

Installation Guide

Tmax 6

TMAXSOFT

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Detailed Information related to the license can be found in the following directory:

\${INSTALL_PATH}/license/oss_licenses

Document History

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1. Installation Overview

This chapter describes installation components and system requirements.

1.1. Installation Components

The following are Tmax installation components.

1.1.1. Package

The Tmax package contains the following.

- Product CD-ROM
 1. Tmax Client/Server for Unix and Linux platforms
 2. Tmax manuals
- Printed Manuals
 1. Tmax Getting Started Guide
 2. Tmax Installation Guide
 3. Tmax Administrator's Guide
 4. Tmax Application Development Guide
 5. Tmax Deployment User Guide
 6. Tmax Error Message Reference Guide
 7. Tmax Reference Guide
 8. Tmax JTmaxServer Guide
 9. Tmax FDL Reference Guide
 10. Tmax Host-link Guide (SNA LU 0, SNA LU 6.2)
 11. Tmax WebtAsync User Guide
 12. Tmax WebTJCA User Guide
 13. Tmax JTC User Guide
 14. Tmax HMS User Guide
 15. Tmax WebT User Guide
 16. Tmax COBOL Guide
 17. Tmax Gateway Guide (SERIAL)
 18. Tmax Gateway Guide (TCP/IP)
 19. Tmax Gateway Guide (TCP/IP Thread)
 20. Tmax Gateway Guide (TCP/IP Service)

21. Tmax Gateway Guide (WebService)
22. Tmax Gateway Guide (X.25)
23. Tmax Programming Guide (4GL)
24. Tmax Programming Guide (Dynamic Library)
25. Tmax Programming Guide (MultipleRM)
26. Tmax Programming Guide (RCA)
27. Tmax Programming Guide (RPC)
28. Tmax Programming Guide (RQ)
29. Tmax Programming Guide (SQ)
30. Tmax Programming Guide (UCS)
31. TmaxGrid User Guide
32. Tmax TCache Guide
33. Tmax XA Library & Gateway Guide
34. Tmax WebAdmin User Guide

1.1.2. CD-ROM Directories

The product CD-ROM has the following directories.

- Manuals: contains Tmax manuals.
- UNIX: contains directories that contain Tmax Server engine and Client for each platform and sample programs.

1.1.3. Downloading Software

Users who want to test Tmax can download the software before purchasing it. To use the software, the users need a trial license issued by TmaxSoft. The license period is maximum two months. Using only a Client module does not require the license. For more information about licensing, refer to [Configuration](#).

Download Tmax from the following technical support site: <http://technet.tmax.com>.

- Software downloads: Downloads > Middleware > Tmax
- Tmax licensing: Demo License Request

1.2. System Requirements

System requirements for using Tmax are as follows:

Vendor	Operating System	Engine	File Descriptor	Version
GNU/Red Hat	Linux on Intel	32-bit	65536	i386/X86
	(kernel Version 2.6)	64-bit	65536	X86_64
HP	HP-UX	64-bit	65536	11.11 PA-RISC
			65536	11.23 Itanium
			65536	11.31 Itanium
IBM	AIX	64-bit	65536	5.1-5.3
			65536	6.1
			65536	7.1
Sun	Solaris on SPARC	64-bit	65536	5.7-5.9
			65536	5.10
			65536	5.11

For detailed information about system requirements for each platform, refer to [System Requirements for Each Platform](#).

1.3. Tmax Installer

The Tmax installer is a console installer that is available on Unix and Linux. It decompresses the compressed Tmax file, configures required environment variables, and provides samples and Makefiles for each platform.

2. Installation and Uninstallation on Unix

This chapter describes how to install and uninstall Tmax Server and Client on Unix and Linux systems.

Tmax provides two types of installers: Full and Patch installers. The Full installer installs Tmax core, configuration, and sample files for the first installation, and the Patch installer only replaces the Tmax core file for upgrade.

For actual Tmax operation, install both Tmax Server and Client.

2.1. Pre-installation Tasks

Perform the following before installing Tmax Server and Client.

- Create a Tmax account.

The root account can be used to install Tmax, but it is recommended to use a Tmax administrator account.

- Check system requirements and mount the CD-ROM.

For information about system requirements for each platform and how to mount a CD-ROM, refer to [System Requirements for Each Platform](#).

- Check the following information.

Check whether the server OS and architecture are 32-bit or 64-bit, the absolute Tmax installation path, and the server IP address used for testing after the installation.

2.2. Installation

The following are the steps for installing Tmax by using the Full installer.

1. Insert and mount the product CD-ROM.
2. Go to the directory that contains the Tmax60_AIX_71_PowerPC_64.bin file.
3. Grant the execution permission to the file to allow an installer located in another directory to execute the file.

```
$ chmod u+x Tmax60_AIX_71_PowerPC_64.bin
```

4. Execute the file in a console.

```
$ ./ Tmax60_AIX_71_PowerPC_64.bin
```



```

tmaxh4@starbj81:/EMC01/starbj81>./Tmax60_AIX_71_PowerPC_64.bin
Preparing to install...
Extracting the JRE from the installer archive...
Unpacking the JRE...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...

Preparing CONSOLE Mode Installation...

=====
Tmax60                (created with InstallAnywhere by Macrovision)
=====

=====
Introduction
-----

InstallAnywhere will guide you through the installation of Tmax60.

It is strongly recommended that you quit all programs before continuing with
this installation.

Respond to each prompt to proceed to the next step in the installation.  If you
want to change something on a previous step, type 'back'.

You may cancel this installation at any time by typing 'quit'.

PRESS <ENTER> TO CONTINUE:

```

5. The Tmax license agreement page appears.

```

=====
License Agreement
-----

Installation and use of Tmax60 requires acceptance of the following
License Agreement:

TP-Monitor Tmax Release
TmaxSoft Co., Ltd. (hereafter, TmaxSoft) End-User License Agreement

Product : Tmax

This is a legal agreement between you (either an individual or an company) and
TmaxSoft, Incorporated.  By opening the sealed software package and/or by using
the software, you agree to be bound by the terms of this agreement.

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1. Grant of License: This TmaxSoft License Agreement ("License") permits you
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the software is in use on only one computer at any one time.  If this package

```

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PRESS <ENTER> TO CONTINUE:

6. Press <Enter> to continue displaying the Tmax license agreement.

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PRESS <ENTER> TO CONTINUE:

7. Enter 'y' and press <Enter> to accept the terms of the license agreement, or enter 'n' to stop the installation.

PRESS <ENTER> TO CONTINUE:

DO YOU ACCEPT THE TERMS OF THIS LICENSE AGREEMENT? (Y/N):

8. Select the Tmax installation set.

'->' indicates the default value. If you press <Enter> without choosing an installation set, the default value of '1' is chosen. Press <Enter> or '1' to install the entire engine. Press '2' to install the Client only.

```

=====
Choose Install Set
-----

Please choose the Install Set to be installed by this installer.

->1- Server + Client
   2- Client

ENTER THE NUMBER FOR THE INSTALL SET, OR PRESS <ENTER> TO ACCEPT THE DEFAULT

```

9. Select the Installation directory.

Press <Enter> to use the default value, or enter a path that you want.

```

=====
Choose Install Folder
-----

Where would you like to install?

    Default Install Folder: /EMC01/QA/tmax

ENTER AN ABSOLUTE PATH, OR PRESS <ENTER> TO ACCEPT THE DEFAULT

```

10. Enter the IP address of a server in which the Tmax system will run. If an IP address is not entered, the IP address of a node in which Tmax is currently being installed is set by default.

```

=====
Set Environment Variable
-----

TMAX_HOST_ADDR  : IP Address of your Tmax Host.

TMAX_HOST_ADDR (DEFAULT: 192.168.1.87):

```

11. The pre-installation summary page appears. Press <Enter> to continue the installation.

```

=====
Pre-Installation Summary
-----

Please Review the Following Before Continuing:

Product Name:
    Tmax60

Install Folder:
    /EMC01/QA/tmax

Link Folder:

```

```
/EMC01/QA
```

Disk Space Information (for Installation Target):

Required: 269,490,714 bytes

Available: 431,792,128 bytes

PRESS <ENTER> TO CONTINUE:

12. The following message indicates that the Tmax installation is ready to start. Press <Enter> to start the installation.

```
=====
Ready To Install
-----

InstallAnywhere is now ready to install Tmax60 onto your system
at the following location:

    /EMC01/QA/tmax

PRESS <ENTER> TO INSTALL:
```

13. A progress bar shows the installation progress.

```
=====
Installing...
-----

[=====|=====|=====|=====]
[-----|-----|-----|-----]

=====
Installation Complete
-----

Congratulations. Tmax60 has been successfully installed to:

    /EMC01/QA/tmax

PRESS <ENTER> TO EXIT THE INSTALLER:
```

14. Press <Enter> to complete the installation.

```
PRESS <ENTER> TO EXIT THE INSTALLER:
```



1. To install only Tmax Client, press '2' in the step 8.
2. If Tmax Server was successfully installed and started with a developed application, verify that the service operates correctly on various platforms. Install Tmax Client and develop a client program to use the service. The Tmax

Client module does not require a license and can be downloaded from the technical support site.

3. For information about post-installation tasks, refer to [Configuration](#). For information about how to test Tmax by using sample programs, refer to [Testing the Tmax Installation](#).

2.3. Installation Verification

Installing Tmax creates the following directories.

```
$Tmax HOME
+---- appbin
+---- bin
+---- config
+---- lib (or lib64)
+---- license
|---- log
|     +---- slog
|     +---- tlog
|     +---- ulog
+---- mod
+---- path
+---- run
|---- sample
|     +---- client
|     +---- tdl
|     +---- fdl
|     +---- sdl
|     +---- server
+---- svct
+---- usrinc
+---- topinc
+---- cobinc
+---- tuxinc
+---- tcpgw
+---- tcpgwthr
+---- x25gw
+---- UninstallerData
+---- bk_appbin
```

\$Tmax HOME

Tmax system home directory. (System variable: TMAXDIR, configuration file item: TMAXDIR)

appbin

Contains server applications developed by using Tmax. (Configuration file item: APPDIR)

bin

Contains Tmax commands and utilities.

config

Contains the Tmax system configuration file.

lib (or lib64 for 64-bit)

Contains the Tmax library.

license

Contains the license file.

log

Contains log files.

Subdirectory	Description
slog	Contains system log files. (Configuration file item: SLOGDIR)
tlog	Contains transaction log files. (Configuration file item: TLOGDIR)
ulog	Contains user log files. (Configuration file item: ULOGDIR)

mod

Contains the library to update when using TDL.

path

Used for inter-process communications. (Configuration file item: PATHDIR)

run

Contains libraries to which a version is assigned after tdlupdate when using TDL.

sample

Directory	Description
client	Contains a sample client program.
tdl	Contains a sample TDL program.
fdl	Contains a sample field key definition file (demo.f). (System variable: FDLFILE)
sdl	Contains a sample structure definition file (demo.s). (System variable: SDLFILE)
server	Contains a sample server program.

svct

Contains a service table file used to compile server applications.

usrinc

Contains Tmax header files.

demo.f defines Field Definition Language (FDL) fields. demo.s defines Structure Definition Language (SDL) fields. Users can create FDL and SDL fields.

topinc

Contains header files used to migrate AT&T's Top End to Tmax.

cobinc

Contains COBOL header files.

tuxinc

Contains header files used to migrate BEA's Tuxedo to Tmax.

tcpgw

Contains TCPGW header files.

tcpgwthr

Contains TCPGW THR header files.

x25gw

Contains x25gw header files.

UninstallerData

Contains files used to uninstall Tmax.

bk_appbin (optional)

User-created directory. A new process is installed in this directory to replace a server process in use. (System variable: TMAX_BKAPPPDIR)



For more information, refer to *Tmax Application Development Guide* and *Tmax Reference Guide*.

2.4. Configuration

2.4.1. License File Installation

Install the license file to activate Tmax or to use Tmax services via WebT. However, you do not need to install the license file to use only the Tmax Client because the Client does not require a license.

A license is also required to use the following functions.

Function	Description
Domain Gateway	Used for communication between separate Tmax domains.
Reliable Queue	Used to use a reliable queue.
HostLink	Used to integrate a Tmax Server with a mainframe.
WebT	Used to use Tmax services in web.

If Tmax is installed successfully, the ncpu file is located in the license directory. You can get information required to get a license by executing the ncpu utility as follows:

```
./ncpu
```

The result is as follows:

```
HOST NAME1: tmaxs1
HOST NAME2: tmaxs1
HOSTID: 80FD0534
HOSTID: 80FD0534
H/W SERIAL: 2164065588
NCPUS: 2
UNAME: SunOS tmaxs1 5.7 Generic_106541-11 sun4u sparc
SUNW,Ultra-80
```

A demo license can be used without functional limitations for a limited period. For information about how to download a demo license, refer to [Downloading Software](#).

2.4.2. Configuring Environment Variables

The C compiler (cc) and the make utility (make) are required to compile Tmax applications or to develop applications at the site where the Tmax Server is installed. Confirm that the PATH environment variable is set to the directory that includes the C compiler and the make utility.

The following shows Tmax system environment variables that are added to **.profile** after the Tmax installation from the Bourne or Korn shell. The variables may differ depending on the platform.

```
# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 1.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
TMAXDIR=/data/tmaxha/tmax
export TMAXDIR
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 1.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 2.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
PATH="/data/tmaxha/tmax/bin:${PATH}"
export PATH
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 2.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 3.
```



```

# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
TMAX_HOST_ADDR=192.168.1.86
export TMAX_HOST_ADDR
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 3.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 4.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
TMAX_HOST_PORT=8888
export TMAX_HOST_PORT
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 4.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 5.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
SDLFILE=/data/tmaxha/tmax/sample/sdl/tmax.sdl
export SDLFILE
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 5.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 6.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
FDLFILE=/data/tmaxha/tmax/sample/fdl/tmax.fdl
export FDLFILE
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 6.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 7.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
TMAX_CONNECT_TIMEOUT=3
export TMAX_CONNECT_TIMEOUT
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 7.

# New environment setting added by Tmax60 on Wed Jul 29 19:35:02 KST 2015 8.
# The unmodified version of this file is saved in /data/tmaxha/.profile330356837.
# Do NOT modify these lines; they are used to uninstall.
LIBPATH="${LIBPATH}:/data/tmaxha/tmax/lib64"
export LIBPATH
# End comments by InstallAnywhere on Wed Jul 29 19:35:02 KST 2015 8.

```

The following describes each environment variable.

Variable	Description
TMAXDIR	Tmax installation directory.
TMAX_HOST_ADDR	IP address of the Tmax Server.
TMAX_HOST_PORT	Port number of the Tmax Server. The port number must be identical to the value set in TPORTNO of the Tmax Server's configuration file (sample.m).
SDLFILE	Location of the SDL binary file (filename.sdl), which is required to use structure buffers. Set this variable only to use structure buffers.
FDLFILE	The location of the FDL binary file (filename.fdl), which required to use field key buffers. Set this variable only to use field key buffers.

Variable	Description
TMAX_CONNECT_TIME OUT	Tmax system connection timeout.
LD_LIBRARY_PATH	Shared library path. The environment variable is different depending on the OS as follows: <ul style="list-style-type: none"> • Solaris, Linux: LD_LIBRARY_PATH • HP-UX: SHLIB_PATH • AIX: LIBPATH
TMAX_BACKUP_ADDR	IP address of the backup Tmax Server.
TMAX_BACKUP_PORT	Port number of the backup Tmax Server. The port number must be identical to the value set in TPORTNO of the backup Tmax Server's configuration file (filename.m).

Since Tmax provides shared libraries, you do not have to re-compile server applications whenever installing a patch or new version. Tmax provides both static and shared libraries. However, Tmax provides only some shared libraries for AIX.

To use shared libraries, include them in applications and set FLAGS in each OS compiler. The shared library directory is set automatically in the configuration file (LD_LIBRARY_PATH, SHLIB_PATH, or LIBPATH) when installing Tmax.

The following are compilation options for each platform.

- Solaris 32-bit and Linux

```
CFLAGS = -O -I$(TMAXDIR)
```

- Solaris 5.7-5.9 64-bit

```
CFLAGS = -xarch=v9 -O -I$(TMAXDIR)
```

- Solaris 5.10 64-bit

```
CFLAGS = -m64 -O -I$(TMAXDIR)
```

- HP PA-RISC 32-bit

```
CFLAGS = -Ae -O -I$(TMAXDIR)
```

- HP PA-RISC 64-bit

```
CFLAGS = -Ae +DA2.0W +DD64 +DS2.0 -O -I$(TMAXDIR)
```

- HP Itanium 32bit

```
CFLAGS = -O -Ae -w +DSblended +DD32 -D_HP -I$(TMAXDIR)
```

- HP Itanium 64-bit

```
CFLAGS = -O -Ae -w +DSblended +DD64 -D_HP -I$(TMAXDIR)
```

- IBM 32-bit

```
CFLAGS = -q32 -brtl -O -I$(TMAXDIR)
```

- IBM 64-bit

```
CFLAGS = -q64 -brtl -O -I$(TMAXDIR)
```

Apply the Tmax environment variables from the home directory as follows:

- Bourne or Korn shell

```
. ~/.profile
```

- C shell

```
source .cshrc
```

Check whether the environment variables are set properly by using the env or set command.



For more information, refer to *Tmax Getting Started Guide* or *Tmax Application Development Guide*.

2.4.3. Configuring sample.m

sample.m is a Tmax system configuration file written in ASCII. Compile the file to create a binary file used to start and end Tmax by using the cfl utility.

The following is sample sample.m.

```

*DOMAIN
tmax1      SHMKEY = 79990, MINCLH = 1, MAXCLH = 3,
           TPORTNO = 8888, BLOCKTIME = 30

*NODE
tmaxs2     TMAXDIR = "/user/mmidea/tmax",
           APPDIR  = "/user/mmidea/tmax/appbin",
           PATHDIR = "/user/mmidea/tmax/path",
           TLOGDIR = "/user/mmidea/tmax/log/tlog",
           ULOGDIR = "/user/mmidea/tmax/log/ulog",
           SLOGDIR = "/user/mmidea/tmax/log/slog"

*SVRGROUP
svg1       NODENAME = tmaxs2

*SERVER
svr1       SVGNAME = svg1, MIN = 1

*SERVICE
SDLTOUPPER SVRNAME = svr1
SDLTOLOWER SVRNAME = svr1

```

2.5. Testing the Tmax Installation

Test the Tmax installation as follows:

The following are an environment and files for the testing.

- Environment

Item	Description
Operating system	Solaris 5.7 32-bit
Shell	Korn
Path	\$TMAXDIR=/user/tmax

- Files

Name	Description
sample.m	Tmax configuration file (\$TMAXDIR/config)
svr1.c	Sample server program (\$TMAXDIR/sample/server)
sdltoupper.c	Sample client program (\$TMAXDIR/sample/client)
demo.s	Structure definition file (\$TMAXDIR/sample/sdl)
demo.f	Field key definition file (\$TMAXDIR/sample/fdl)
tmax.env	Tmax environment variable definition file (\$TMAXDIR/sample/client)

2.5.1. Basic Configuration

The following describes how to configure the basic environment.

1. Compile the configuration file in the \$TMAXDIR/config directory. sample.m is automatically created in TMAXDIR/config when Tmax is installed. TMAXDIR is the Tmax installation home directory.

```
$>cfl -i sample.m
```

If the configuration file is successfully compiled, the following message is displayed.

```
CFL is done successfully for node(<nodename>)
```



The host name set in sample.m may not be identical to the actual host name. For example, if executing the `uname -n` command displays `tmax1.tmax.co.kr` as a host name, this means that compiling sample.m failed. In this case, check a host name by using the `ncpu` utility in TMAXDIR/license, set the host name in sample.m, and get a license appropriate for the host name. For more information about `ncpu`, refer to [Configuration](#).

2. Create a service table as follows. A service table has information about services handled by each process. It is used when a server process is created.

```
$>gst
```

If the service table is created successfully, the following message is displayed.

```
SVC tables are successfully generated GST is successfully done
```

3. Create a binary structure definition file in the TMAXDIR/sample/sdl directory by using the `sdlc` command. Since a server and a client use different files, use different options for the server and the client. Although `sdlc` is executed successfully, no message is displayed.

- For a server

```
$>sdlc -i demo.s
```

Executing the previous command creates `demo_sdl.h` and `demo_sdl.c`. The files are used when compiling server programs that use structure buffer.

The sample makefile has a routine to execute `sdlc` when compiling server programs that use

structure buffers. However, it is recommended to execute sdlc before the compilation.

- For a client

```
$>sdlc -c -i demo.s -o tmax.sdl
```

Executing the previous command created demo_sdl.h and tmax.sdl. If the -o option is not used in the previous command, the result sdl file is named as <structure file name>.sdl by default. The created files are used when client programs that use structure buffers allocate memory to the buffers.

The result sdl file is located and named by referring to SDLFILE set in a user configuration file. When Tmax is installed, the installer sets TMAXDIR/sample/sdl/ tmax.sdl to SDLFILE by default. To use the default value, specify the result file name as tmax.sdl by using the -o option.

4. Create a binary field key file in the TMAXDIR/sample/fdl directory by using the fdlc command for both the server and the client.

```
$>fdlc -c -i demo.f
```

If the file is created successfully, the following message is displayed.

```
FDLC is successfully done
```

2.5.2. Compiling a Server Program

Compile a server program that provides a service in the TMAXDIR/sample/server directory.

```
$>./compile sdl svr1
```

If the program is successfully compiled, the following message is displayed.

```
cc -O -I/user/tmax -c svr1.c
cc -O -I/user/tmax -L/user/tmax/lib -o svr1 svr1.o demo_sdl.o svr1_svctab.o
-lsvr -lnsl -lsocket -lnodb
mv svr1 /user/tmax/appbin
```

/user/tmax/appbin in the last line can be replaced with a directory that includes service programs. The directory can be set in Tmax configuration file by a user.



For more information, refer to *Tmax Administrator's Guide*.

2.5.3. Starting Tmax

Start Tmax with the following command.

```
$>tmboot
```

If Tmax starts successfully, the following message is displayed.

```
TMBOOT for node(qpsx2) is starting:
  TMBOOT: TMM is starting: Fri Jul 24 00:51:48 2015
(I) TMAX00127 General Infomation :event mechanism is epoll [EVT0003]
  TMBOOT: CLL is starting: Fri Jul 24 00:51:48 2015
  TMBOOT: CLH is starting: Fri Jul 24 00:51:48 2015
(I) TMAX00127 General Infomation :event mechanism is epoll [EVT0003]
(I) TMAX00593 Current Tmax Configuration: Number of client handler(MINCLH) = 1
  Supported maximum user per node = 65073
  Supported maximum user per handler = 65073 [CLH0141]
  TMBOOT: CAS(cas) is starting: Fri Jul 24 00:51:48 2015
(I) TMAX00127 General Infomation :event mechanism is epoll [EVT0003]
  TMBOOT: TLM(tlm) is starting: Fri Jul 24 00:51:49 2015
  TMBOOT: SVR(svr1) is starting: Fri Jul 24 00:51:49 2015
```



The **<nodename>**, **Supported maximum user per node**, and **Supported maximum user per handler** values differ depending on the system.

Tmax may not start successfully in the following cases. If Tmax starts abnormally or an error messages is displayed, check the following, take appropriate action, and then restart Tmax.

- TPORTNO and TPORTNO+1 set in the Tmax configuration file are already used by the system.
- The value set in SHMKEY is already used by the system.
- The Tmax configuration file is not compiled successfully with cfl.
- Service programs registered in the Tmax configuration file are not all compiled.

2.5.4. Compiling and Executing a Client Program

The following are the steps for compiling and executing a client program.

1. Compile a client program in the TMAXDIR/sample/client directory.

```
TMAXDIR/sample/client
```

```
$>./compile c sdltoupper
```

If the program is successfully compiled, the following message is displayed.

```
cc -O -I/user/tmax -c sdltoupper.c
cc -O -I/user/tmax -L/user/tmax/lib -o sdltoupper sdltoupper.o -lcli -lnsl -lsocket
```

2. Check that tmax.env exists in the current directory (sample/client). tmax.env is a text file that defines environment variables used for a client to access the Tmax system.

Execute the client program.

```
$>./sdltoupper tmax
```

If the service is executed successfully, the following message is displayed, which means that Tmax is installed successfully.

```
send data: tmax
recv data: TMAX
```

The following describes sample files provided by Tmax.

Client	Server	Compilation	Remarks
sdltoupper.c	svr1.c	compile sdl svr1	Structure buffer
sdltolower.c			
toupper.c	svr2.c	compile c svr2	String buffer
tolower.c			
fdltoupper.c	svr3.c	compile c svr3	Field key buffer
fdlttolower.c			
sdl_main.c	sdltest.pc	compile psdl sdltest	Structure buffer, Oracle interface
fdl_main.c	fdltest.pc	compile pc fdltest	Field key buffer, Oracle interface
toupper_conv.c	svr_conv.c	compile c svr_conv	Interactive service
toupper_rq.c	svr_rq.c	compile c svr_rq	RQ service
cli_rq.c			
cli_ucs.c	svr_ucs	compile ucs svr_ucs	UCS program

2.6. Uninstallation

To uninstall Tmax by using the Full installer, execute the following. Executing the following deletes Tmax engine, installation directory, and environment variables.

```
$TMAXDIR/UninstallerData/Uninstall
```



Manually delete files created after the Tmax installation because they are not deleted automatically.

The following are the steps for uninstalling Tmax.

1. Execute Uninstall.exe. Check the uninstallation information.

```
tmaxh4@QA:/EMC01/QA/tmax/UninstallerData>./Uninstall
Preparing CONSOLE Mode Installation...

=====
Tmax60                (created with InstallAnywhere by Macrovision)
-----

=====
Uninstall Tmax60
-----

About to uninstall...

Tmax60

This will remove features installed by InstallAnywhere. It will not remove
files and folders created after the installation.

PRESS <ENTER> TO CONTINUE:
```

2. Press <Enter> to begin the uninstallation.

```
=====
Uninstalling...
-----

...*
*
*****
*****
*****
*****
...*
*
```

```

*****
*****
*****
*****

...*
*

*****
*****
*****
*****

...*
*

*****
*****
*****
*****

=====
Uninstall Complete
-----

Some items could not be removed.

```

3. Verify that the uninstallation is successful.

2.6.1. Checking Uninstallation

Verify the uninstallation by checking the following.

- Files and directories

Confirm that all files and directories under the \$TMAXDIR (default value: \$HOME/tmax) directory have been deleted. Manually delete files created after the Tmax installation because they are not deleted automatically.

- Environment variables

Confirm that Tmax-related environment variables have been deleted.

- PATH

Confirm that Tmax paths such as \$HOME/tmax/bin have been deleted.

Appendix A: Compiling TMS

Transaction Management Server (TMS) is a process of a Tmax system that is responsible for database management and distributed transaction processing. This appendix describes how to create a binary TMS for Tibero, Oracle, and Informix DBMSs.

DBMS stub provided by Tmax is available in any versions of Tmax.

A.1. TMS for Tibero DBMS

Create a binary TMS file for Tibero by compiling `tms_tbr.mk`, provided by Tmax, located in the following directory. **TMAXDIR** is the Tmax installation directory.

```
TMAXDIR/sample/server
```

The following are the steps for compiling `tms_tbr.mk`.

1. Log in to Tmax with a Tmax user account.

```
$su - tmax
```

2. Export Tibero environment variables. Copy them to a shell configuration file and apply them.

The following is an example of Tibero environment variables.

```
## Tibero Environment ##
export TB_HOME=/program/tibero4
export TB_SID=tibero
export TB_PROF_DIR=$TB_HOME/bin/prof
export PATH=.:$TB_HOME/bin:$TB_HOME/client/bin:$PATH
export LD_LIBRARY_PATH=$TB_HOME/lib:$TB_HOME/client/lib:$LD_LIBRARY_PATH
export LD_LIBRARY_PATH_64=$LD_LIBRARY_PATH_64:$TB_HOME/lib:$TB_HOME/client/lib
export SHLIB_PATH=${SHLIB_PATH}:$TB_HOME/lib:$TB_HOME/client/lib
```

3. Go to the `$TMAXDIR/sample/server` directory.

```
cd $TMAXDIR/sample/server
```

4. Compile `tms_tbr.mk` to create a binary TMS file for Tibero.

```
$make -f tms_tbr.mk all
```

5. The binary TMS file is generated in the following directory. The file is loaded to memory when

Tmax starts and supports two-phase commit in a Tmax system to enable global transactions through an XA interface.

```
$TMAXDIR/appbin
```



For more information about the Tmax configuration file required to run TMS for Tiberio, refer to \$TMAXDIR/config/sample.m.

A.2. TMS for Oracle DBMS

Create a binary TMS file for Oracle by compiling tms_ora.mk, provided by Tmax, located in the following directory. **TMAXDIR** is the Tmax installation directory.

```
TMAXDIR/sample/server
```

The following are the steps for compiling tms_ora.mk.

1. Log in to Tmax with a Tmax user account.

```
$su - tmax
```

2. Export Oracle environment variables. Copy them to a shell configuration file and apply them.

The following is an example of Oracle environment variables.

```
## Oracle Environment ## ORACLE_HOME=/oracle/app/oracle/product/8.0.5;
export ORACLE_HOME PATH=$PATH:$ORACLE_HOME/bin; export PATH ORACLE_SID=ora805;
export ORACLE_SID NLS_LANG=American_America.KO16KSC5601;
export NLS_LANG ORA_NLS33=$ORACLE_HOME/ocommon/nls/admin/data;
export ORA_NLS33 LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib;
export LD_LIBRARY_PATH
```

3. Go to the \$TMAXDIR/sample/server directory.

```
cd $TMAXDIR/sample/server
```

4. Compile tms_ora.mk to create a binary TMS file for Oracle.

```
$make -f tms_ora.mk all
```

5. The binary TMS file is generated in the following directory. The file is loaded to memory when

Tmax starts and supports two-phase commit in a Tmax system to enable global transactions through an XA interface.

```
$TMAXDIR/appbin
```



For more information about the Tmax configuration file required to run TMS for Oracle, refer to `$TMAXDIR/config/sample.m`.

A.3. TMS for Informix DBMS

Create a binary TMS file for Informix by compiling `tms_info.mk`, provided by Tmax, located in the following directory. **TMAXDIR** is the Tmax installation directory.

```
TMAXDIR/sample/server
```

The following are the steps for compiling `tms_info.mk`.

1. Log in to Tmax with a Tmax user account.

```
$su - tmax
```

2. Export Informix environment variables. Copy them to a shell configuration file and apply them.

The following is an example of Informix environment variables.

```
## Informix Environment ##
export PATH=$PATH:/data2/informix/bin:$HOME/bin
export INFORMIXDIR=/data2/informix
export INFORMIXDIR=/data2/ids93fc
export INFORMIXSERVER=ids93fc
export LD_LIBRARY_PATH=$INFORMIXDIR/lib:$INFORMIXDIR/lib/esql
export TERMCAP=$INFORMIXDIR/etc/termcap
```

3. Go to the `$TMAXDIR/sample/server` directory.

```
$cd $TMAXDIR/sample/server
```

4. Compile `tms_info.mk` to create a binary TMS file for Informix.

```
$make -f tms_info.mk all
```

5. The binary TMS file is generated in the following directory. The file is loaded to memory when Tmax starts and supports two-phase commit in a Tmax system to enable global transactions through an XA interface. (The -lifxa flag of INFOLIBS enables to use an XA interface that supports two-phase commit.)

`$TMAXDIR/appbin`



For more information about the Tmax configuration file required to run TMS for Informix, refer to `$TMAXDIR/config/sample.m`.

Appendix B: System Requirements for Each Platform

This appendix describes system requirements to use Tmax. The exact amount of disk space required varies depending on the system, application programs, and user logging information. A compiler is only required to develop Tmax applications.

B.1. HP-UX

B.1.1. HP-UX v10.20 on HP9000 Series

- Hardware requirements

Category	Requirement
Platform	HP PA-RISC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	HP-UX 10.20
Compiler	HP-UX ANSI C Compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM

```
$su - $mkdir /cdrom $mount -F cdfs -o cdcase /dev/dsk/cdrom_devicename /cdrom
```

B.1.2. HP-UX v11.00 on HP9000 Series

- Hardware requirements

Category	Requirement
Platform	HP PA-RISC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	HP-UX 11.0 (64-bit architecture support)
Compiler	HP-UX ANSI C Compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM

```
$su - $mkdir /cdrom $mount -F cdfs -o cdcase /dev/dsk/cdrom_devicename /cdrom
```

B.1.3. HP-UX v11.11 on HP9000 Series

- Hardware requirements

Category	Requirement
Platform	HP PA-RISC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	HP-UX 11.11 (64-bit architecture support)
Compiler	HP-UX ANSI C Compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM

```
$su - $mkdir /cdrom $mount -F cdfs -o cdcase /dev/dsk/cdrom_devicename /cdrom
```

B.1.4. HP-UX v11i on Itanium

- Hardware requirements

Category	Requirement
Platform	HP Intel Itanium-based servers

Category	Requirement
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	HP-UX 11i (64-bit architecture support)
Compiler	HP ANSI C compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM

```
$su - $mkdir /cdrom $mount -F cdfs -o cdcase /dev/dsk/cdrom_devicename /cdrom
```

B.2. IBM AIX

B.2.1. IBM AIX v4.3.x on RS/6000

- Hardware requirements

Category	Requirement
Platform	IBM PowerPC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	AIX v4.3.x (64-bit architecture support)
Compiler	AIX XL C Compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - Use the smit or smitty utility.

```
$smitty mount
```

B.2.2. IBM AIX v5.1.x on RS/6000

- Hardware requirements

Category	Requirement
Platform	IBM PowerPC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	AIX v5.1.x (64-bit architecture support)
Compiler	AIX XL C Compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - Use the smit or smitty utility.

```
$smitty mount
```

B.3. SUN Solaris

B.3.1. SUN Solaris v2.5.1 (SunOS 5.5.1) on SPARC

- Hardware requirements

Category	Requirement
Platform	SUN UltraSPARC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	SunOS 5.5.1
Compiler	SparCompiler C 4.0 or later

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - The CD-ROM is automatically mounted to /cdrom when inserted.

B.3.2. SUN Solaris v2.6 (SunOS 5.6) on UltraSPARC

- Hardware requirements

Category	Requirement
Platform	SUN UltraSPARC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	SunOS 5.6
Compiler	SparCompiler C 4.0 or later

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - The CD-ROM is automatically mounted to /cdrom when inserted.

B.3.3. SUN Solaris v2.7 (SunOS 5.7) on UltraSPARC

- Hardware requirements

Category	Requirement
Platform	SUN UltraSPARC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	SunOS 5.7 (64-bit architecture support)
Compiler	SparCompiler C 4.0 or later

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - The CD-ROM is automatically mounted to /cdrom when inserted.

B.3.4. SUN Solaris v2.8 (SunOS 5.8) on UltraSPARC

- Hardware requirements

Category	Requirement
Platform	SUN UltraSPARC
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	SunOS 5.8 (64-bit architecture support)
Compiler	SparCompiler C 4.0 or later

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - The CD-ROM is automatically mounted to /cdrom when inserted.

B.3.5. SUN Solaris 8 on x86

- Hardware requirements

Category	Requirement
Platform	Intel x86 servers
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	Solaris 8
Compiler	SUN ANSI C compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM
 - The CD-ROM is automatically mounted to /cdrom when inserted.

B.4. SCO UnixWare

B.4.1. SCO UnixWare 7 on x86

- Hardware requirements

Category	Requirement
Platform	Intel x86 servers
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	UnixWare 7.1
Compiler	UnixWare ANSI C compiler

- Network
 - TCP/IP network
- Mounting the CD-ROM

```
$mount -r -F cdfs /dev/cdrom/cdrom1 /mnt
```

B.4.2. SCO UnixWare 2 on x86

- Hardware requirements

Category	Requirement
Platform	Intel x86 servers
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	UnixWare 2.1
Compiler	UnixWare ANSI C compiler

- Network
 - TCP/IP network

- Mounting the CD-ROM

```
$mount -r -F cdfs /dev/cdrom/cdrom1 /mnt
```

B.5. NCR MP-RAS v03.02 on x86

- Hardware requirements

Category	Requirement
Platform	NCR Intel x86 SMP servers
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	NCR UNIX SVR4 MP-RAS 03.02
Compiler	NCR High Performance C Compiler

- Network
 - TCP/IP network

B.6. Red Hat Linux 7.x on Intel

- Hardware requirements

Category	Requirement
Platform	Based on Intel CPU
Memory	More than 256 MB RAM (512 MB or more recommended)
Disk space	More than 500 MB hard disk space (1 GB or more recommended)

- Software requirements

Category	Requirement
Operating system	Red Hat Linux and other Linux versions (Kernel 2.0 and later)
Compiler	Required only when developing Tmax applications

- Network

- TCP/IP network

- Mounting the CD-ROM

- If the /mnt/cdrom directory does not exist, create a directory by using the super user privilege.

```
$mkdir /mnt/cdrom $mount /mnt/cdrom
```

or

```
$mkdir /mnt/cdrom $mount /mnt/cdrom
```