For other values of label, the global section variables plus any variables in a section matching the label are put into the environment.

An error message is printed to the userlog under the following conditions:

- A memory failure
- A non-null filename does not exist
- A non-null label does not exist

Each time tpinit(3c) is called (either explicitly or implicitly by calling another ATMI function), tuxreadenv(3c) is called automatically in Workstation clients. If WSENVFILE is set in the environment, then it designates the environment file; otherwise, NULL is passed to tuxreadenv() for the filename so that the default file is used. If WSAPP is set in the environment, then it is to be used as the section label in the environment file; otherwise, NULL is passed to tuxreadenv() for the label name. Application clients may also call tuxreadenv() explicitly.
The environment is implemented and available in different ways on different platforms. A uniform interface to the environment is provided via the existing `tuxgetenv(3c)` and `tuxputenv(3c)` functions. These functions provide access to the following:

- All variables from the specified `WSENVFILE` file for the specified `WSAPP` label (or the defaults if not specified)
- The environment variables in the operating system environment

**See Also**

- `tpinit(3c)` in *BEA Tuxedo ATMI C Function Reference*
- `tuxreadenv(3c)` in *BEA Tuxedo ATMI C Function Reference*

**How a Multithreaded or Multicontexted Workstation Client Joins an Application**

To join a BEA Tuxedo application, a multithreaded Workstation client must always call `tpinit()` with the `TPMULTICONTEXTS` flag set, even if the client is running in single-context mode.

**See Also**

- `tpinit(3c)` in *BEA Tuxedo ATMI C Function Reference*
CHAPTER 3

Using Workstation on a Windows System

The following sections describe additional information about using the BEA Tuxedo ATMI Workstation component on a Windows XP or Windows Server 2003 system:

- Benefits of Using Workstation on a Windows System
- Software Prerequisites
- Writing Client Programs
- How a Multithreaded or Multicontexted Workstation Client Joins an Application

Benefits of Using Workstation on a Windows System

The Windows instantiation of the Workstation client offers significant benefits to application developers:

- Executable text is shared among applications, saving memory.
- BEA Tuxedo Workstation upgrades are possible without relinking or modifying an application program's executable file.
- Dynamic linking permits interpretive graphical application generator tools (such as Visual Basic, ObjectVision and SQLWindows) to call BEA Tuxedo system services.

Software Prerequisites

The software prerequisites for running the Workstation component on a Windows system are as follows:
● Workstation for Windows runs under the Windows XP or Windows Server 2003 operating system.

● In Windows, the native TCP/IP stack is used.

● In Windows, while using TCP/IP, any Windows Sockets Compliant TCP/IP stack can be used.

● The server machine must have the BEA Tuxedo system and the native-side BEA Tuxedo Workstation installed.

**Writing Client Programs**

You can develop client programs targeted for Windows workstations in the same way that you would develop native client programs within the BEA Tuxedo system administrative domain. All the ATMI functions are available.

**Interoperability Restrictions for Workstation Clients**

Interoperability between BEA Tuxedo release 7.1 and later Workstation clients and applications based on pre-7.1 releases of the BEA Tuxedo system is supported in any of the following situations:

● The client is neither multithreaded nor multicontexted.

● The client is multicontexted.

● The client is multithreaded and each thread is in a different context.

A BEA Tuxedo release 7.1 or later Workstation client with multiple threads in a single context cannot interoperate with a pre-7.1 release of the BEA Tuxedo system.

**Building Client Programs**

To compile client programs written in C, you can use any compiler that can read Microsoft C import libraries. To compile COBOL source programs that call the ATMI, use the `LITLINK` option of the COBOL compiler. For details, see “COBOL Language Bindings for the Workstation Component” on page 12-1 in Programming a BEA Tuxedo ATMI Application Using COBOL.

Use `buildclient(1)` with the `-w` flag to link-edit your client programs.
You can also build BEA Tuxedo clients without using the `buildclient(1)` utility. If you are using Microsoft Visual C++ projects, use the following settings:

- Set the Preprocessor option to `-DWIN32`.
- Add `WTUXWS32.LIB` and `MSVCRT.LIB` to the input libraries for the linker option.

In addition, set the `INCLUDE`, `LIB`, and `PATH` search directories appropriately.

### Building GUI ATMI Clients

The `sample/atmi/ws` directory contains several different windows platform `.mak` files for creating GUI `atmi` clients. For an example of how these files may be used, see Tutorial for `bankapp`, a Full C Application.

### Run Time

When you run client programs, your `PATH` must include `TUXDIR\bin`.

### Limitations

The BEA Tuxedo libraries (DLLs) prior to BEA Tuxedo release 7.1 are not thread-safe. For applications written using the pre-release 7.1 DLLs, threads should not be used; otherwise, threaded access is serialized through all BEA Tuxedo calls (such as ATMI, FML, `userlog()`, and so on).

### See Also

- “Writing Clients” on page 4-1 in Programming a BEA Tuxedo ATMI Application Using C or Programming a BEA Tuxedo ATMI Application Using COBOL
- “COBOL Language Bindings for the Workstation Component” on page 12-1 in Programming a BEA Tuxedo ATMI Application Using COBOL
- “Writing Security Code So Client Programs Can Join the ATMI Application” on page 3-4 in Using Security in CORBA Applications
- `buildclient(1)` in BEA Tuxedo Command Reference
How a Multithreaded or Multicontexted Workstation Client Joins an Application

To join a BEA Tuxedo application, a multithreaded Workstation client must always call `tpinit(3c)` with the `TPMULTICONTEXTS` flag set, even if the client is running in single-context mode.

See Also

- `tpinit(3c)` in *BEA Tuxedo ATMI C Function Reference*
Bringing Up bankapp on Workstations

The following sections describe the procedure for bringing up bankapp, the BEA Tuxedo system sample application, on a Windows or UNIX workstation:

- Characteristics of a Workstation Application
- Bringing Up bankapp on a Workstation Client
- Changes on the Native Site
- Setting the bankapp Variables
- Building the bankapp Client
- Running the bankapp Client

Characteristics of a Workstation Application

In a workstation application, client processes are moved off the native site. The listener process (WSL) runs with a well-known network address and starts surrogate workstation handlers (WSH) as needed. Servers run on one or more machines within the BEA Tuxedo administrative domain. Existing servers are available to run on the BEA Tuxedo system nodes in either single processor (SHM) or multiprocessor (MP) mode.
On Workstations, the sample applications are located in the following directories:

- `%TUXDIR%\samples\atmi\bankapp` (Windows)
- `$TUXDIR/samples/atmi/bankapp` (UNIX)

**Bringing Up bankapp on a Workstation Client**

The following illustration shows the steps in bringing up `bankapp` on a Workstation client.

![Steps in Bringing Up bankapp](image)

**Changes on the Native Site**

Install and build the `bankapp` software on the native site. The procedure for doing this is described in “Tutorial for bankapp, a Full C Application” on page 3-1 in *Tutorials for Developing BEA Tuxedo ATMI Applications* and in the following README files on the master machine where your BEA Tuxedo system software is installed:

- `%TUXDIR%\samples\atmi\bankapp\README.nt` (Windows)
- `$TUXDIR/samples/atmi/bankapp/README` (UNIX)
Editing the Configuration File

You need to edit the configuration file you plan to use (either ubbshm or ubbmp) to specify the workstation listener (WSL) as a server in the GROUPS and SERVERS sections, and to specify MAXWSCLIENTS in the MACHINES section. When you edit the GROUPS section, put the entry for WSGRP ahead of the DEFAULT line or move the specifications for TMSNAME and TMSCOUNT to the server groups that use them; they should not be assigned to WSGRP. The new specifications should be in the following format.

```plaintext
*MACHINES
DEFAULT: MAXWSCLIENTS=50
#
*GROUPS
WSGRP   GRPNO=<next available group #> LMID=SITE1
#
*SERVERS
WSL     SRVGRP=WSGRP     SRVID=1
       CLOPT="-A -n //machine:port -m 1 -M 5 -x 10"
```

Also, remember to increase the MAXACCESSERS parameter in the RESOURCES or MACHINES section to cover the new Workstation clients.

Loading and Booting the Configuration

Before you can start using a Workstation client, you need to run `tmloadcf(1)` to load the configuration file into its binary form and `tmboot(1)` to start the application. These commands do not have to be run immediately; there is work to be done in getting the bankapp clients installed on your workstations and getting them built. However, the application must be running on the BEA Tuxedo system native site when you attempt to join the application from a workstation. The steps for loading and booting bankapp on the native site are part of the overall procedure documented in “Tutorial for bankapp, a Full C Application” on page 3-1 in Tutorials for Developing BEA Tuxedo ATMI Applications.

See Also

- `tmloadcf(1)` in BEA Tuxedo Command Reference
- `WSL(5)` in BEA Tuxedo File Formats, Data Descriptions, MIBs, and System Processes Reference
“Tutorial for bankapp, a Full C Application” on page 3-1 in *Tutorials for Developing BEA Tuxedo ATMI Applications*

“Defining a Workstation Listener (WSL) as a Server” on page 12-4 in *Setting Up a BEA Tuxedo Application*

**Setting the bankapp Variables**

To set your environment to run bankapp, complete the following procedure on the Workstation client.

1. Set the following environment variable:

   WSNADDR=<WSL advertised address(es)>
   WSTYPE=<type of Workstation machine>
2. Include %TUXDIR%/bin (Windows) or $TUXDIR/bin (UNIX) in your PATH.
3. Verify that your environment is set appropriately to run the C compiler.

**Building the bankapp Client**

To build a client program, enter the following commands:

```
mkfldhdr bankflds
buildclient -w -o bankclt -f bankclt.c
```

**Running the bankapp Client**

To run the bankapp client on the Workstation, complete the following procedure.

1. Verify that the value of `WSNADDR` on the Workstation client matches the value of the `CLOPT -n` option for the WSL in the `SERVERS` section of the configuration file on the native site.
2. If `bankapp` has not been booted on the native site, make sure it has been booted before you attempt to run a Workstation client.
3. Execute `bankclt` to run the Workstation client.