Tibero

Installation Guide

Tibero 6

Manual Information

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About This Document

Intended Audience

This document is intended for database users who want to install or uninstall Tibero® (hereafter Tibero).

Required Knowledge

This document explains how to install Tibero. To fully understand this guide, users need to have an understanding of the following.

- Database
- RDBMS
- Basic knowledge of OSs and system environments
- Basic knowledge of UNIX and Linux

Document Scope

This guide does not contain all the information needed for the actual application or operation of Tibero.

Document Organization

This guide consists of 7 chapters and appendixes.

Descriptions for each are as follows.

- Chapter 1: Installation Overview

  Briefly introduces Tibero and describes the system requirements for installation.

- Chapter 2: Pre-installation Tasks

  Describes pre-installation tasks including verification of sufficient disk space and configuration of certain settings.

- Chapter 3: Installation

  Describes how to install Tibero.

- Chapter 4: Uninstallation

  Describes how to uninstall Tibero.

- Chapter 5: Client Installation and Uninstallation

  Describes how to install a client by using the installer in Windows.

- Chapter 6: Multi-instance Installation

  Describes how to install multiple instances.

- Chapter 7: TAC (Tibero Active Cluster) Installation

  Describes how to install Tibero

- Appendix A: Troubleshooting

  Describes how to solve problems that may occur after Tibero is installed.

- Appendix B: Mounting a CD-ROM

  Describes how to mount a CD-ROM for each platform.

- Appendix C: Supported Character Sets

  Describes the character sets supported in Tibero.

- Appendix D: system.sh

  Describes the options when running system.sh (vbs).

- Appendix E: Configuring HugePage

  Describes how to configure HugePage for each operating system.

Conventions

Convention	Meaning
<AaBbCc123>	Filename of a program or source code
<Ctrl>+C	Hold the Control key and press C
[Button]	Button or Menu name
Boldface	Emphasis
" " (double quotes)	Reference to chapters or sections in the manual, or to other related documentation
'Input Item'	Description for an input item on the screen
`Hyperlink`	E-mail account, website, or a link to other chapters or sections
>	Progress order of menus
+----	Files or directories exist below
|----	Files or directories do not exist below
Note	Reference or note
[Figure 1.1]	Figure name
[Table 1.1]	Table name
`AaBbCc123`	Command, execution result, or example code
{ }	Required argument
[ ]	Optional argument

Related Documents

Guide	Description
Tibero tbCLIGuide	Describes the tbCLI (Call Level Interface) concept, components, and program structures, as well as the data types, functions, and error messages needed to write tbCLI applications.
Tibero Application Developer's Guide	Describes how to develop application programs by using application libraries.
Tibero External Procedure Guide	Describes how to create and use external procedures.
Tibero JDBC Developer's Guide	Describes how to develop application programs by using the JDBC functions provided in Tibero.
Tibero tbESQL/C Guide	Describes how to create various database application programs in the C programming language.
Tibero tbESQL/COBOL Guide	Describes how to create various database application programs in the COBOL programming language.
Tibero tbPSM Guide	Introduces the concepts, syntax, and components of tbPSM (Procedure Storage Module). This guide also describes how to execute the control structure, complex type, sub programs, packages, and SQL statements required for creating a tbPSM program and to handle any errors.
Tibero tbPSM Reference Guide	Introduces the tbPSM package, a storage procedure module. This guide also describes the prototypes, parameters, and examples of each procedure and function included in this package.
Tibero Administrator's Guide	Describes how to manage Tibero in order to guarantee smooth operation. This guide also describes the various functions that support management.
Tibero tbAdmin Guide	Introduces tbAdmin, a GUI based tool that provides SQL/PSM processing and system management function for DBAs. This guide also describes installation and operation.
Tibero Utility Guide	Describes how to install, use, and configure the utilities that handle database related operations.

Guide	Description
Tibero Error Reference Guide	Describes troubleshooting methods for various errors that may occur while using Tibero.
Tibero Reference Guide	Describes the initialization parameters, data dictionary, and static and dynamic views used by Tibero .
Tibero SQL Reference Guide	Describes the SQL statements required for creating application programs or operating a database.
Tibero Spatial Reference Guide	Describes the geometry type and spatial procedures and functions of Tibero and how to use them.
Tibero TEXT Reference Guide	Describes how to create and use the text index provided by Tibero.
Tibero Hadoop Connector Guide	Describes how to use the Tibero Hadoop Connector.

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Chapter 1. Installation Overview

This chapter briefly introduces Tibero and describes the system requirements for installation.

1.1. Overview

The current enterprise business rapidly expanded with the explosive increase of data and the advent of a variety of environments and platforms. This new business environment requires more flexible and efficient data services, information handling, and data management functions.

Tibero is an enterprise database management system that supports building a database infrastructure on which enterprise business is implemented and provides high performance, high availability, and scalability.

To make up for the disadvantages of existing DBs, Tibero implemented its own Tibero thread architecture. It also uses system resources such as CPU and memory efficiently, guarantees high performance and reliability, and provides a convenient development environment and management features.

Tibero was developed to handle a large number of users and large amounts of data while offering reliability and compatibility.

Tibero is a data management solution that manages large amounts of data and guarantees reliable business continuity. Tibero has all of the features needed for an RDBMS environment such as distributed database links, data replication, data clustering, and parallel query processing.

Tibero is a superior DB that supports an optimized database environment.

1.2. Installation Components

1.2.1. Package Components

Tiberopackage contains the following.

- One Tibero product CD
- Tibero product license and warranty
- Twenty Tibero guides
  - Tibero Release Notes
  - Tibero Installation Guide

- Tibero Administrator's Guide
- Tibero Application Developer Guide
- Tibero External Procedure Guide
- Tibero DB Hadoop Connector Guide
- Tibero JDBC Developer Guide
- Tibero tbAdmin Guide
- Tibero tbCLI Guide
- Tibero tbESQL/C Guide
- Tibero tbESQL/COBOL Guide
- Tibero tbPSM Guide
- Tibero tbPSM Reference Guide
- Tibero TEXT Reference Guide
- Tibero Spatial Reference Guide
- Tibero Active Storage Administrator's Guide
- Tibero Utility Guide
- Tibero Error Reference Guide
- Tibero Reference Guide
- Tibero SQL Reference Guide

1.2.2. Software Distribution Policy

The Tibero DB software distribution policy is as follows.

- Full Purchase Version

  Licensed by the number of CPUs and features.

- Evaluation Version

  A license that restricts the trial period and the number of users.

A demo license file can be download from TechNet.

```
http://technet.tmaxsoft.com/ko/front/main/main.do
```

1.3. System Requirements

1.3.1. Supported Platforms and Operating Systems

Tibero supports the following platforms and operating systems.

HW and SW Vendor	CPU	OS	Binary Bits
HP	Itanium	HP-UX 11i v2 (11.23) HP-UX 11i v3 (11.31)	64 bits
SUN	SPARC	Solaris 10	64 bits
	x86	Solaris 10	64 bits
IBM	PPC	AIX 5.3 AIX 6.1 AIX 7.1	64 bits
GNU	X86 (Pentium 4 or higher)	– 32 Bit Red Hat Enterprise Linux 4 Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6 SUSE Linux Enterprise Server 10 – 64 Bit Red Hat Enterprise Linux 4 Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6 Red Hat Enterprise Linux 7 SUSE Linux Enterprise Server 10	32 bits, 64 bits
	Itanium	Red Hat Enterprise Linux 4 Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	64 bits

HW and SW Vendor	CPU	OS	Binary Bits
		Red Hat Enterprise Linux 7	
	Power8 (Big / Little)	Red Hat Enterprise Linux 7	64 bits
Microsoft	Intel (x86), AMD64	– 32 Bit (Client Only) Windows 7 Windows Server 2008 – 64 Bit Windows 7 Windows Server 2008 Windows Server 2012	32 bits, 64 bits

1.3.2. Hardware Requirements

Hardware requirements for installing Tibero are as follows.

Platform	RAM	Swap Space	/tmp Directory Space	HDD Space (Full / Client Only)
LINUX/x86	1GB	2GB	500MB	2.5GB / 400MB
LINUX/Itanium	1GB	2GB	500MB	2.5GB / 400MB
LINUX/Power8 (Big / Little)	1GB	2GB	500MB	2.5GB / 400MB
HP-UX/itanium	1GB	2GB	500MB	3GB / 400MB
Solaris	1GB	2GB	500MB	2.5GB / 400MB
AIX	1GB	2GB	500MB	2.5GB / 400MB
Windows	1GB	-	-	2GB / 400MB

1.3.3. Software Requirements

Software requirements for installing Tibero are as follows.

Platform	OS	Compiler	JDK Version
LINUX/x86	Red Hat Enterprise Linux 4 kernel 2.6.9 or higher	Compiler supporting C99,	JDK 1.5.17 or higher

Platform	OS	Compiler	JDK Version
		gcc version 3.4.6 or higher	
LINUX/Itanium	Red Hat Enterprise Linux 4 kernel 2.6.9 or higher	Compiler supporting C99, gcc version 3.4.6 or higher	JDK 1.5.17 or higher
LINUX/Power8 (Big / Little)	Red Hat Enterprise Linux 7 kernel 3.10.0 or higher	Compiler supporting C99, gcc version 4.8.5 or higher	JDK 1.7.0 or higher
HP-UX/itanium	HP-UX 11i v2 (11.23) with BUNDLE11i (== HP-UX 11i v2 (B.11.23), September 2004) 64Bit kernel	Compiler supporting C99, HP aC++/ANSI C B3910B A.06.02	JDK 1.5 or higher for HP-UX
Solaris	Solaris 10 64Bit kernel	Compiler supporting C99, Sun C 5.8 2005/10/13	JDK 1.5.17 or higher
AIX	AIX 5L version 5.3 64Bit kernel AIX 6.1 64Bit kernel	Compiler supporting C99, IBM XL C/C++ Enterprise Edition V7.0	JDK 1.5.17 or higher
Windows	Windows 7 Windows Server 2008 Windows Server 2012(64bit Only)	Compiler supporting C99	JDK 1.5.17 or higher

Note

1. For Windows 32-bit, only the client is supported.

2. For Windows AMD64 (x64), **Microsoft Visual C++ 2008 Redistributable Package(x64)** and **Microsoft.NET Framework 3.5 SP1** must be installed for Tibero to function properly.

Chapter 2. Pre-installation Tasks

This chapter describes how to perform pre-installation tasks such as verifying hard disk space, installing JDK, and setting kernel parameters for each operating system.

2.1. Overview

Before Tibero is installed, the following tasks should be performed.

- Verify available disk space
- Install JDK
- Install packages for each operating system
- Set kernel parameters for each operating system
- Set shell limits for each operating system
- Set NTP server
- Verify host name, port number, system account, and localhost

2.2. Verifying Available Disk Space

At least 2 GB of free space is needed to install Tibero. After Tibero is installed, the free space is needed to create the database.

Note

For more information about hardware requirements, refer to section “1.3. System Requirements”.

To verify the free disk space, run the **df** command on a UNIX system, or check the related **property** of the hard disk on which Tibero will be installed, on a Windows system.

2.3. Installing JDK

To install Tibero, **JDK 1.5.17** or higher must be installed.

JDK can be downloaded from the following website.

```
http://www.oracle.com/technetwork/java/javase/downloads/index.html
```

If Oracle's JDK cannot be used, install an appropriate JDK. For example, the JDKs for HP-UX and AIX can be downloaded from the HP and IBM websites, respectively.

For JDK installation instructions for each operating system, refer to the following.

```
http://www.oracle.com/technetwork/java/index.html
```

Note

For JDK installation instructions for each operating system, refer to the following.

2.4. Installing Packages

This section describes the packages required for each operating system.

Packages of the following versions or higher must be installed in each package, and the package name or version may differ for each OS and version.

Platform	Packages
Linux	gcc-3.4.6-11 gcc-c++-3.4.6-11 libgcc-3.4.6-11 libstdc++-3.4.6-11 libstdc++-devel-3.4.6-11 compat-libstdc++-33-3.2.3-47.3 libaio-0.3.105-2 libaio-devel-0.3.105-2
Windows	WSH 5.6

2.5. Setting Kernel Parameters

The following describes how to set kernel parameters for each operating system. After the parameters are set, the system requires a reboot.

2.5.1. Linux

Kernel parameters for Linux are as follows.

Kernel Parameter	Value	File
semmsl semmns semopm semmni	10000 32000 10000 10000	/proc/sys/kernel/sem
shmall	ceil(shmmax/PAGE_SIZE)	/proc/sys/kernel/shmall
shmmax	Half of physical memory (byte)	/proc/sys/kernel/shmmax
shmmni	4096	/proc/sys/kernel/shmmni
file-max	6815744	/proc/sys/fs/file-max
ip_local_port_range	1024 ~ 65000	/proc/sys/net/ipv4/ip_local_port_range

2.5.2. Solaris

Kernel parameters for Solaris can be set in the /etc/system file.

The parameters for Solaris 10 are as follows:

Kernel Parameter	Value
project.max-sem-ids	Based on the _SEM_ARR parameter value, set to one of: – Y: Greater than equal to the system default value – N: Server's semaphore count + Total Tibero thread count
process.max-sem-nsems	10000
project.max-shm-memory	4294967295 (half of physical memory)
project.max-shm-ids	100

[Note]

For Solaris 10 and later versions, it is recommended to manage parameters for each user by creating a project.

The following is an example of configuring parameters for a specific user.

1. Create a project.

```
# projadd -c "tibero" 'user.tibero'
```

2. Configure the parameters.

```
# projmod -sK "project.max-shm-memory=(privileged,4294967295,deny)" user.tibero
```

3. Reconnect as the user.

   Check the parameter value changes as follows:

```
# prctl -n project.max-shm-memory -i project user.tibero
project: 100: user.tibero
NAME    PRIVILEGE       VALUE    FLAG   ACTION                       RECIPIENT
project.max-shm-memory
        privileged      4.00GB      -   deny                                 -
        system          16.0EB    max   deny                                 -
```

2.5.3. HP-UX

Kernel parameters for HP-UX are as follows.

Kernel Parameter	Recommended Expression or Value
nproc	4096
semmap	(semmni+2)
semmni	4096
semmns	(semmni*2)
semmnu	(nproc-4)
semvmx	32767
shmmax	Larger value among physical memory size (0X40000000) or 1073741824.
shmmni	512
shmseg	120

The kernel parameter values can be verified using the System Administration Manager (SAM).

1. Start the SAM program.

```
# /usr/sbin/sam
```

2. Select the kernel configuration section and configurable parameter section.
3. Verify the displayed parameter values and modify them as needed.
4. Close the SAM program.

2.5.4. AIX

Configuration of settings is not necessary because the kernel parameter is set to maximum size by default like the following:

```
semaphore = 10000
```

2.6. Setting Shell Limits

The following describes how to set kernel parameters for each operating system. After the parameters are set, the system requires a reboot.

- Linux

Parameter	Soft Limit	Hard Limit
nofile	1024	65536
nproc	2047	16384

- AIX

Parameter	Recommended Value
Soft FILE size	-1 (Unlimited)
Soft CPU time	-1 (Unlimited)
Soft DATA segment	-1 (Unlimited)
Soft STACK size	-1 (Unlimited)
Soft Real Memory size	-1 (Unlimited)

- Solaris

Parameter	Soft Limit	Hard Limit
nofile	1024	65536
nproc	2047	16384

2.7. Setting NTP Server

System time is set backwards due to the xntpd daemon during database operations. Synchronize the system time to prevent input of invalid data and then restart the daemon by using the '-x' option.

```
# stopsrc -s xntpd
# startsrc -s xntpd -a "-x"
```

To apply the option when the system is restarting, remove the comment mark for the following in "/etc/rc.tcpip".

```
start /usr/sbin/xntpd "$src_running" "-x"
```

2.8. Verifying Host Name, Port Number, System Account, and localhost

TThe host name, port number, system account, and localhost should be verified before Tibero is installed.

- Host name

  Verify the host name when the license is requested. Confirm via the /etc/hosts file, or run the following command via the console:

  ```
  uname –n
  ```

- Port number

  Verify the port number when Tibero starts. The default value is **8629**.

- System account

  Verify the system account with which Tibero is installed and operated.

- localhost

  Use the ping command to verify that the localhost is configured correctly. If it is not configured correctly, modify the /etc/hosts file.

  ```
  ping localhost
  ```

Chapter 3. Installation

This chapter describes how to install Tibero.

3.1. Overview

Tibero can be installed manually or through an installer.

- Using the Installer

  The installer is provided in the form of tibero6_<*fixset*>_<*platform*>.[bin|exe]. The installer offers two installation methods:

  – GUI mode (Windows)

  – Console mode (Linux)

- Manual

  All platforms are provided in the form of tibero6-bin-<*fixset*>_<*platform*>.tar.gz.

3.2. Using the Installer

3.2.1. GUI Mode (Windows)

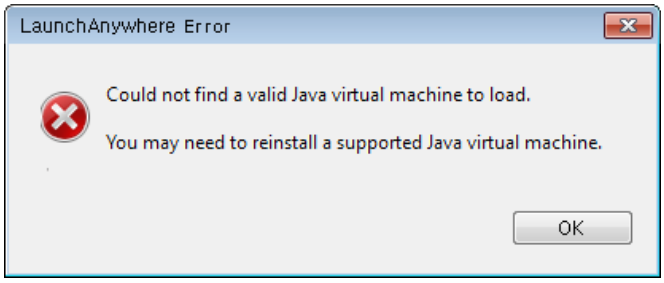
The following is the Tibero installation process for Windows.

1. Insert the Tibero installation CD into the CD-ROM drive. Double-click on the tibero6_<*fixset*>_<*platform*>.exe file to start the Tibero 6 installer.

   [Note]

   If the installer is executed in an environment without Java Virtual Machine (JVM), it fails to execute and the following message is displayed. Check the Java environment of the system where the installer is executed.

[Figure 3.1] JVM Error



2. After the installer starts, the following screen is displayed. Select a language and then click **[OK]**. Installation is available in Korean and English.

[Figure 3.2] Installation Language Screen

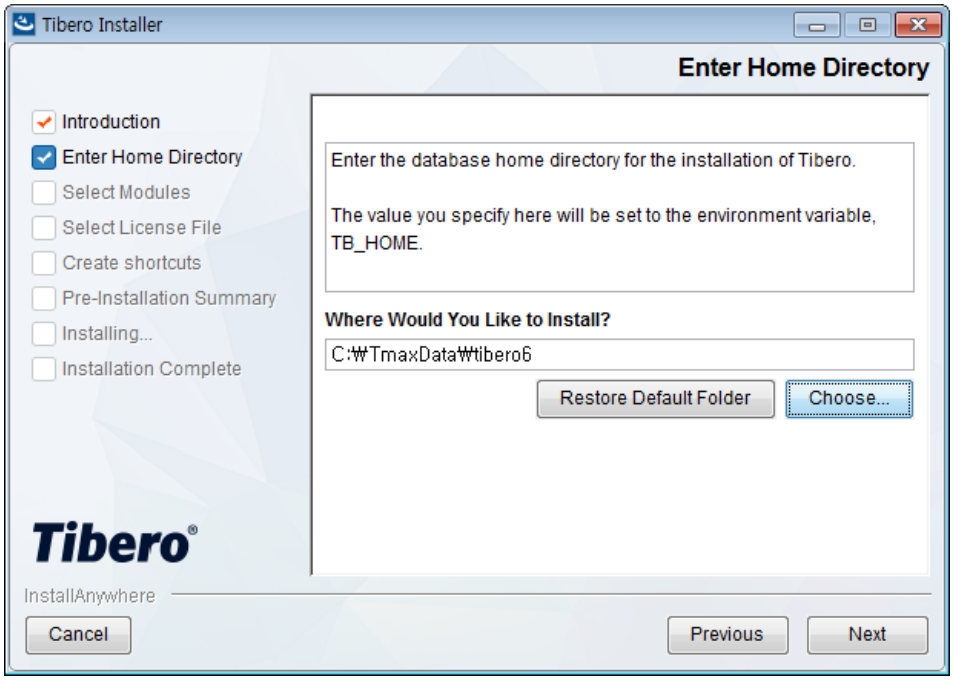
3. The screen for selecting the Tibero home directory is displayed.

   The default installation directory is **'C:\TmaxData\tibero6'**, and it is set to the TB_HOME parameter in the user configuration file. The directory path cannot include any blank spaces.

   To change the home directory, click **[Choose...]** and then select the desired folder. To restore the default home directory, click **[Restore Default Folder]**.

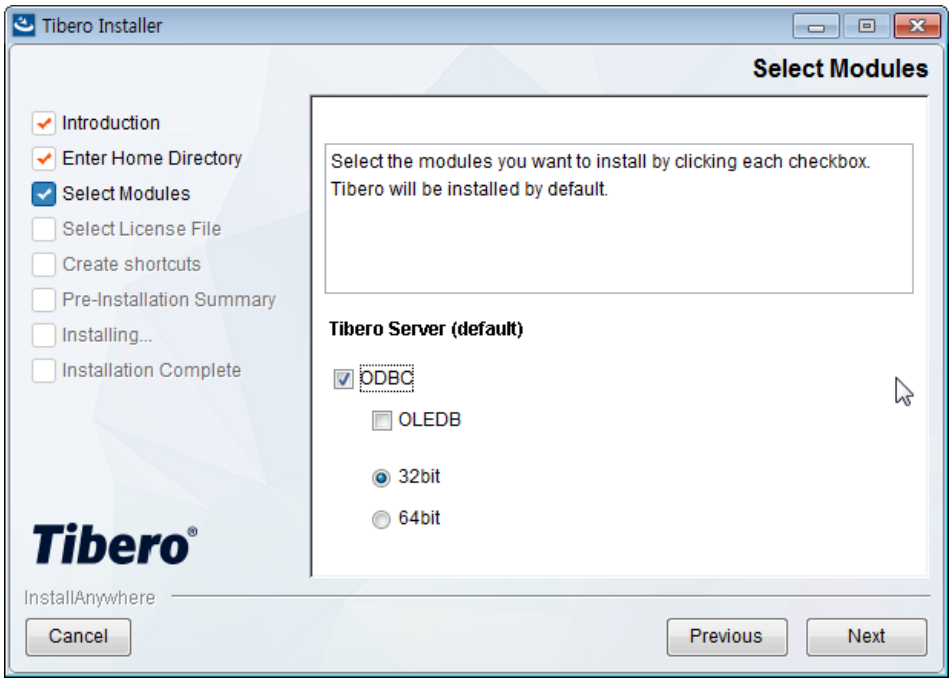
   Click **[Next]** to continue.

[Figure 3.3] Destination Folder



4. Choose the modules to install.

[Figure 3.4] Choosing Installation Modules



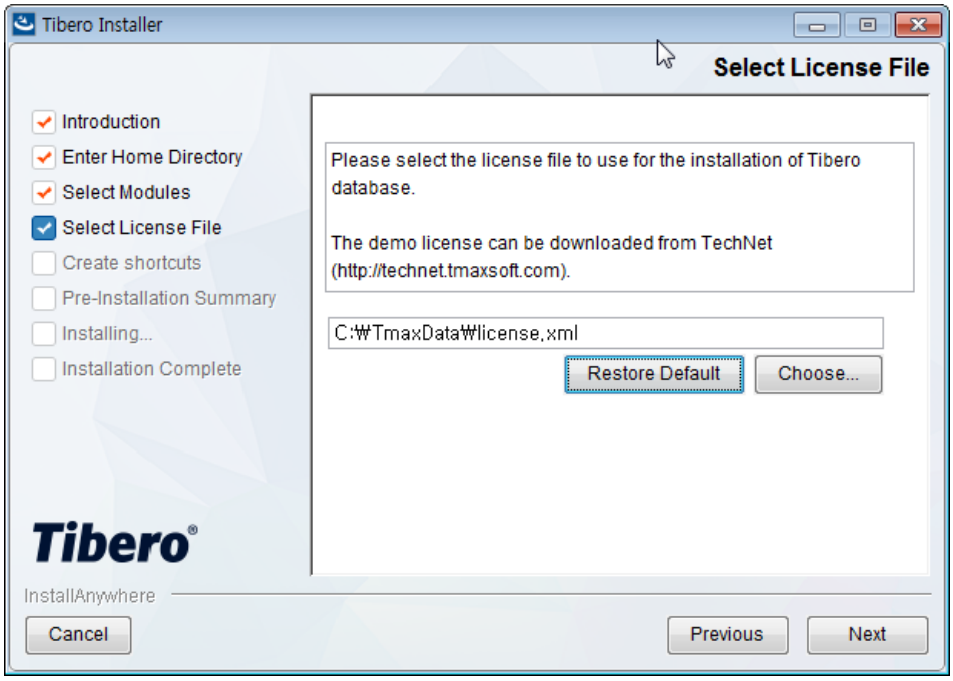
The following are the available options.

Option	Description
Tibero Server (default)	Tibero database to install (installed by default).
ODBC	Installs Tibero ODBC driver provider in Tibero ODBC Data Source Administrator.
OLE DB	Installs the OLE DB module. The ODBC module must be installed to install the ODBC DB module.
32bit / 64bit	Bit information of the platform where ODBC or OLE DB is installed. – 32bit: 32-bit or 64-bit platform – 64bit: 64-bit platform

5. Set the location of the Tibero license file.

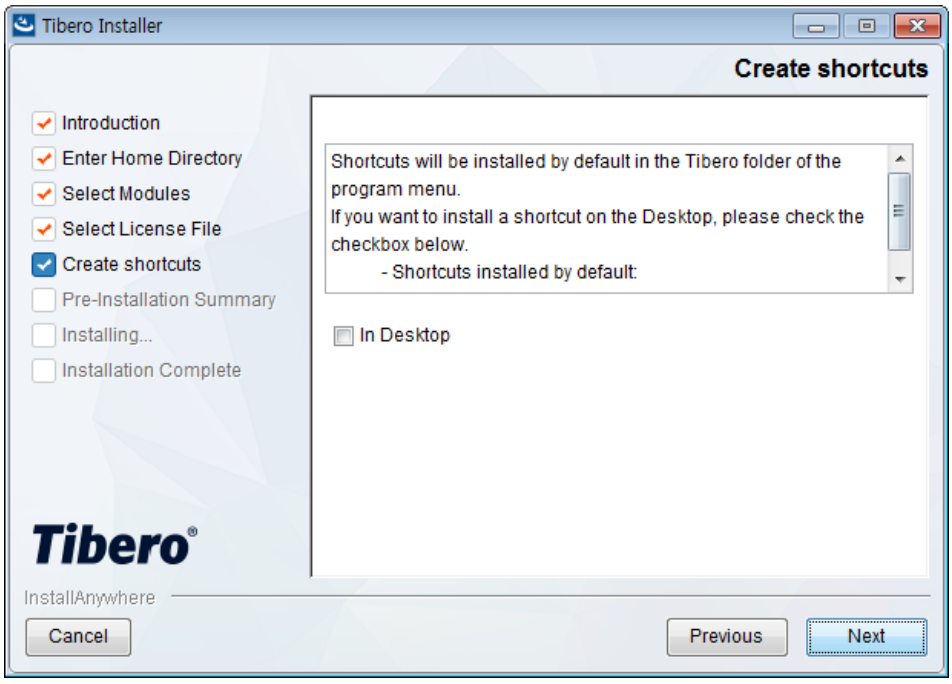
   The location must be an absolute path including the license file name (license.xml). A demo license file can be downloaded from TechNet. For more information about license files, refer to “1.2.2. Software Distribution Policy”.

[Figure 3.5] License



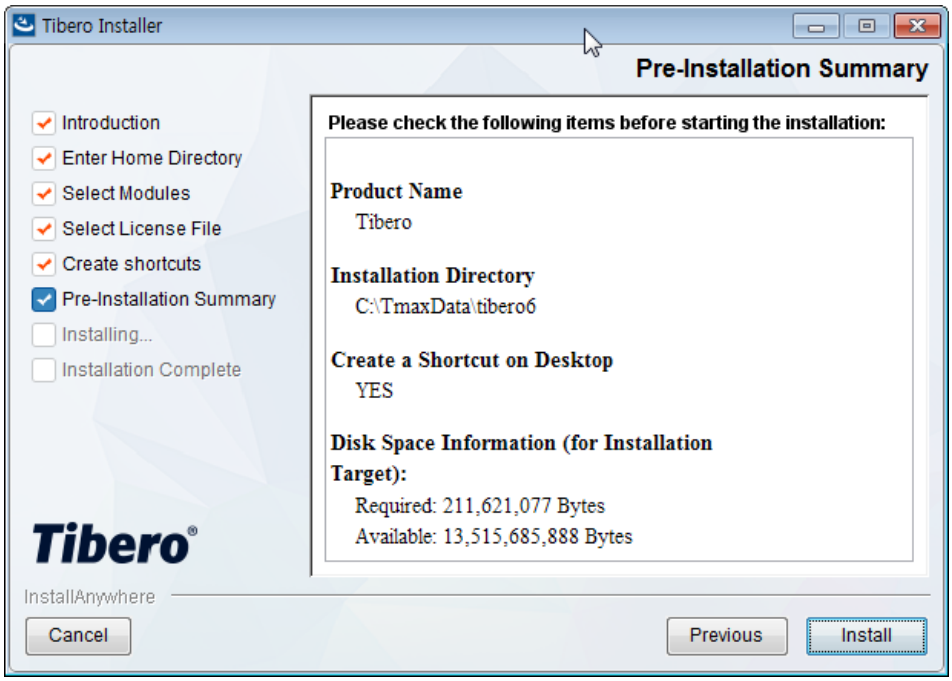
6. After installing Tibero, choose whether to create shortcuts, and then click **[Next]**.

[Figure 3.6] Shortcuts



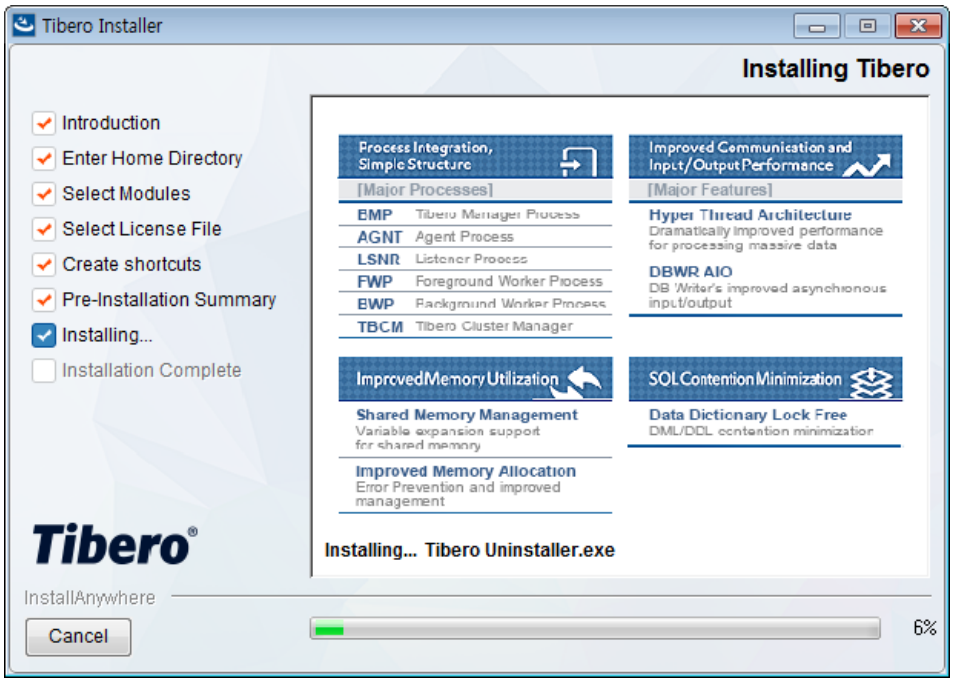
7. The pre-installation summary screen is displayed. Review the installation details, verify the installation directory, and then click **[Install]** to begin the installation.

[Figure 3.7] Pre-installation Summary



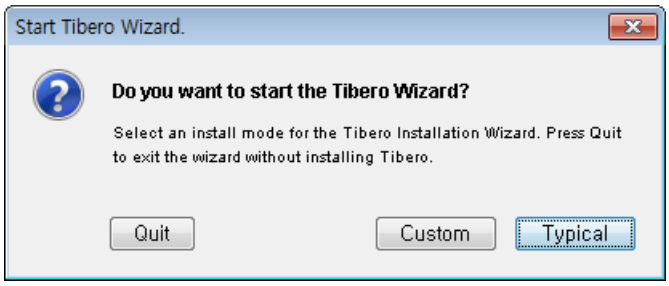
8. Set the environment configuration and extract the files needed for creating a Tibero database.

[Figure 3.8] Pre-installation Progress



9. When the Tibero pre-installation process is complete, an install mode for creating a database instance can be selected.

[Figure 3.9] Starting Tibero Instance Wizard



The following describes each button.

Button	Description
[Quit]	Quits the wizard for creating a database.
[Custom]	Allows the user to enter detailed information about database creation. User needs to enter parameter values as well as basic information such as DB_NAME, PORT, and PASSWORD.
[Typical]	Creates a database by using default values except for basic information such as DB_NAME, PORT, and PASSWORD. User does not need to enter parameter values.

To cancel the installation, click **[Quit]**. To install Tibero manually, open a Windows command window while logged in as an administrator and run the wizard through the following command.

– Typical Mode

```
%TB_HOME%\client\bin\runWizard -m gui -d Y
```

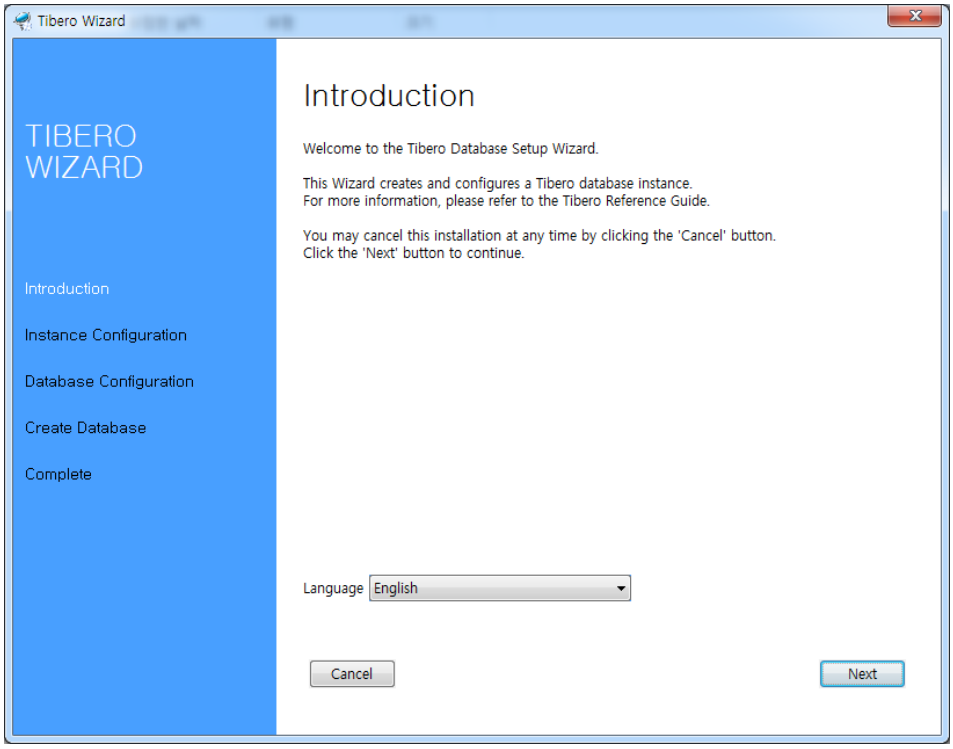
– Custom Mode

```
%TB_HOME%\client\bin\runWizard -m gui
```

10. The following is the wizard for creating a Tibero database.

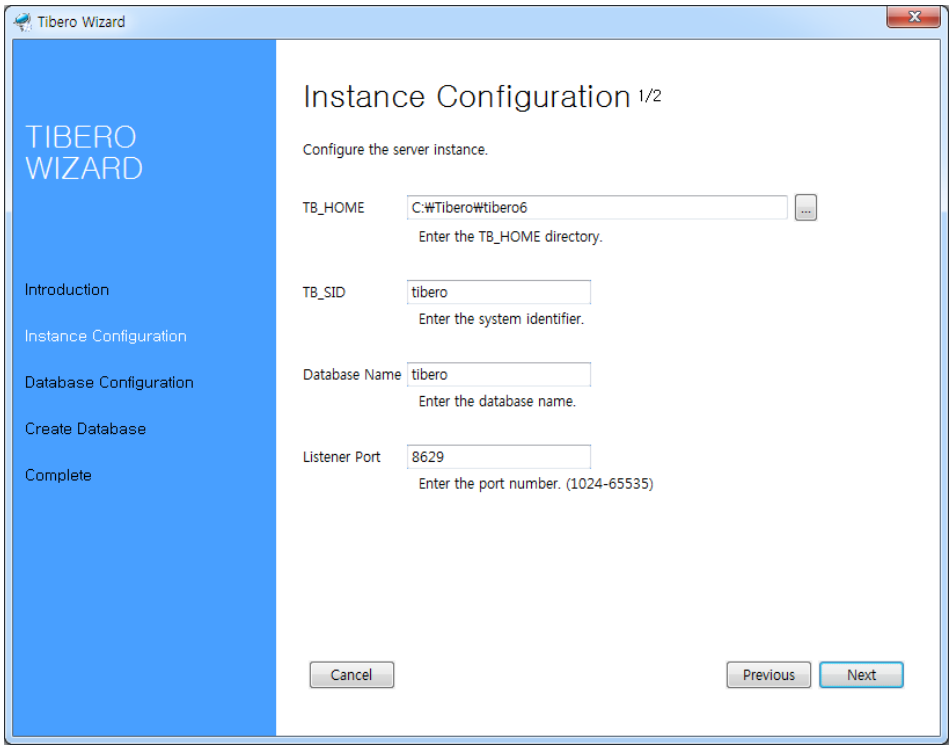
Select a language and then click **[Next]**. Installation is available in Korean and English.

[Figure 3.10] Tibero Wizard



11. Configure the environment for creating a database, and then click **[Next]**.

[Figure 3.11] Database Identification



The following are the installation options.

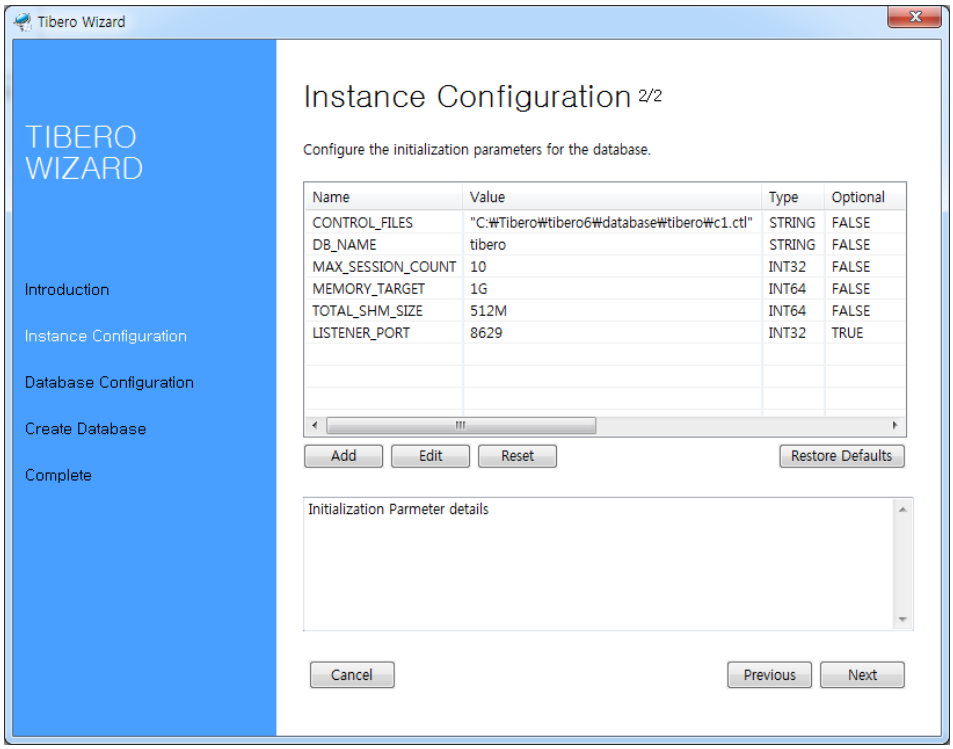
Item	Description
TB_UP_HOME	Path where Tibero binary is installed. TB_UP_HOME is set to the Tibero home directory.
TB_UP_SID	Service ID used when running an Tibero instance on the server.
Database Name	Database name. (Default value: tibero)
Listener Port	Port number used by the listener. (Default value: 8629)

Note the following when setting TB_UP_SID and Database Name.

- SID must be unique on a server. (Default value: tibero)
- SID may contain numbers, letters, dashes, and underscores.
- SID cannot contain special characters, and the first character cannot be a number.

12 Set the initialization parameters for the Tibero database. Skip this step if the install mode is Typical.

[Figure 3.12] Initialization Parameters



The following are the default initialization parameters.

Parameter	Description
CONTROL_FILES	Location of control files. Set an absolute path.
DB_NAME	Database name. (Default value: tibero)
MAX_SESSION_COUNT	Maximum number of sessions that can access a database. (Default value: 20)
MEMORY_TARGET	Maximum memory size that the database can use.
TOTAL_SHM_SIZE	Total shared memory size that can be used in a database instance.
LISTENER_PORT	Port number used by the listener. (Default value: 8629)

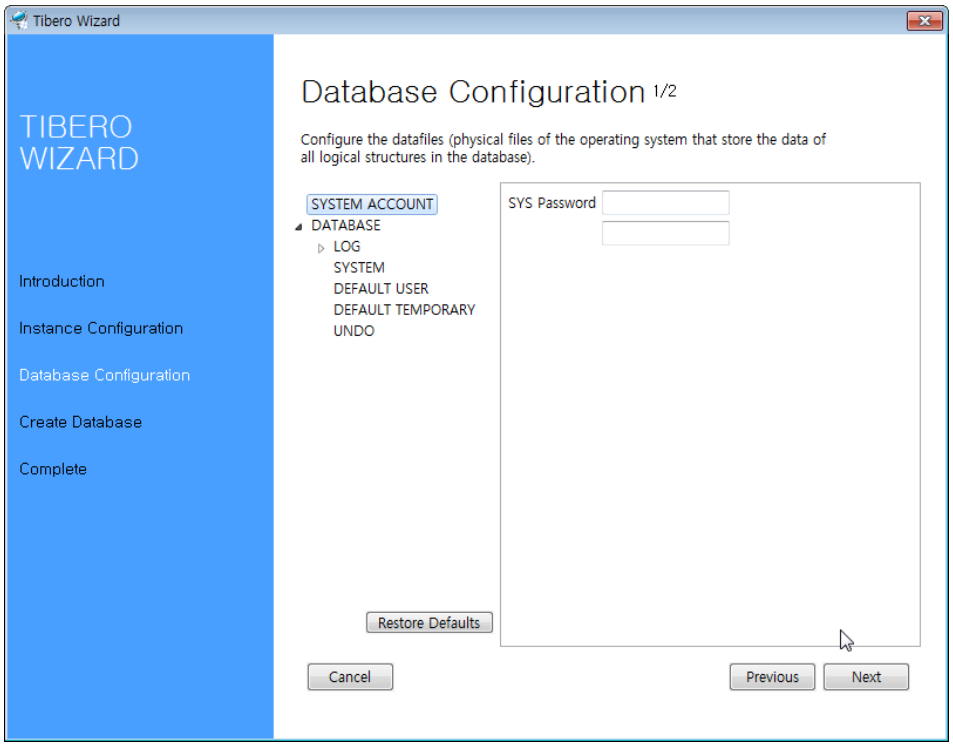
The user can add, delete, and modify initialization parameters by clicking **[Add]**, **[Del]**, and **[Edit]**, respectively. To restore the default configuration, click **[Restore Default]**.

Note

For more information about initialization parameters, refer to "Tibero Reference Guide".

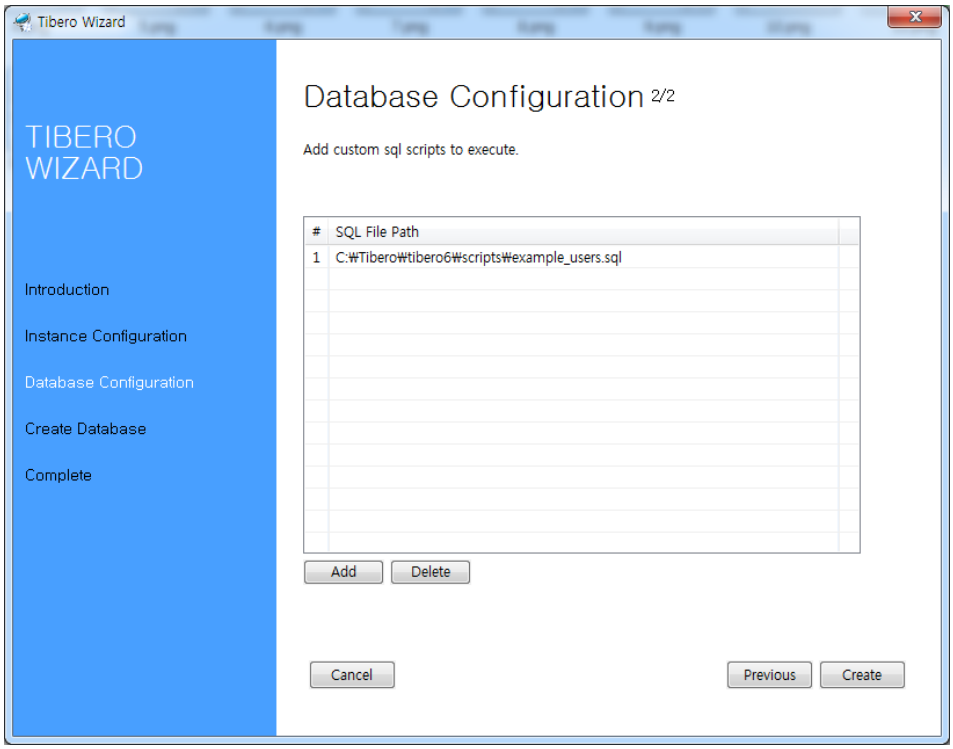
13. Set the Tibero system user password and database settings. Click **[Next]** to continue.

[Figure 3.13] Account Configuration



14. After creating the database, set user-defined script files to execute. Click **[Create]** to continue.

[Figure 3.14] User Defined SQL

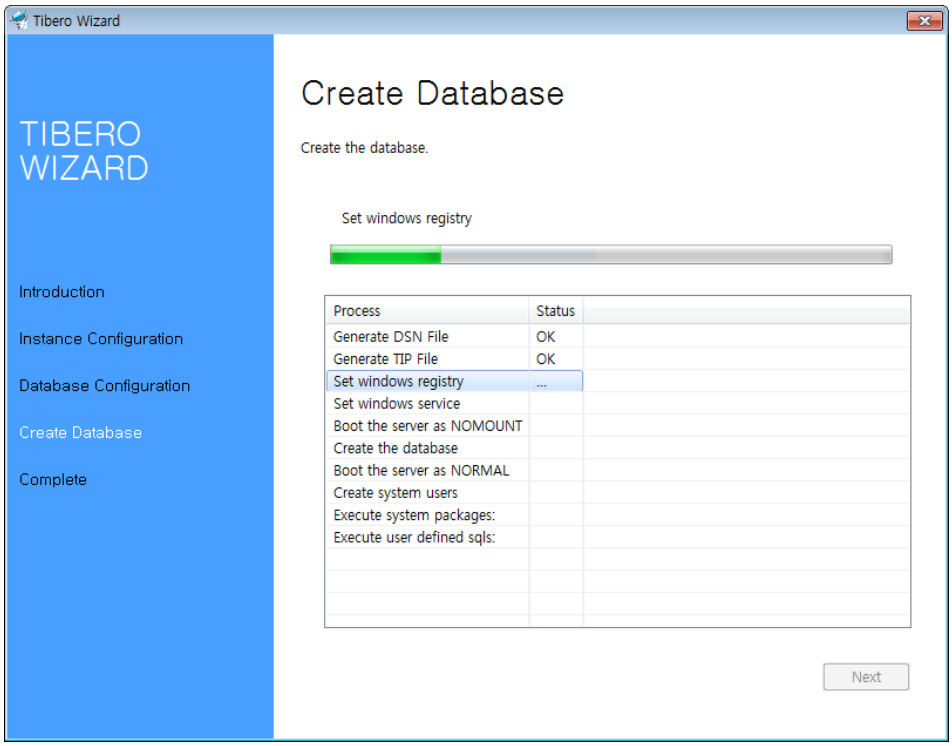


To add or delete a user-defined SQL script file, click **[Add]** or **[Delete]**. The **%TB_UP_HOME%\scripts\example_users.sql** script executes by default. This script creates the following sample user accounts.

Account	Description
TIBEROUP	Sample user account granted with CONNECT, RESOURCE, and DBA permissions.
TIBERO 1	Sample user account granted with CONNECT, RESOURCE, and DBA permissions.

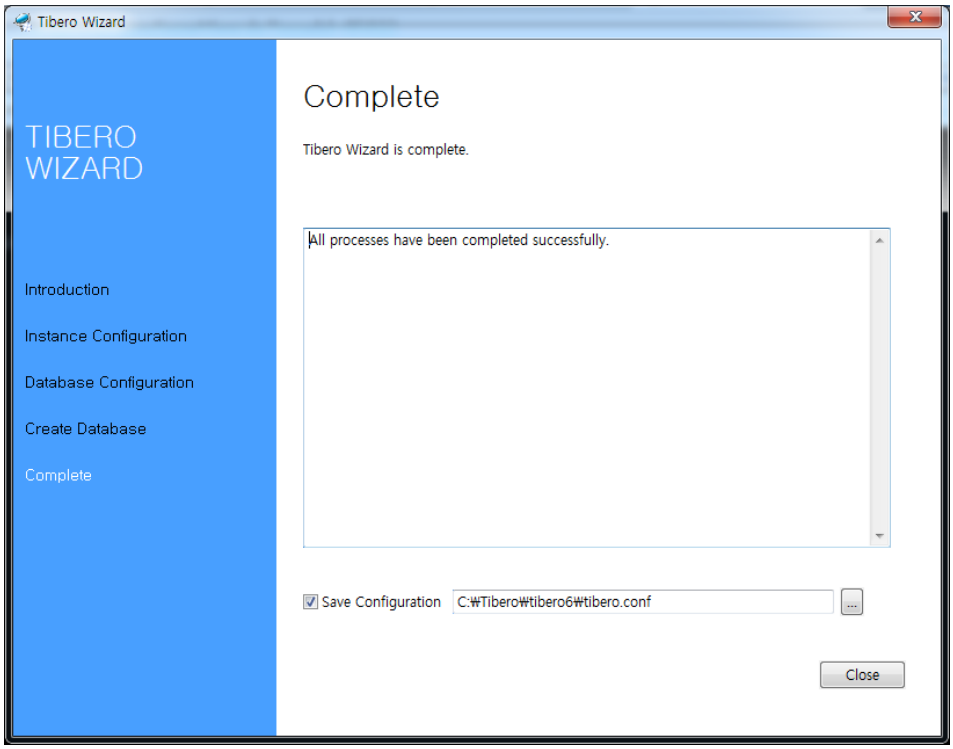
15. After configuring the database, review the installation process displayed. If an error occurs during the installation, then the installation process is rolled back and the installation is terminated.

[Figure 3.15] Creating a Database Instance



16. The following screen is displayed after a database is created.

[Figure 3.16] Creating a Database



3.2.2. Console Mode (Linux)

1. Grant execute permission to the Tibero installer file as follows:

```
$ chmod u+x tibero6_<FixSet>_Linux_x86_64.bin
```

2. Execute the tibero6_<*FixSet*>_Linux_x86_64.bin file in the console.

```
$ ./tibero6_<FixSet>_Linux_x86_64.bin
Preparing to install...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...
Launching installer...
===============================================================================
Tibero                                                (created with InstallAnywhere)
-------------------------------------------------------------------------------
Preparing CONSOLE Mode Installation...


===============================================================================
```

```
Introduction
------------
Welcome to the Installer for Tibero.

This installation will guide you through the installation process.
Press <ENTER> to proceed with the installation.
To cancel installation, enter 'quit'.

PRESS <ENTER> TO CONTINUE:
```

3. Choose the Tibero installation directory. Press <ENTER> to use the default directory. To change the directory, enter the desired directory and then press <ENTER>.

   TB_HOME in the user environment configuration file is set to the specified directory. The directory path cannot include any spaces.

```
================================================================================
Specify a home directory
------------------------

Specify a database home directory.
The value you specified here will be set to the environment variable, TB_HOME.

Where would you like to install?

  Default Install Folder: /home/tibero/TmaxData/tibero6

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

4. Select the Tibero license file.

```
================================================================================
Input a License File
--------------------
Please input a license file with the absolute path.
The demo license can be downloaded at TechNet (http://technet.tmaxsoft.com).

Location (Default: /home/tibero/license.xml):
```

   A demo license file can be downloaded from TechNet. For more information, refer to “1.2.2. Software Distribution Policy”.

5. The configuration values set by the user during the installation process are displayed on the screen. Check the values and then click <ENTER>.

```
 Pre-Installation Summary
------------------------

Please review the following before continuing:

Product Name
    Tibero

Installation Directory
    /home/tibero/TmaxData/tibero6

Disk Space Information (for Installation Target):
    Required:  294,225,987 Bytes
    Available: 333,651,283,968 Bytes

PRESS <ENTER> TO CONTINUE:
```

6. Installation for Tibero will now start. This copies the binary and creates links.

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

 [=================|=================|========
```

7. Select an install mode for the wizard.

```
===============================================================
Choose An Install Mode
----------------------
Choose an install mode.
  ->1- Typical mode
    2- Custom mode

ENTER THE NUMBER OF THE DESIRED CHOICE, OR PRESS <ENTER> TO ACCEPT THE
   DEFAULT: 2
```

The following describes each install mode.

Mode	Description
Typical	Creates a database by using default values except for user-configured settings such as DB_NAME, PORT, and PASSWORD.
Custom	Creates a database by using detailed user-configured settings.

8. When the pre-installation process for Tibero is complete, the following message is displayed. Click <<ENTER>> to terminate the installer.

```
=============================================================
Install complete
---------------
Congratulations! Tibero has been successfully installed to:
/home/tibero/TmaxData/tibero6

Execute the  Wizard to configure your database.
Execute the /home/tibero/TmaxData/tibero6/client/bin/install.sh file.
 Example). /home/tibero/TmaxData/tibero6/client/bin/install.sh

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

$TB_HOME/client/bin/install.sh performs the following after the installer is terminated.

a. Apply environment variables for creating a database.

b. Execute the $TB_HOME/client/bin/runWizard.sh script to create a database.

Users can execute the Wizard by running the following command after applying environment variables.

- Typical mode

```
$ sh $TB_HOME/client/bin/runWizard.sh -m cmd -d Y
```

- Custom mode

```
$ sh $TB_HOME/client/bin/runWizard.sh -m cmd
```

9. To create a Tibero database instance, execute "install.sh". To continue with the installation, click <<ENTER>>.

   The following is an example of using the custom mode.

```
$ sh /home/tibero/TmaxData/tibero6/client/bin/install.sh
=========================================================
Introduction
-------------------------
Create Tibero Database.

To cancel installation, enter 'quit'.
PRESS <ENTER> TO PROCEED WITH THE INSTALLATION.
```

10. Select the Tibero binary installation directory. $TB_HOME is set to the Tibero home directory.

```
TB_HOME (DEFAULT: /home/tibero/TmaxData/tibero6) :
```

11. Enter the service ID to use when running a Tibero instance.

```
TB_SID (DEFAULT : tibero) :
```

12. Set the database name.

```
Database name (DEFAULT : tibero) :
```

13. Set the port number used by the listener.

```
Port (DEFAULT : 8629) :
```

14. Set the initialization parameters for the Tibero database. Skip this step if the install mode is Typical.

```
======================================================
Initialization Parameter
-------------------------

Configure initialization parameters.

  ALL : Displays all parameters.
  M   : Mandatory.
        Displays the system boot parameters.
  O   : Optional.
        Displays additional parameters that are not boot parameters.
        If unspecified, the default value is used.
  S   : Static.
        Displays the parameters that cannot be modified at runtime.
  D   : Dynamic.
        Displays the parameters that can be modified at runtime.
  P   : Persistent.
        Displays the parameters that cannot be modified after a database is created.
  A   : Adjustable.
        Displays the parameters that can be modified after a database is created.

Enter 'ALL', one of the above options, the parameter number, or the parameter
itself to view the parameters.
PRESS <ENTER> TO PROCEED TO THE NEXT STEP:
```

Note

For more information about initialization parameters, refer to "Tibero Reference Guide".

---

15. Set the Tibero system user password.

```
======================================================
SYS password
-------------------------
Enter the password for the SYS account.
```

```
PASSWORD :
CONFIRM PASSWORD :
```

16. Select the character set of the database.

```
=========================================================
Character Set
-------------------------
Select the character set of the database.
  0. ASCII
  1. EUCKR
->2. MSWIN949
  3. UTF8
  4. SJIS
    ......Omitted......
  15. EE8ISO8859P2
  16. WE8ISO8859P9
  17. WE8ISO8859P15
  18. CL8KOI8R
  19. CL8ISO8859P5

ENTER AN OPTION OR PRESS <ENTER> TO USE THE SELECTED CHARACTER SET:
```

Note

For more information about the character sets supported in Tibero, refer to “Appendix C. Supported Character Sets”.

17. Select the national character set of the database.

```
=========================================================
National Character Set
-------------------------
Select the national character set of the database.
  0. UTF8
->1. UTF16

ENTER AN OPTION OR PRESS <ENTER> TO USE THE SELECTED NATIONAL CHARACTER SET:
```

18. Configure the database settings. Skip this step if the install mode is Typical.

```
=========================================================
MAXDATAFILES
-------------------------
Enter the maximum number of data files to be used in the database.
-> DEFAULT : 100
```

```
ENTER A VALUE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT :
    ......Omitted......

TABLESPACE
-------------------------
Configure a TABLESPACE.

1. DEFAULT
2. TEMPORARY
3. UNDO

SELECT ONE OF THE NUMBER ABOVE,
OR PRESS <ENTER> TO CONTINUE :
```

The following information can be set in this step.

Item	Description
MAXDATAFILES	Maximum number of data files used in the database. (Default value: 100)
MAXLOGGROUPS	Maximum number of log groups. (Default value: 255)
MAXLOGMEMBERS	Maximum number of log files in a log group. (Default value: 8)
ARCHIVE LOG mode	Log archive mode. (Default value: NO)
LOG Group	LOG GROUP.
SYSTEM Tablespace	Data file for the system tablespace.
TABLESPACE	Tablespace.

19. After creating the database, set additional user-defined scripts to execute. Skip this step if the install mode is Typical.

```
=====================================================
USER-DEFINED SQL
-------------------------
Add a new USER-DEFINED SQL, or delete one of the following SQL files:

  0. /home/install2/tibero6/scripts/example_users.sql


ENTER 'DEL <NUMBER>' TO DELETE,
'Y' TO ADD,
OR 'N' TO CONTINUE:
```

The **$TB_HOME\scripts\example_users.sql** script is set to execute by default. This script creates the following sample user accounts.

Account	Description
TIBERO	Sample user account with CONNECT, RESOURCE, and DBA permissions.
TIBERO1	Sample user account with CONNECT, RESOURCE, and DBA permissions.

20. The database is created with the previously configured settings. If the installation completes successfully, the database is created.

```
=====================================================
Wizard Process
-------------------------
0         50         100 (%)
|======|======|======|
All processes have been completed successfully.
Thank you.
```

3.3. Manual Installation

Manual installation of Tibero is available for all supported platforms.

3.3.1. Windows

The following is the Tibero manual installation process for Windows. The installation requires an administrator account.

1. Prepare the following two files.
   - Binary executable file (tar.gz)
   - License file (license.xml)
2. Click **[Environment Variables]** in the **[Start] > [Settings] > [Control Panel] > [System] > [Advanced]** tab to set the environment variables. The following are sample environment variables and their values.

Environment Variable	Value
TB_HOME	C:\Tibero\tibero6
TB_SID	tibero
PATH	C:\Tibero\tibero6\bin;C:\Tibero\tibero6\client\bin

3. Extract the compressed binary executable file (tar.gz) to C:\Tibero. Copy the issued license file (license.xml) to the **license** subdirectory under **%TB_HOME%**.
4. Enter the following command from the **%TB_HOME%\bin** path. The service name may be omitted.

```
tbinstall %TB_HOME% %TB_SID% [-s service name]
```

After executing the command, Tibero is registered as a Windows service. The Windows service can be verified from **[Start] > [Settings] > [Control Panel] > [Administrative Tools] > [Service]**. Execute the command prompt by clicking **[Run as administrator]** from the context menu.

```
C:\Tibero\tibero6\bin>tbinstall %TB_HOME% %TB_SID%
 Microsoft (R) Windows Script Host Version 5.6
 Copyright (C) Microsoft Corporation 1996-2001. All rights reserved.

 TB_HOME = C:\Tibero\tibero6
 TB_SID = tibero
 service account = LocalSystem
 Tibero_tibero installed successfully.
```

5. Enter the following command from the **%TB_HOME%\config** path.

```
gen_tip.bat
```

After executing the command, the environment file (.tip), tbdsn.tbr, and psm_commands.bat are created.

```
C:\Tibero\tibero6\config>gen_tip.bat
 Using TB_SID [tibero]
C:\Tibero\tibero6\config\tibero.tip generated
C:\Tibero\tibero6\client\config\tbdsn.tbr generated.
C:\Tibero\tibero6\config\psm_commands.bat generated
```

Note

1. For more information about how to configure tbdsn.tbr, refer to "Appendix A. tbdsn.tbr" in "Tibero Administrator's Guide."

2. For more information about how to configure %TB_SID%.tip, refer to "Appendix A. Example of Initialization Parameters" in "Tibero Reference Guide."

---

6. Start the Tibero server in **'NOMOUNT'** mode.

```
C:\Tibero\tibero6\bin>tbboot nomount

Tibero instance started up (NOMOUNT mode).
```

7. Connect to the database by using the tbSQL utility. In the following example, the **'sys'** account is used to connect to a database.

```
C:\Tibero\tibero6\bin>tbsql sys/tibero

tbSQL 6
```

```
Copyright (c) 2008, 2009, 2011, 2012 TmaxData Corporation. All rights reserved.

Connected to Tibero.
```

8. Create a database using the **CREATE DATABASE** statement. In the following example, a database named **'tibero'** is created. For information about the configuration items, refer to step 18 in “3.2.2. Console Mode (Linux)”.

```
SQL> create database "tibero"
  user sys identified by tibero
  maxinstances 8
  maxdatafiles 100
  character set MSWIN949
  national character set UTF16
  logfile
    group 1 'log001.log' size 100M,
    group 2 'log002.log' size 100M,
    group 3 'log003.log' size 100M
  maxloggroups 255
  maxlogmembers 8
  noarchivelog
    datafile 'system001.dtf' size 100M autoextend on next 100M maxsize unlimited
    default temporary tablespace TEMP
      tempfile 'temp001.dtf' size 100M autoextend on next 100M maxsize unlimited
      extent management local autoallocate
    undo tablespace UNDO
      datafile 'undo001.dtf' size 100M autoextend on next 100M maxsize unlimited
      extent management local autoallocate;
Database created.
SQL> quit;
```

Note

For more information about the CREATE DATABASE statement, refer to "Tibero SQL Reference Guide."

9. After the database is created, use the **tbboot** command to restart Tibero.

```
C:\Tibero\tibero6\bin>tbboot

Tibero instance started up (NORMAL mode)
```

10. Change the default script host to cscript. Otherwise, an alert window is displayed in the user input area when the vbs file is executed to stall the installation.

```
C:\Tibero\tibero6\scripts> cscript //H:CScript
Microsoft (R) Windows Script Host Version 5.6
Copyright (C) Microsoft Corporation 1996-2001. All rights reserved.

The default script host is now set to "cscript.exe".
```

11. Enter the **system.sh** command from the **$TB_HOME/scripts** directory to execute the SQL file in the current directory. The SQL file creates roles, system users, views, packages, etc. The default passwords for the sys and syscat accounts are tibero and syscat, respectively.

```
C:\Tibero\tibero6\scripts>system.vbs
 Microsoft (R) Windows Script Host Version 5.6
 Copyright (C) Microsoft Corporation 1996-2001. All rights reserved.

Creating the role DBA...
       Running C:\Tibero\tibero6\scripts\create_dba_gen.sql...
Creating system users & roles...
       Running C:\Tibero\tibero6\scripts\system_users.sql...
Creating virtual tables(1)...
       Running C:\Tibero\tibero6\scripts\vt_drop_gen.sql...
Creating virtual tables(2)...
       Running C:\Tibero\tibero6\scripts\vt_create_gen.sql...
Granting public access to _VT_DUAL...
       Running C:\Tibero\tibero6\scripts\vt_dual.sql...
Creating the system generated sequences...
       Running C:\Tibero\tibero6\scripts\create_seq.sql...
Creating internal dynamic performance views...
       Running C:\Tibero\tibero6\scripts\dpvx.sql...
Creating system packages:
       Running C:\Tibero\tibero6\scripts\pkg\pkg_standard.sql...
       Running C:\Tibero\tibero6\scripts\pkg\pkg_dbms_output.sql...
       Running C:\Tibero\tibero6\scripts\pkg\pkg_dbms_lob.sql...
       Running C:\Tibero\tibero6\scripts\pkg\pkg_dbms_utility.sql...
       Running C:\Tibero\tibero6\scripts\pkg\pkg_dbms_obfuscation.sql...
    ......Omitted......

Creating dynamic performance view descriptions...
       Running C:\Tibero\tibero6\scripts\dpv_dict.sql...
Creating spatial meta tables and views ...
       Running C:\Tibero\tibero6\scripts\create_gis.sql...
Creating internal system tables...
       Running C:\Tibero\tibero6\scripts\sys_tbl.sql...
```

Note

When system.vbs is executed, a DB connection is created using the environment variable "%TB_SID%". Verify that the DSN named %TB_SID%For more information about the options provided in system.sh (.vbs), refer to “Appendix D. system.sh”.

12. After the Tibero installation is complete, the tblistener and tbsvr processes are executed. To check the process states, use the **[Process]** tab in the Windows task administrator.

```
Image Name                    User Name            CPU            Memory Usage
...
tblistener.exe               SYSTEM              00              2,804 KB
tbsvr.exe                    SYSTEM              00            216,056 KB
...
```

3.3.2. UNIX

The following is the Tibero manual installation process for UNIX.

1. Prepare the following files.
   - Binary executable file (tar.gz)
   - License file (license.xml)
2. Set the environment variables in the environment configuration files (.bashrc, .bash_profile, .profile, etc.) for each OS user account.

   The following are examples of environment variables and their values.

```
export TB_HOME=/home/tibero/Tibero/tibero6
export TB_SID=tibero
export LD_LIBRARY_PATH=$TB_HOME/lib:$TB_HOME/client/lib
export PATH=$PATH:$TB_HOME/bin:$TB_HOME/client/bin
```

Note

1. The environment variable configuration method varies for each OS. For more information, refer to each OS guide.

2. Refer to “3.4.2. Applying and Verifying User Configuration File” for a description of each environment variable.

3. Extract the compressed binary executable file (tar.gz) to **home/tibero/Tibero**. Copy the issued license file (license.xml) to the **license** subdirectory in **%TB_HOME%**.

4. Enter the following command from the **$TB_HOME/config** path.

```
gen_tip.sh
```

After executing the command, the environment file (.tip), tbdsn.tbr, and psm_commands.bat are created.

```
tibero@Tibero:~/Tibero/tibero6/config$ gen_tip.sh
Using TB_SID "tibero"
/home/tibero/Tibero/tibero6/config/tibero.tip generated
/home/tibero/Tibero/tibero6/config/psm_commands generated
/home/tibero/Tibero/tibero6/client/config/tbdsn.tbr generated.
Running client/config/gen_esql_cfg.sh
Done.
```

5. Start the Tibero **'NOMOUNT Mode'**.

```
tibero@Tibero:~/Tibero/tibero6/bin$ tbboot nomount
Change core dump dir to /home/tibero6/tibero6/bin/prof.
Listener port = 8629

Tibero6

TmaxData Corporation Copyright (c) 2008-. All rights reserved.
Tibero instance started up (NOMOUNT mode).
```

6. Connect to the database by using the tbSQL utility. In the following example, the **'sys'** account is used to connect to a database.

```
tibero@Tibero:~/Tibero/tibero6/client/bin$ tbsql sys/tibero

tbSQL 6

TmaxData Corporation Copyright (c) 2008-. All rights reserved.

Connected to Tibero.

SQL>
```

7. Create a database using the **CREATE DATABASE** statement. In the following example, a database named **'tibero'** is created. For information about the configuration items, refer to step 18 in “3.2.2. Console Mode (Linux)”.

```
SQL> create database "tibero"
  user sys identified by tibero
  maxinstances 8
  maxdatafiles 100
  character set MSWIN949
```

```
  national character set UTF16
  logfile
    group 1 'log001.log' size 100M,
    group 2 'log002.log' size 100M,
    group 3 'log003.log' size 100M
  maxloggroups 255
  maxlogmembers 8
  noarchivelog
    datafile 'system001.dtf' size 100M autoextend on next 100M maxsize unlimited
    default temporary tablespace TEMP
      tempfile 'temp001.dtf' size 100M autoextend on next 100M maxsize unlimited
      extent management local autoallocate
    undo tablespace UNDO
      datafile 'undo001.dtf' size 100M autoextend on next 100M maxsize unlimited
      extent management local autoallocate;
Database created.

SQL> quit
Disconnected.
```

Note

For more information about the CREATE DATABASE statement, refer to "Tibero SQL Reference Guide".

8. After the database is created, use the **tbboot** command to restart Tibero.

```
tibero@Tibero:~/Tibero/tibero6/bin$ tbboot
Change core dump dir to /home/tibero6/tibero6/bin/prof.
Listener port = 25010

Tibero 6

TmaxData Corporation Copyright (c) 2008-. All rights reserved.
Tibero instance started up (NORMAL mode).
```

9. Enter the **system.sh** command from **$TB_HOME/scripts** directory to execute the SQL file in the current directory. The SQL file creates roles, system users, views, packages, etc. The default passwords for the sys and syscat accounts are tibero and syscat, respectively.

```
tibero@Tibero:~/Tibero/tibero6/scripts$ system.sh
Enter SYS password:

Enter SYSCAT password:

Creating the role DBA...
```

```
create default system users & roles?(Y/N):

Creating system users & roles...
Creating virtual tables(1)...
Creating virtual tables(2)...
Granting public access to _VT_DUAL...
Creating the system generated sequences...
Creating internal dynamic performance views...
Creating outline table...
Creating system package specifications:
    Running /home/tibero/Tibero/tibero6/scripts/pkg/pkg_standard.sql...
    Running /home/tibero/Tibero/tibero6/scripts/pkg/pkg_dbms_output.sql...
    Running /home/tibero/Tibero/tibero6/scripts/pkg/pkg_dbms_lob.sql...
    Running /home/tibero/Tibero/tibero6/scripts/pkg/pkg_dbms_utility.sql...
    ......Omitted......

Creating spatial meta tables and views ...
Creating internal system jobs...
Creating internal system notice queue ...
Done.
For details, check /home/tibero6/tibero6/instance/tibero/log/system_init.log.
```

Note

For more information about options provided in system.sh(.vbs), refer to “Appendix D. system.sh”.

10. After the Tibero installation is complete, the Tibero process starts. To check the process state, execute the following command.

```
tibero@Tibero:~/Tibero/tibero6/scripts$ ps -ef | grep tbsvr
tibero   19981     1  0 21:12 pts/2    00:00:00 tbsvr         ...
tibero   19983 19981  0 21:12 pts/2    00:00:00 tbsvr_TBMP    ...
tibero   19984 19981  0 21:12 pts/2    00:00:00 tbsvr_WP000   ...
tibero   19985 19981  3 21:12 pts/2    00:00:00 tbsvr_WP001   ...
tibero   19986 19981  1 21:12 pts/2    00:00:12 tbsvr_WP002   ...
tibero   19987 19981  2 21:12 pts/2    00:00:12 tbsvr_PEP000   ...
tibero   19988 19981  0 21:12 pts/2    00:00:00 tbsvr_AGNT    ...
tibero   19989 19981  1 21:12 pts/2    00:00:00 tbsvr_DBWR    ...
tibero   19999 19981  0 21:12 pts/2    00:00:00 tbsvr_RECO    ...
```

3.4. Checking Installation

This section describes how to verify that Tibero installed successfully.

3.4.1. Directory Structure

The following directory structure is created after installing Tibero.

```
$TB_HOME
    +- bin
    |
    +- client
    |   |
    |   +- bin
    |   +- config
    |   +- include
    |   +- lib
    |   +- ssl
    |   |   |
    |   |   +- certs
    |   |   +- misc
    |   |   +- private
    |   +- epa
    |   |   |
    |   |   +- java
    |   |       |
    |   |       +- config
    |   |       +- lib
    |   +- win32
    |   +- win64
    |
    +- config
    |
    +- database
    |   +- $TB_SID
    |       |
    |       +- psm
    |
    +- instance
    |   |
    |   +- $TB_SID
    |       |
    |       +- audit
    |       +- log
    |       |  +- dbmslog
    |       |  +- lsnr
    |       |  +- tracelog
    |       +- path
    |
    +- lib
    |
```

```
+- license
|   |
|   +- oss_licenses
|
+- scripts
     +- pkg
```

The directories shown as $TB_SID in the previous directory structure is replaced by the server SID of the system environment.

The following are the native directories of Tibero.

bin

This directory contains Tibero. The tbsvr and tblistener files are executables for creating the Tibero, and tbboot and tbdown are used to start up and shut down the Tibero.

The tbsvr and tblistener 'tbboot.

client/bin

This directory contains the following Tibero (utilities).

Utility	Description
tbSQL	Basic client program for executing SQL queries and checking their results.
T-Up	Utility for migrating data to and checking compatibility with Tibero from another database.
tbExport	Utility for writing data to an external file for data migration or logical backup.
tbImport	Utility for importing data from an external file.
tbLoader	Utility for loading a large amount of data into the database.
tbpc	Utility for converting embedded SQL in a C program to C so that the program can be compiled by a C compiler.

For more information about the utilities, refer to "Tibero Utility Guide". For the **tbpc** utility, refer to "Tibero tbESQL/C Guide".

client/config

This directory contains configuration file for executing a Tibero client program.

client/include

This directory contains the header files for creating a Tibero

client/lib

This directory contains the library files for creating a Tibero. For more information, refer to "Tibero Application Developer's Guide" and "Tibero tbESQL/C Guide".

client/ssl

This directory contains certificate and key files for server security.

client/epa

This directory contains configuration and log files related to external procedures. For more information, refer to "Tibero External Procedure Guide".

client/win32

This directory contains the ODBC/OLE DB driver for 32-bit Windows.

client/win64

This directory contains the ODBC/OLE DB driver for 64-bit Windows.

config

This directory contains the environment configuration files for Tibero. The $TB_SID.tip file in this directory contains the environment settings for Tibero.

database/$TB_SID

This directory and its subdirectories contain all database information unless it is configured separately. It includes the metadata and the following file types.

File	Description
Control File	Contains the location of all other files.
Data File	Contains the actual data.
Log File	Contains all data changes for use during data recovery.

database/$TB_SID/psm

This directory contains the tbPSM programs that are compiled in the compiled mode. Note that currently, Tibero For more information, refer to "Tibero tbPSM Guide".

instance/$TB_SID/audit

This directory contains the audit files that records activities of database users using system privileges or schema object privileges.

instance/$TB_SID/log

This directory contains the trace, DBMS, event, and listener log files of Tibero.

File	Description
Trace Log File	Used for debugging. This file logs all server activities in detail that can be used for troubleshooting performance issues or resolve bugs within Tibero.
DBMS Log File	Logs more important server activities than the trace log file. It records about server startup and mode, ddl executions, etc.
EVENT Log File	Logs trace logs for configured events. Use tbev to view the logs.
LISTENER Log File	Used for debugging Listener objects. It records important activities in Listeners objects and the logs are used for debugging purposes.

Trace, DBMS, event, and listener log files are accumulated with use and can grow up to the size of the directory. Old files must be deleted from the directory to not exceed the limit.

The following are the initialization parameters for a DBMS log file.

Initialization Parameter	Description
DBMS_LOG_FILE_SIZE	Maximum DBMS log file size.
DBMS_LOG_TOTAL_SIZE_LIMIT	Maximum size of the directory where DBMS log files are saved.
TRACE_LOG_FILE_SIZE	Maximum trace log file size.
TRACE_LOG_TOTAL_SIZE_LIMIT	Maximum size of the directory where trace log files are saved.
EVENT_TRACE_FILE_SIZE	Maximum event log file size.
EVENT_TRACE_TOTAL_SIZE_LIMIT	Maximum size of the directory where event log files are saved.
LSNR_LOG_FILE_SIZE	Maximum listener file size.
LSNR_LOG_TOTAL_SIZE_LIMIT	Maximum size of the directory where listener log files are saved.

instance/$TB_SID/path

This directory contains the socket files used for interprocess communication in Tibero. The files in this directory must not be read or updated while Tibero is running.

lib

This directory contains the spatial function library files for Tibero.

license

This directory contains the Tibero(license.xml). This XML file can be opened using a text editor to check its contents.

license/oss_licenses

This directory contains the open license terms that must be complied with when using Tibero.

nls/zoneinfo

This directory contains the time zone information file for Tibero.

scripts

This directory contains various SQL statements used when creating a database in Tibero. It also includes various view definitions that reflect the current state of Tibero.

scripts/pkg

This directory contains the package creation statements for Tibero.

3.4.2. Applying and Verifying User Configuration File

If Tibero is installed properly, the following properties are added in the user configuration file.

Environment Variable	Description
TB_HOME	Path where Tibero is installed. If an installation path is not entered during the installation, it is set to **{user home directory}/Tibero/tibero5** by default.
TB_SID	SID entered during installation. If not entered, it is set to **tibero** by default.
LD_LIBRARY_PATH	Shared library path for Tibero. All libraries are in $TB_HOME/lib or $TB_HOME/client/lib, and the environment variable varies by OS type. – SunOS, Linux: LD_LIBRARY_PATH – HP-UX: SHLIB_PATH – AIX: LIBPATH
PATH	Tibero paths. It is set to $TB_HOME/bin and $TB_HOME/client/bin by default.

In UNIX, when a process is abnormally terminated, virtual memory information remains on the disk. This process is called a core dump. It requires a lot of computing resources and temporarily lowers system performance during execution, and the created dump file takes up a large amount of disk space. Therefore, this process is not recommended for Tibero. To disable the core dump feature, add the following command to the configuration file (.profile) of the user account.

```
ulimit -c 0
```

Although the user configuration file has been created, this does not mean the file has yet been applied. To apply the file, do the following.

1. To apply the configuration file, run the following command for UNIX or Linux.

```
sh .profile
```

2. To check the results, run the following command:

   - UNIX

     ```
     echo $TB_HOME
     ```

   - Windows

     ```
     echo %TB_HOME%
     ```

3.4.3. Startup and Termination

Only database administrators (DBAs) are allowed to start up or terminate Tibero..

Startup

Executes the following **tbboot** command to start up Tibero

```
tbboot [-h] [-v] [-l] [-C] [-c] [-t BOOTMODE]
```

Option	Description
-h	Help for the tbboot command.
-v	Current version of Tibero .
-l	License information of Tibero.
-C	Character sets supported by Tibero.
-c	Option to disable Replication mode when Tibero is set to the replication mode.
-t BOOTMODE	Startup options for Tibero server (Optional). The tbboot command supports the following bootmode options: – NOMOUNT: Only starts up the Tibero process. – MOUNT: Supports database management functions such as media recovery. – RECOVERY: Runs a standby database when configuring a Tibero Standby Cluster. – NORMAL: Enables normal use of all database functions. – RESETLOGS: Initializes log files when Tibero server is restarted after a media recovery. – READONLY: Only allows database to be read. No updates are permitted.

Termination

Executes the following **tbdown** command to terminate Tibero

```
tbdown [-h] [-t DOWNMODE]
```

Option	Description
-h	Displays help for the tbdown command.
-t DOWNMODE	Shutdown options for Tibero server. Optional. The tbdown command supports the following options for downmode. – NORMAL: Normally shuts down the database. – POST_TX: Shuts down the database after all transactions are complete. – IMMEDIATE: Shuts down the database after forcibly terminating all tasks and rolling back any running transactions. – ABORTL: Forcibly terminates the Tibero processes. – SWITCHOVER: Terminates the primary database in the normal mode after synchronizing the primary database with the standby database. – ABNORMAL: Forcibly terminates the server process without accessing the Tibero server.

Connecting to the database with a tbSQL utility

Executes the **tbsql** command. The user ID and password can be entered as in the following:

```
tbsql sys/tibero
```

To connect to a database through a listener, enter @ and the alias set in the **tbdsn.tbr** file after the user ID and password.

```
tbsql sys/tibero@tibero
```

3.4.4. User Accounts

The following user accounts are automatically created when Tibero is installed.

User Account	Description
SYS	User account for database management. Creates and manages system packages, synonyms, users, roles, virtual tables, sequences, dynamic views, etc.
SYSCAT	Creates and manages the static catalog views for database management.
OUTLN	Stores SQL hint to re-execute the same query plan for the same SQL.
SYSGIS	Creates and manages the tables that are related to GIS (Geographic Information System).
TIBERO	Sample user account that has been granted the CONNECT, RESOURCE and DBA roles.
TIBERO1	Sample user account that has been granted the CONNECT, RESOURCE and DBA roles.

Chapter 4. Uninstallation

This chapter describes how to uninstall Tibero.

4.1. Overview

Tibero

- Using the Installer
  - GUI mode (Windows)
  - Console mode (Linux)
- Manual

  Run $TB_HOME/.installation/Tibero_Uninstaller for all platforms.

4.2. Using the Uninstaller

4.2.1. GUI Mode (Windows)

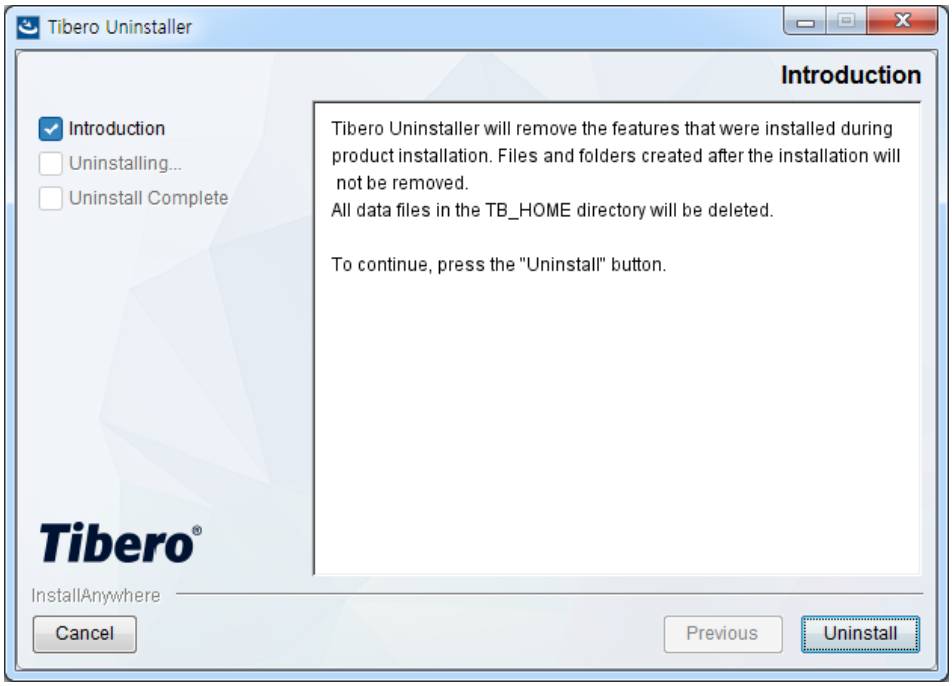
The following is the Tibero uninstallation process for Windows in GUI Mode.

1. Run **[Start] > [Programs] > [Tibero] > [Tibero 6] > [Uninstall Tibero 6]**, or run the uninstallaion GUI screen by running the following file.

```
%TB_HOME%\.installation\Tibero Uninstaller.exe
```

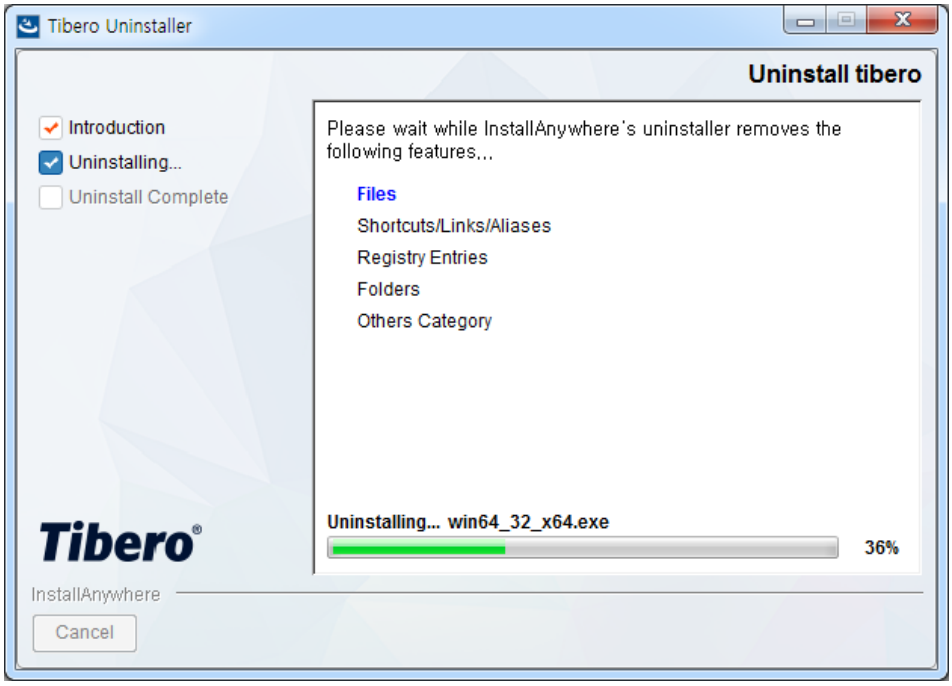
2. A screen confirming the uninstallation of Tibero is displayed. To uninstall, click **[Uninstall]**.

[Figure 4.1] Tibero GUI Uninstallation



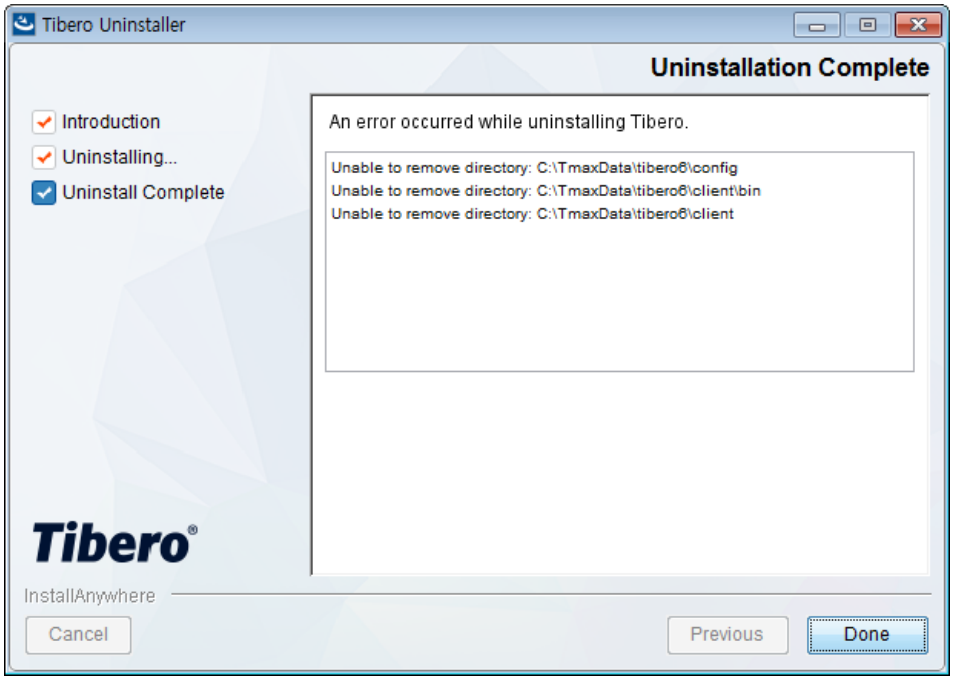
3. The following screen displays the Tibero

[Figure 4.2] Tibero GUI Uninstalling



4. After uninstallation is complete, the following screen is displayed. Click the **[Done]** button to finish the uninstallation.

[Figure 4.3] Uninstallation Completed



5. When Tibero is uninstalled, database files are removed but physical files are not. The physical files must be removed after the uninstallation process is complete.

   To remove all files and directories under %TB_HOME%, run the following command in the command prompt.

```
C:\>del Tibero
C:\Tibero\*, Do you want to continue(Y/N)? y
```

4.2.2. Console Mode (Linux)

The following is the Tibero uninstallation processfor Linux in console mode.

1. Run the following command in $TB_HOME/uninstall.

```
$ $TB_HOME/.installation/Tibero_Uninstaller

    ......Omitted......

===============================================================================
Introduction
------------
```

```
Tibero_Uninstaller will remove the features that were installed during product
installation.
All data files in the TB_HOME directory will be deleted.
Files and folders created after the installation will not be removed.

To continue, press the <ENTER>. To cancel Uninstallation, enter 'quit'.

PRESS <ENTER> TO CONTINUE:
```

2. The following message is displayed when uninstallation is complete.

```
================================================================================
Uninstallation Complete
-----------------------
All items of Tibero have been successfully uninstalled.

================================================================================
PRESS <ENTER> TO CONTINUE:
```

3. When Tibero is uninstalled, database files are removed but physical files are not. The physical files must be removed after the uninstallation process is complete.

   To remove all physical files, run the following command:

```
$ rm -rf Tibero
```

4.3. Manual Mode

The following is the uninstallation process for Tibero for Windows in manual mode.

1. Shut down Tibero.

```
tbdown
```

2. – For Windows

```
rmdir %TB_HOME%
```

   – For Linux

```
rm –rf $TB_HOME
```

Chapter 5. Client Installation and Uninstallation

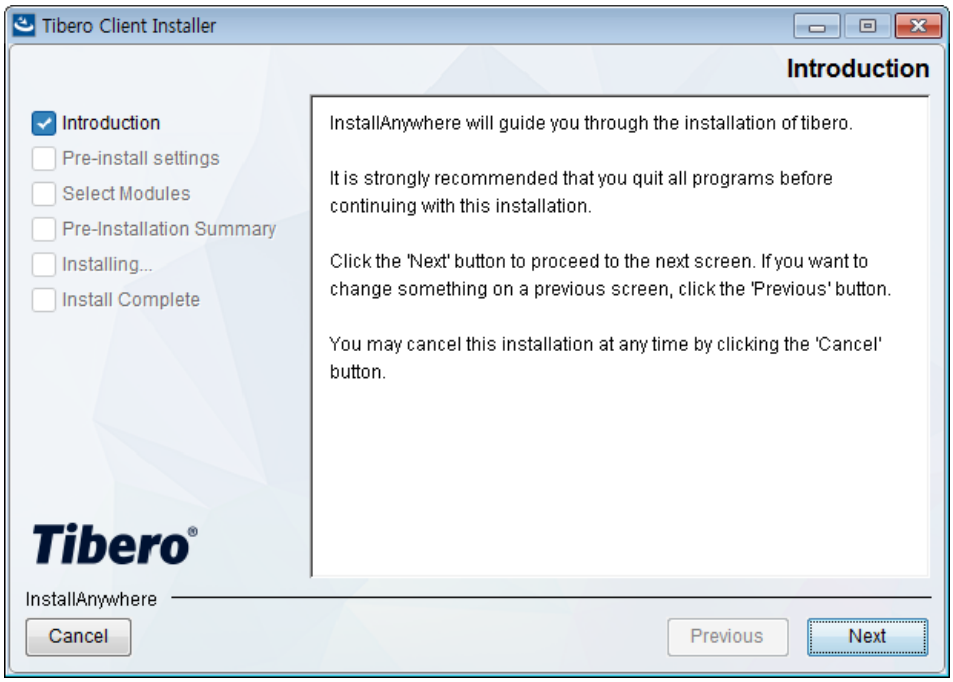
This chapter describes how to install the Tibero client in Windows.

5.1. Installation

The following is the Tibero client installation process for Windows.

1. Double-click the tibero6_<*fixset*>_windows_<*bit*>_client.exe file. The client installer starts and the following screen is displayed. To cancel the installation process, click **[Cancel]**. To continue with the installation, click **[Next]**.

   [Figure 5.1] Client Installation Start Screen

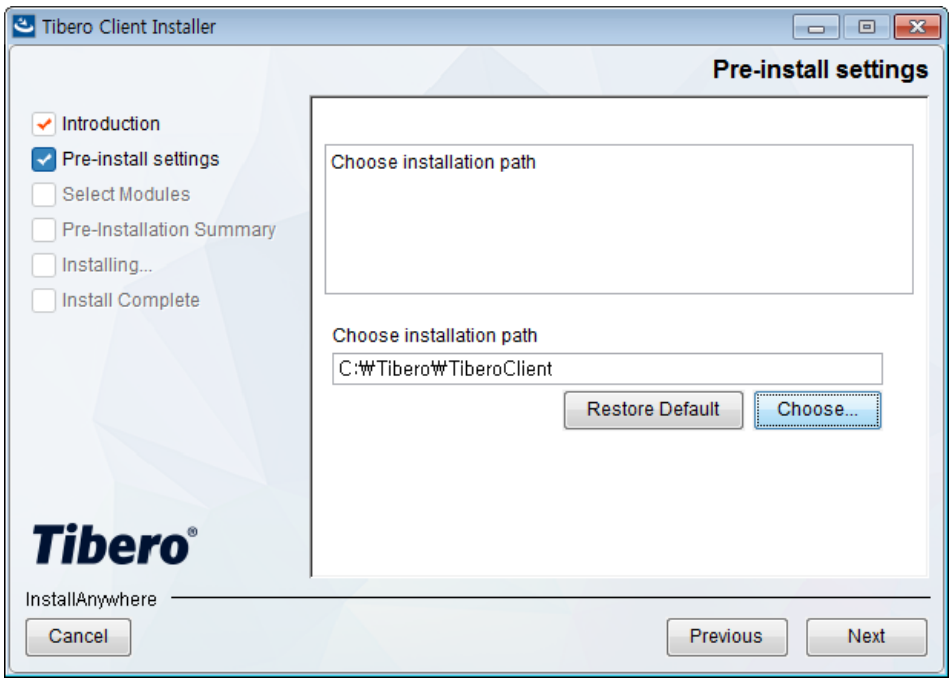


2. After clicking **[Next]**, the following screen is displayed. Select the installation directory. **'C:\Tibero\TiberoClient'** is set as the default directory. To change the installation directory, click **[Choose...]** and select the desired folder. To restore the default installation directory, click **[Restore Default]**. After entering a directory, click **[Next]** to continue.

Note

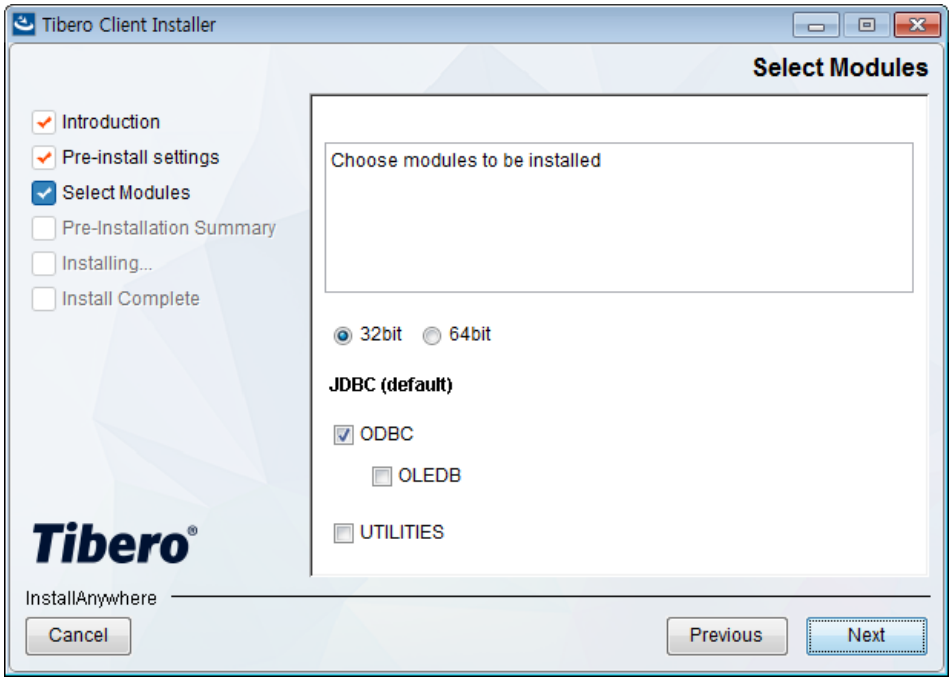
If an existing installation directory is selected and overwritten, an unexpected error may occur due to the version difference.

[Figure 5.2] Client Install Path



3. Choose the modules to install.

[Figure 5.3] Choosing Client Installation Modules



Note

To install the OLE DB module, the ODBC module must also be selected.

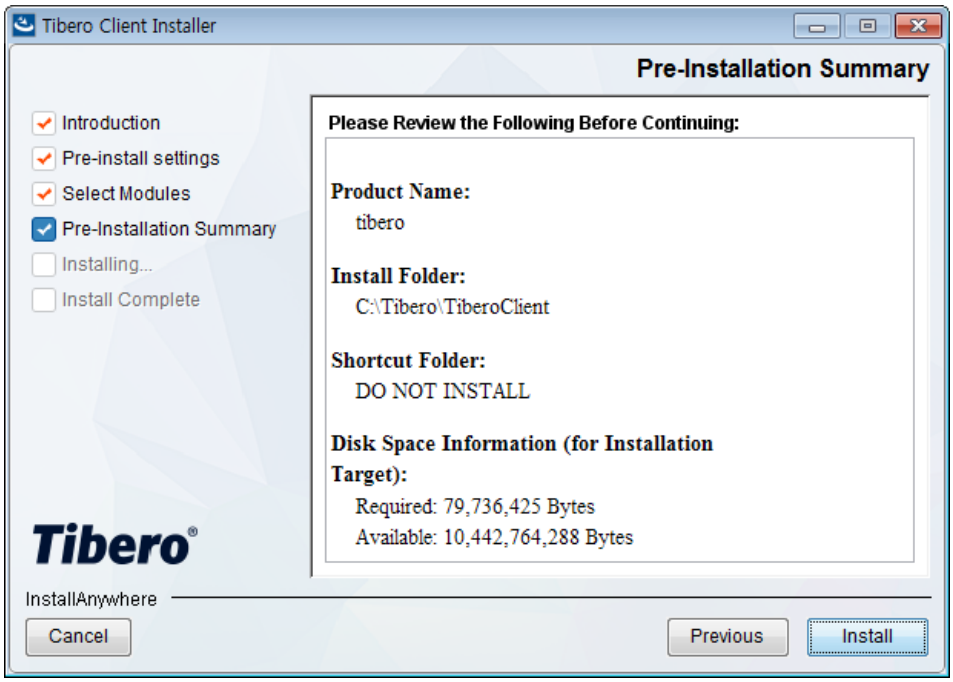
The JDBC driver is installed by default. The following are the available options.

Option	Description
Bit	Bit information of the client library to install.
ODBC	Installs Tibero ODBC driver provider in Tibero ODBC Data Source Administrator.
OLE DB	Installs the OLE DB module. The ODBC module must be installed to install the ODBC DB module.
UTILITIES	Installs client utilities such as tbSQL and tbLoader.

4. The pre-installation summary screen is displayed. Review the details, verify the installation directory, and then click **[Install]** to begin the installation.

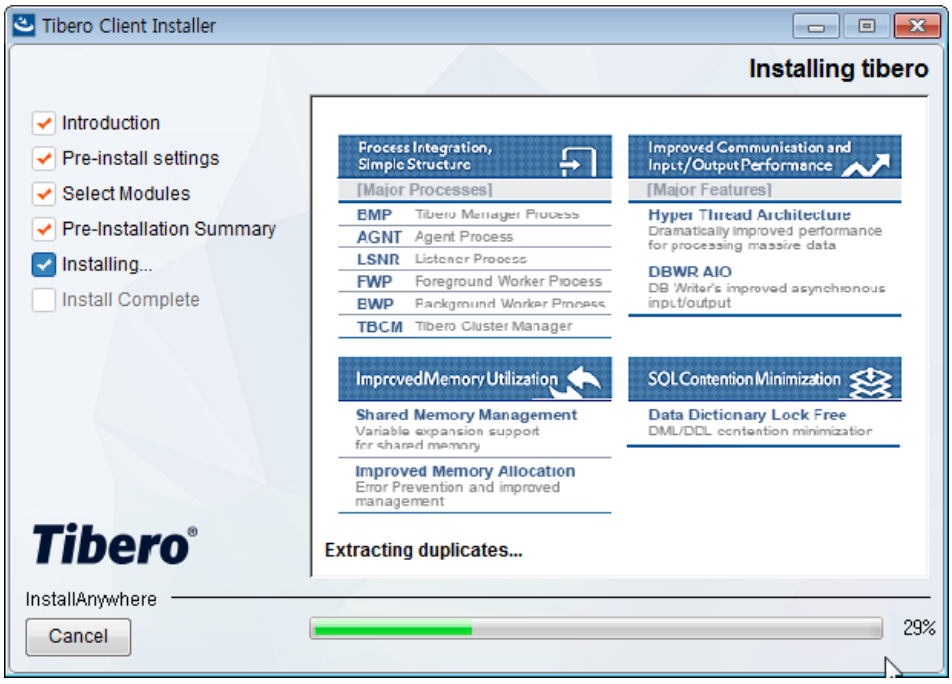
   To modify the installation information, click **[Previous]** and then modify the information.

[Figure 5.4] Client Pre-Installation Summary



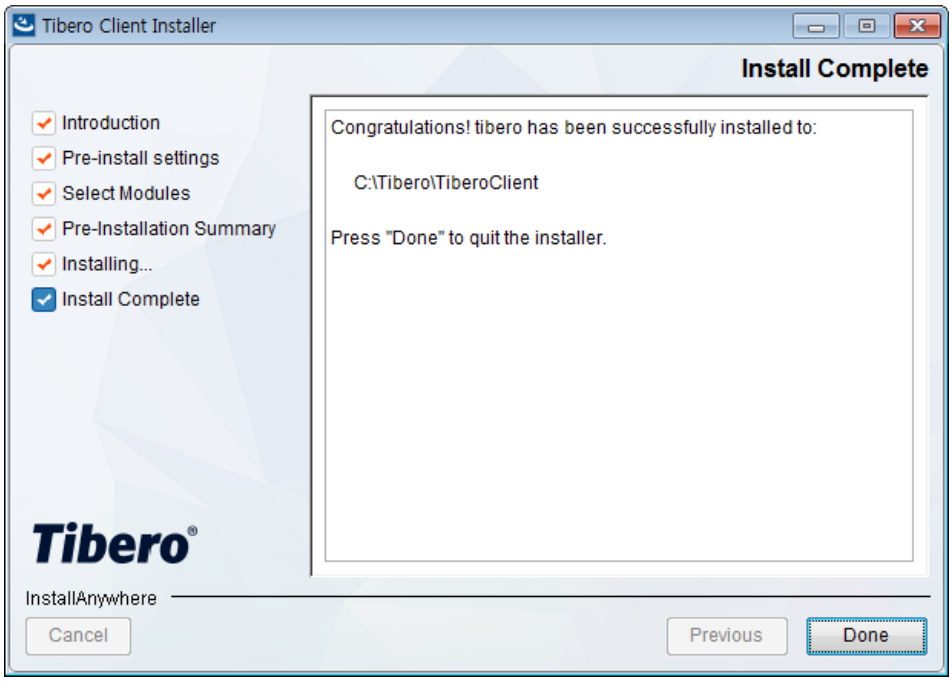
5. After clicking **[Install]**, the installation progress screen is displayed.

[Figure 5.5] Client Installation



6. When the Tibero client installation is complete, the following screen is displayed. Click **[Done]** to close the installer.

[Figure 5.6] Client Installation Complete



5.2. Uninstallation

The following is the Tibero client uninstallation process for Windows.

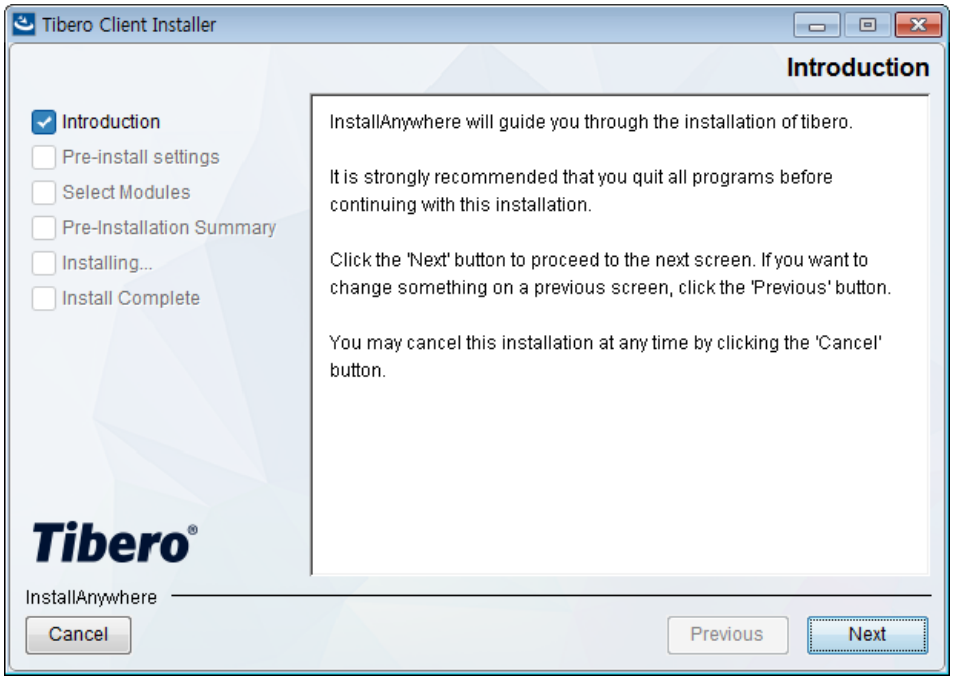
Note

The logs genereated duing the Tibero client uninstallation process is not deleted automatically. They must be deleted manually.

---

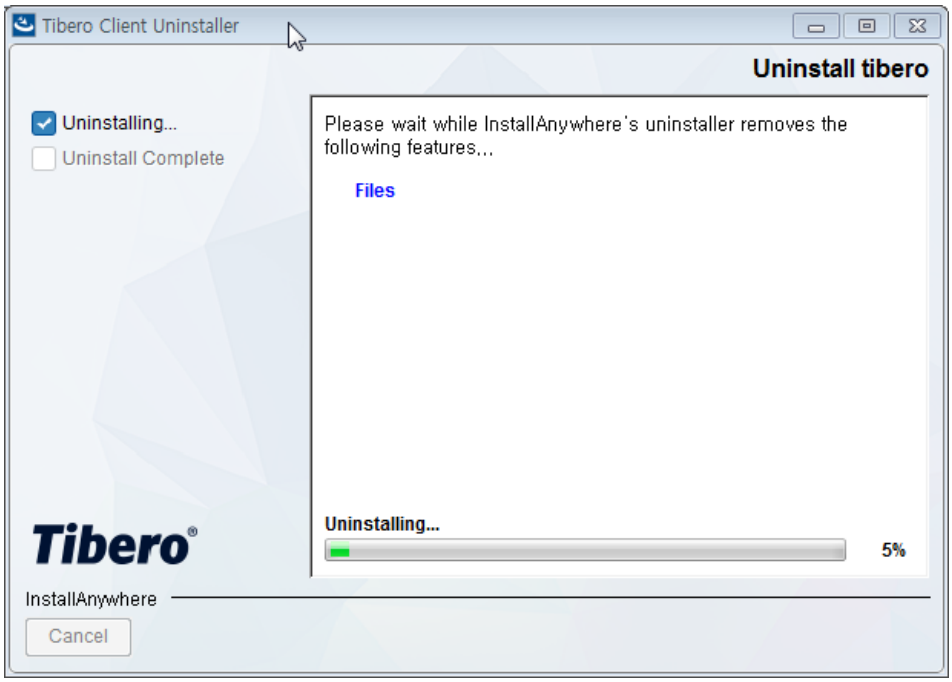
1. Double-click the "{*Tibero Client Installation Path*}\.installation\Tibero Client Uninstall.exe" file. The following screen is displayed.

[Figure 5.7] Client Uninstallation Start Screen



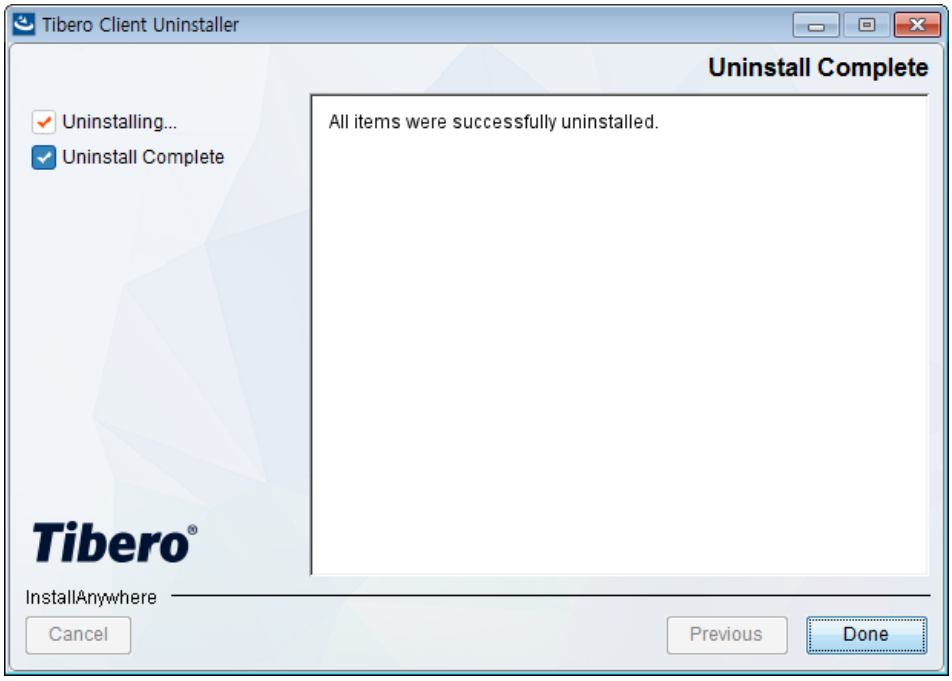
2. After clicking **[Next]**, the uninstallation progress screen is displayed.

[Figure 5.8] Client Uninstallation Progress Screen



3. When uninstallation is complete, click **[Done]** to close the installer.

[Figure 5.9] Client Uninstallation Complete



Chapter 6. Multi-instance Installation

This chapter describes how to install multiple instances.

6.1. Overview

In Windows and Unix (Linux), multiple instances from different databases can be simultaneously installed. These instances can share a single Tibero license file and a Tibero binary execution file, but their TB_SID and environment file (.tip) must be separately configured.

6.2. Windows

The following is the Tibero

1. Install a Tibero “3.2.1. GUI Mode (Windows)” or “3.3.1. Windows ”.

   The following are the assumed values of the environment variables for the previously installed instance.

Environment Variable	Value
TB_HOME	C:\Tibero\tibero6
TB_SID	tibero1
PATH	%TB_HOME%\bin;%TB_HOME%\client\bin

2. Set the TB_SID environment variable for the instance to be installed. Its value must be different from the TB_SID

```
set TB_SID=tibero2
```

3. Enter the following command in the **%TB_HOME%\bin** directory. The service name can be omitted.

```
tbinstall %TB_HOME% %TB_SID% [-s service name]
```

   This command installs Tibero as a Windows Service.

   Registered Windows Services can be checked in **[Start] > [Settings] > [Control Panel] > [Administrative Tools] > [Service]**. Execute the command prompt by clicking **[Run as administrator]** from the context menu.

```
C:\Tibero\tibero6\bin>tbinstall %TB_HOME% %TB_SID%
 Microsoft (R) Windows Script Host Version 5.6
```

```
Copyright (C) Microsoft Corporation 1996-2001. All rights reserved.

TB_HOME = C:\Tibero\tibero6
TB_SID = tibero2
service account = LocalSystem
Tibero_tibero installed successfully.
```

4. Enter the following command in the **%TB_HOME%\config** directory.

```
gen_tip.bat
```

This command creates the environment file (.tip), tbdsn.tbr, and psm_commands.bat.

```
C:\Tibero\tibero6\config> gen_tip.bat
 Using TB_SID [tibero2]
C:\Tibero\tibero6\config\tibero2.tip generated
C:\Tibero\tibero6\client\config\tbdsn.tbr generated.
C:\Tibero\tibero6\config\psm_commands.bat generated
```

5. Open the environment file (.tip) created in the **%TB_HOME%\config** directory. Set LISTENER_PORT to a value different from the LISTENER_PORT value of any previously installed instance.

```
   ......Omitted......

DB_NAME=tibero2
LISTENER_PORT=9629

    ......Omitted......
```

Note

The default values of _LSNR_SPECIAL_PORT, _LSNR_SSL_PORT, and CM_PORT are LISTENER_PORT+1, LISTENER_PORT+2, and LISTENER_PORT+3, respectively. When setting LISTENER_PORT, make sure that the values of LISTENER_PORT, _LSNR_SPECIAL_PORT, _LSNR_SSL_PORT, and CM_PORT are different from the values of any previously installed instance.

6. The subsequent steps of the installation process are the same as in “3.2.1. GUI Mode (Windows)” from step 6. However, when using the CREATE DATABASE statement to create a database in step 7, modify the log file or the data file path to match the TB_SID

6.3. Unix

The Tibero

1. Install the Tibero instance by referring to “3.2.2. Console Mode (Linux)” or “3.3.2. UNIX”.

The following are the assumed values of the environment variables for the previously installed instance.

Environment Variable	Value
TB_HOME	/home/tibero/Tibero/tibero6
TB_SID	tibero1
LD_LIBRARY_PATH	$TB_HOME/lib:$TB_HOME/client/lib
PATH	$PATH:$TB_HOME/bin:$TB_HOME/client/bin

2. Set the TB_SID environment variable for the instance to be installed. Its value must be different from the TB_SID

```
export TB_SID=tibero2
```

3. Enter the following command in the **$TB_HOME/config** directory.

```
gen_tip.sh
```

This command creates the environment file (.tip), tbdsn.tbr, and psm_commands.bat.

```
tibero@Tibero:~/Tibero/tibero6/config$ gen_tip.sh
Using TB_SID "tibero2"
/home/tibero/Tibero/tibero6/config/tibero2.tip generated
/home/tibero/Tibero/tibero6/config/psm_commands generated
/home/tibero/Tibero/tibero6/client/config/tbdsn.tbr generated.
Running client/config/gen_esql_cfg.sh
Done.
```

4. Open the environment file (.tip) created in the **$TB_HOME/config** directory. Set LISTENER_PORT to a value different from the LISTENER_PORT value of any previously installed instance.

```
tibero@Tibero:~/Tibero/tibero6/config$ cat tibero2.tip
    ......Omitted......

DB_NAME=tibero2
LISTENER_PORT=9629
    ......Omitted......
```

Note

The default values of _LSNR_SPECIAL_PORT, _LSNR_SSL_PORT, and CM_PORT are LISTENER_PORT+1, LISTENER_PORT+2, and LISTENER_PORT+3, respectively. When setting LISTENER_PORT, make sure that the values of LISTENER_PORT, _LSNR_SPECIAL_PORT, _LSNR_SSL_PORT, and CM_PORT are different from the values of any previously installed instance.

5. The subsequent steps of the installation process are the same as in “3.2.2. Console Mode (Linux)” from step 6. However, when using the CREATE DATABASE statement to create a database in step 6, modify the log file or the data file path to match the TB_SID

Chapter 7. TAC (Tibero Active Cluster) Installation

This chapter describes how to install Tibero to configure TAC(Tibero Active Cluster).

7.1. Pre-Installation Tasks

Before TAC is configured, verify the following:

- System requirements

  For more information about the system requirements for TAC, refer to “1.3. System Requirements”.

- Installation requirements

  Before configuring TACUAC, verify the basic installation requirements in “Chapter 2. Pre-installation Tasks”.

- IP address and port information
- Socket buffer configuration
- Shared disk type

7.1.1. Checking IP Address and Port Information

Prior to installation, check the external IP address and listener port number which are needed by an instance of Tibero. In addition, the interconnect IP address, interconnect port number, and the CM port number are also required.

- IP Address

Classification	Description
External IP address	IP address for external communication.
Interconnect IP address	Internal IP address for communication among nodes.

- Port Number

Classification	Description
Listener port number	Port number assigned when each node's Tibero instance starts.
port number	Port number assigned to for communication among nodes.
Interconnect port number	Port number for communication among each node's Tibero instances.

7.1.2. Socket Buffer Configuration

Configure the socket buffer values of the operating system.

Parameter	Recommended Value
SB_MAX	4194304
TCP_RECVSPACE	4194304
TCP_SENDSPACE	1048576

Note

The sb_max parameter is only applicable to the AIX operating system.

7.1.3. Checking Shared Disk Type

TAC requires shared disk space that all instances can access together.

To execute and operate TAC, at least seven shared files are needed. The files are created based on the parameter {SHARED_DISK_HOME} entered by the user during installation. If necessary, {TAC_INSTANCE_ID} is attached to the name of the files. For example, if {SHARED_DISK_HOME} is "dev/tac" and {TAC_INSTANCE_ID} is 0, the path of an Undo log file is "dev/tac/UNDO0.tdf."

The following is a list of shared files necessary when a node is originally installed as well as the paths where the files are created.

File	Path
Control file	{SHARED_DISK_HOME}/c1.ctl (changeable)
cfile for CM	{SHARED_DISK_HOME}/cfile/cls1_cfile (changeable)
Redo log file	{SHARED_DISK_HOME}/log{TAC_INSTANCE_ID}1.log {SHARED_DISK_HOME}/log{TAC_INSTANCE_ID}2.log {SHARED_DISK_HOME}/log{TAC_INSTANCE_ID}3.log
Undo log file	{SHARED_DISK_HOME}/UNDO{TAC_INSTANCE_ID}.tdf

File	Path
User tablespace file	{SHARED_DISK_HOME}/usr001.tdf
System tablespace file	{SHARED_DISK_HOME}/system001.tdf
Temporary tablespace file	{SHARED_DISK_HOME}/temp001.tdf

Note

If the above file names cannot be used because of hardware, use symbolic links.

Each additional node after the first needs the following four shared files. For information on each file's path, see the above table.

- Three redo log files
- An undo log file

Note

If a raw device is used as a shared disk, each shared file above corresponds to a single raw device file. Prior to installation, a raw device administrator needs to create the corresponding file. Each file's size should be sufficiently large, its block size must be 512 kilobytes, and the character type must be set.

A control file and cfile and resource file for CM can be installed in custom mode so that the user can choose a desired path and name. **However, to change a file name or block size, contact the Tibero technical support team.**

7.2. Manual Installation

For information on how to manually configure the TAC environment and install Tibero , refer to 'Chapter 9. Tibero Cluster Manager' and 'Chapter 10. Tibero Active Cluster' in the "Tibero Administrator's Guide."

7.3. Verifying Installation

The tbcm command can verify if installation was properly completed.

```
tbcm -s
```

When the command is run, the CM configuration will be displayed, as below.

```
CM information
============================================================
```

```
CM NAME             : cm0
CM UI PORT          : 8635
RESOURCE FILE PATH  : /home/tibero6/cm0_res.crf
CM MODE             : GUARD ON, FENCE OFF
LOG LEVEL           : 2
================================================================
```

Note

For information on how to use the tbcm command, refer to 'Chapter 9. Tibero Cluster Manager' in the "Tibero Administrator's Guide."

7.4. Uninstallation

There are two methods for uninstalling a node in the TAC environment: **console mode** and **manual mode**.

Console Mode

The following is the process for removing a node in console mode.

1. Close the Tibero instance.

   ```
   tbdown
   ```

2. Close TBCM.

   ```
   tbcm -d
   ```

3. Delete all the child directories that include the directory in which Tibero is installed by using the operating system's command.

   ```
   $ rm –rf $TB_HOME
   ```

Manual Mode

The following is the process for removing a node in manual mode.

1. Close Tibero instance.

   ```
   tbdown
   ```

2. Close TBCM.

```
tbcm -d
```

3. Remove the directory where the Tibero instance is installed as well as its subdirectories.

```
rm –rf $TB_HOME
```

Appendix A. Troubleshooting

This appendix describes how to solve problems that can occur after Tibero is installed.

A.1. User Configuration File

A.1.1. TB_HOME

- Problem and Cause

```
TBR-2048 : Data source was not found.
```

If the property **TB_HOME** is not set or is set improperly, or if the user configuration file is not applied after Tibero is installed, the above message may be displayed when trying to connect to the **tbSQL** utility.

- Solution

Check the TB_HOME property in the user configuration file, change the value if necessary, and then apply the file to the system.

A.1.2. LD_LIBRARY_PATH

- Error

```
tbsql: error while loading shared libraries: libtbcli.so:
cannot open shared object file: No such file or directory
```

If the property **LD_LIBRARY_PATH** is not set or is set improperly, or if the user configuration file is not applied after Tibero is installed, the above message may be displayed when trying to connect to the **tbSQL** utility.

- Solution

Check the LD_LIBRARY_PATH property in the user configuration file, change the value if necessary, and then apply the file to the system.

A.1.3. TB_SID

- Error

```
ERROR: environment variable $TB_SID is not set
```

```
tbdown: environment variable TB_HOME or TB_SID is not set.
```

```
Tip file open failure.: No such file or directory
```

```
tbdown failed. proc info file is deleted.
```

If **TB_SID** is not set, the above message may be displayed when the **tbboot** or **tbdown** command is executed.

- Solution

Check the TB_SID property in the user configuration file, change the value if necessary, and then apply the file to the system.

A.2. TAC Installation

The following describes how to resolve issues that can occur after Tibero is installed in the TAC environment.

A.2.1. Adding a Node

Accessing a tip File

- Error

```
tip file does not exist / reading tip file failed / malformed tip file
```

If a configuration file (.tip) cannot be found when a node is added, the above message may be displayed.

- Resolution

Check whether the Tibero instance's $TB_SID.tip exists in the corresponding path by referring to TB_HOME and TB_SID.

Accessing TAC

- Error

```
extracting information from the existing cluster failed
```

To add a node, an existing node's setting values are necessary. If trying to access an existing node fails, the above message may be displayed.

- Resolution
  - Check that TB_HOME and TB_SID are set properly.
  - Check that the existing node can be accessed through tbsql.
  - If an existing node does not work, start the node with the **tbcm**, **tbboot** commands then try to add the node again.

Transferring an scp File

- Error

```
Remote file transfer failed! / Remote configuration export failed!
```

If transferring Tibero installation files to a new node fails, the above message may be displayed.

- Resolution
  - Check whether the current node can access the node to be added using ping or ssh.
  - If the current node cannot access the node to be added, check the settings for account synchronization, networking, and any firewalls.

A.2.2. TPR-Related Error When Using a TAC Raw Device

- Error

The tablespace (SYSSUB) ,which is dedicated to TPR for TPR-related tables, was added in version 5.0 r61295. During the system schema configuration portion of installing and patching, the syssub001.dtf file is automatically created in the directory $TB_HOME/database/$TB_SID. However, if the property DB_CREATE_FILE_DEST is set to a specific location, the file is created at that location.

However, in an environment where a TAC raw device is used, the file is created on the local disk of the node processing the system schema. This results in an error that prevents other nodes from accessing the SYSSUB tablespace. The same error occurs in a shared disk environment when the property, DB_CREATE_FILE_DEST, is not set correctly.

- Resolution

Recreate the SYSSUB tablespace as follows.

1. Delete the existing tablespace.

```
SQL> DROP TABLESPACE SYSSUB INCLUDING CONTENTS AND DATAFILES;
```

2. Create a new tablespace.

```
SQL> CREATE TABLESPACE SYSSUB DATAFILE '<SYSSUB path>/syssub001.dtf' ...;
```

3. Execute the following script.

```
$TB_HOME/scripts/tpr.sql
$TB_HOME/scripts/pkg/_pkg_dbms_tpr.tbw
```

A.3. Miscellaneous

A.3.1. Port Number

- Error

```
Listener port = 8629
bind() failed: Address already in use.
Error: Timedout while trying to open port 8629
Check if there are any Tibero instances running.
Tibero instance startup failed!
```

This error occurs when the specified port number is already in use when executing the **tbboot** command.

- Resolution

Check whether the instance is already in use or modify the port number set in the $TB_SID.tip file in $TB_HOME/client/config.

Appendix B. Mounting a CD-ROM

This appendix describes how to mount a CD-ROM for each platform.

B.1. AIX

The method for mounting a CD-ROM in AIX is as follows.

1. Login with a root account.
2. Create a mount point to which a CD-ROM drive will be mounted.

```
# mkdir /cdrom
```

3. Run the mount command.

```
mount <option>
      <device_name><mount_point>
```

B.2. HP

The method for mounting a CD-ROM in HP is as follows.

1. Login with a root account.
2. Determine the CD to be mounted.

```
# ioscan -fun -C disk
```

3. If there is no CD-ROM in the /etc/pfs_fstab directory, mount a new CD-ROM.
4. Mount a new CD-ROM.

```
# nohup /usr/sbin/pfs_mountd
         & # nohup /usr/sbin/pfsd &
```

5. Insert a CD.

```
# /usr/sbin/pfs_mount /SD_CDROM
```

6. Change the CD.

```
# /usr/sbin/pfs_umount /SD_CDROM
```

7. Eject the CD and insert another CD.

```
# /usr/sbin/pfs_mount /SD_CDROM
```

B.3. LINUX

The method for mounting a CD-ROM in Linux is as follows.

1. Check whether automounting is working.

```
$ ps -aux | grep automount
```

2. Switch to a root account using the root account password.

```
$ su -
Password : *****
```

3. Run the mount command.

```
# mount <option>
        <device_name><mount_point>
```

4. Run the unmount command.

```
# umount <mount_point>
```

B.4. Solaris

The method for mounting a CD-ROM in Solaris is as follows.

1. Check the volume manageto verify whether a CD is recognized automatically.

```
$ ps -e | grep vold
```

2. If a CD exists, eject the CD.

```
$ eject
```

3. Insert a CD and mount it with the following command.

```
# mkdir <mount_point> #
        mount <options> <device_name>
        <mount_point>
```

Appendix C. Supported Character Sets

This chapter describes the character sets supported in Tibero.

The following character sets are provided in Tibero.

Language	Character Set	Description
Universal	UTF8	24-bit International Standard Multilingual
Korean	EUCKR	EUC 16-bit Korean
	MSWIN949	MS Windows Code Page 949 Korean (Default Value)
English	ASCII	ASCII 7-bit English
Japanese	SJIS	SHIFT-JIS 16-bit Japanese
	JA16SJIS	MS Windows Code Page 932 Japanese
	JA16SJISTILDE	MS Windows Code Page 932 Including Fullwidth Tilde
	JA16EUC	EUC 24-bit Japanese
	JA16EUCTILDE	EUC 24-bit Japanese
Chinese	GBK	MS Windows Code Page 936 Chinese
Chinese, Hong Kong	ZHT16HKSCS	HKSCS2001 Hong Kong MS Windows Code Page 950 Chinese
Vietnamese	VN8VN3	VN3 8-bit Vietnamese
Eastern European	EE8ISO8859P2	ISO8859-2 Eastern European
Western European	WE8MSWIN1252	MS Windows Code Page 1252 Western European
	WE8ISO8859P1	ISO8859-1 Western European
	WE8ISO8859P9	ISO8859-9 Western European (Turkish)
	WE8ISO8859P15	ISO8859-15 Western European
Russian, Bulgarian	CL8MSWIN1251	MS Windows Code Page 1251 Cyrillic Script
	CL8KOI8R	KOI8-R Cyrillic Script
	CL8ISO8859P5	ISO8859-5 Cyrillic Script

The following shows how to check the available character sets for installation when installing the Tibero binary.

```
$ tbboot -C

Available character set list

  ASCII
  CL8ISO8859P5
  CL8KOI8R
  CL8MSWIN1251
  EE8ISO8859P2
  EUCKR
  ......Omitted......

Available nls_date_lang set list

  AMERICAN
  BRAZILIAN PORTUGUESE
  JAPANESE
  KOREAN
......Omitted......
```

Appendix D. system.sh

This chapter describes the options of system.sh(vbs).

The following are the options that can be used with system.sh(vbs).

```
$ system.sh -h
Usage: system.sh [option] [arg]
-h : dispaly usage
-p1 password : sys password
-p2 password : syscat password
-a1 Y/N : create default system users & roles
-a2 Y/N : create system tables related to profile
-a3 Y/N : register dbms stat job to Job Scheduler
-a4 Y/N : create TPR tables
pkgonly : create psm built-in packages only
minonly : create minimum packages only
-sod Y/N : separation of duties
error : print error whenever sql encounters error
```

The following describes each option.

Option	Description
-h	Displays the help screen.
-p1 password	Enters the password of the SYS account. (Default value: tiberochangepassword)
-p2 password	Enters the password of the SYSCAT account. (Default value: syscat)
-a1	Creates a system user and grant permissions. For the initial installation, select '**Y**'. – Y: create a system user and grant permissions. – N: retain data.
-a2	Creates a table for a profile that can specify the database user password management policy. For the initial installation, select '**Y**'. – Y: delete the existing table and create a new one. – N: retain data.

Option	Description
	For more information about the profile, refer to "Chapter 5: User Management and Database Security" of "Tibero Administrator's Guide".
-a3	Registers a job schedule for collecting database object statistics. For the initial installation, it is recommended to select '**Y**'. – Y: delete the job for statistics collection and then register. – N: do not register.
-a4	Creates TRP related tables for regular, automatic collection of statistics. Select '**Y**' for the initial installation. – Y: delete the existing table and then create a new one. – N: retain data. For more information about the APM, refer to "Chapter 14 Tibero Performance Repository" of "Tibero Administrator's Guide."
pkgonly	Executes only PSM built-in package scripts.
minonly	Only executes the minimum required scripts to operate the DB. (Not supported in Windows)
-sod	Divides the administrator role into 3 accounts for security purposes. – SYSSEC: Security Administrator – SYSAUD: System Auditor – SYSADM: System Administrator (Default value: N, Not supported in Windows)
error	Outputs error details to the terminal when an error occurs from a specific script while executing system.sh. (Not supported in Windows)

Appendix E. Configuring HugePage

This chapter describes how to configure HugePage for each operating system.

E.1. Linux

This section describes how to configure HugePage in Linux. Root permission is required.

E.1.1. Enabling HugePage

The following describes how to enable HugePage.

1. Check the size of HugePage support in the current OS.

```
$ grep Hugepagesize /proc/meminfo
Hugepagesize:     2048 KB
```

2. Check the user group ID that runs Tibero.

```
$ id -a
uid=579(tibero) gid=579(tibero) groups=579(tibero)
```

3. Apply the groups and number that will allocate HugePage in "/etc/sysctl.conf".

Kernel Parameter	Description	Expression
vm.nr_hugepage	Number of HugePages.	Size of TOTAL_SHM_SIZE / HugePage.
shmall	Group ID that will allocate HugePage.	User group ID that runs Tibero.

The following is an example of applying the kernel parameter when TOTAL_SHM_SIZE is set to 1024MB and the size of HugePage supported by the current OS is 2MB (2048 KB).

```
$ cat /etc/sysctl.conf
......Omitted......
vm.nr_hugepage=512
vm.hugetlb_shm_group=579
```

4. Apply the maximum locked memory value in "/etc/security/limits.conf".

Value	Expression
memlock	HugePage size * number of HugePages

The following is an example of configuring the memlock value.

```
$ cat /etc/security/limits.conf
......Omitted......
tibero           soft    memlock         1048576
tibero           hard    memlock         1048576
```

5. Restart the operating system.

   The modified HugePage value has been applied.

```
$ egrep -e HugePages_Total /proc/meminfo
HugePages_Total:   512 kB
```

6. Configure the Tibero initialization parameters in the environment file (.tip).

Initialization Parameter	Value
TOTAL_SHM_SIZE	HugePage size * HugePage count
_USE_HUGE_PAGE	Y

The following is an example of configuring the initialization parameters.

```
$ cat tibero.tip
......Omitted......
TOTAL_SHM_SIZE=1G
_USE_HUGE_PAGE=Y
```

7. Grant the CAP_IPC_LOCK permission to the $TB_HOME/bin/tbsvr file by using the root permission.

```
$ su -
Password:
$ setcap CAP_IPC_LOCK+ep tbsvr
```

8. Restart the Tibero server.

```
$ tbdown

Tibero instance terminated (NORMAL mode).

$ tbboot
Listener port = 8629
Change core dump dir to /home/tibero/tibero6/instance/tibero.
```

```
Tibero 6

TmaxData Corporation Copyright (c) 2008-. All rights reserved.
Tibero instance started up (NORMAL mode).
```

E.1.2. Disable HugePage

To disable HugePage, restore the values that were modified to enable HugePage to their original values. The modified values can be restored by the same process and order used to enable Hugepage.

E.2. HP-UX

HP-UX uses Large Page instead of HugePage. The function that applies Large Page for shared memory regions is not separately supported by the OS.

The default page can be configured for the entire system. Use the kctune command to modify the base_pagesize value (unit: MB) and then restart the computer. However, the HP-UX PARISC OS does not support this function.

The following is an example of using the kctune command to configure the default page value.

```
$ kctune base_pagesize=16
```

E.3. AIX

AIX uses Large Page instead of HugePage. The benefits of using Large Page are similar to those of HugePage.

E.3.1. Enabling Large Page

The following describes how to enable Large Page.

1. Change the Large Page configuration value of the OS.

   AIX internally maintains physical memory pool sizes of 4 KB and 16 MB.

   The size of this pool can be changed to 16 MB by using the vmo command. The remaining space is automatically allocated to the 4 KB pool. From AIX 5.3 on, Large Page pools are dynamically maintained, so the system does not need to be restarted after changing the size.

   First, v_pinshm must be separately configured so that the space in which the shared memory is allocated is not swapped to disk. percent_of_real_memory is the amount of memory that TSM possesses as a percentage of the total memory.

```
$ vmo r o v_pinshm=1
$ vmo r o maxpin%=percent_of_real_memory
```

Configure the Large Page pool size. num_of_lage_pages is an integer and is equal to TSM / 16 MB.

```
$ vmo p o lgpg_regions=num_of_lage_pages o lgpg_size=16 MB
```

2. Configure user permissions.

   According to the security policy, all users (except the root user) must have the CAP_BYPASS_RAC_VMM permission to use Large Page. The permission can be configured by using the chuser command.

```
$ chuser capabilities=CAP_BYPASS_RAC_VMM,CAP_PROPAGATE <user id>
```

3. Configure the following Tibero initialization parameters in the environment configuration file (.tip).

Initialization Parameter	Value
TOTAL_SHM_SIZE	Must be less than or equal to the size that was allocated for the 16 MB memory pool.
_USE_HUGE_PAGE	Y

   The following is an example of configuring the initialization parameters.

```
$ cat tibero.tip
......Omitted......
TOTAL_SHM_SIZE=1G
_USE_HUGE_PAGE=Y
```

4. Restart the Tibero server.

```
$ tbdown

Tibero instance terminated (NORMAL mode).

$ tbboot
Listener port = 8629
Change core dump dir to /home/tibero/tibero6/instance/tibero.

Tibero 6

TmaxData Corporation Copyright (c) 2008-. All rights reserved.
Tibero instance started up (NORMAL mode).
```

E.3.2. Disabling Large Page

To disable Large Page, restore the values that were modified to enable Large Page to their original values.

E.4. Solaris

The functionality of HugePage can be applied by using the ISM (Intimate Shared Memory) function through Large Page. The advantages of using ISM are as follows.

- ISM shared memory is automatically locked by the OS when it is created. This ensures that the memory segment is not swapped to disk. It also allows the kernel to use a fast locking mechanism for I/O of the shared memory segment.

- The memory structure used to convert the kernel's virtual memory address into a physical memory address is shared between multiple processes. This sharing reduces CPU consumption and conserves kernel memory space.

- Large Page supported in the system's MMU (Memory Management Unit) is automatically allocated in the ISM memory segment.

  This allocation improves system performance by conserving memory space for managing pages and by simplifying virtual memory address conversion.

E.4.1. Enabling HugePage

To enable HugePage, configure the server initialization parameter as follows. The parameter is only valid in Solaris and the default value is Y.

```
_USE_ISM=Y
```

If this function is turned on, shmget is used to create share memory and the SHM_SHARED_MMU option is added when attaching with shmat.

This function is only applied in the server process and the listener process. The client module that attaches the server's TSM does not use this option.

However, if the parameter configuration value is not Y, change the value to Y and restart the Tibero server.

E.4.2. Disabling HugePage

Set the server initialization parameter _USE_ISM to N and then restart the Tibero server.

```
_USE_ISM=N
```

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