

Altibase® Tools & Utilities

Adapter for JDBC User's Manual

Release 7.1 (July 5, 2017)



Altibase® Tools & Utilities Adapter for JDBC User's Manual
Release 7.1
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Altibase Corp.
10F, Daerung PostTower II,
306, Digital-ro, Guro-gu, Seoul 08378, Korea
Telephone: +82-2-2082-1000 Fax: 82-2-2082-1099
Homepage: <http://www.altibase.com>

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Preface

About This Manual

This manual delineates Adapter for JDBC, an utility replicating modified data in Altibase to other database supporting JDBC

Audience

This manual has been prepared for the following Altibase users:

- Database administrators
- Application developers
- Technical support workers

It is recommended that those reading this manual possess the following background knowledge:

- Basic knowledge in the use of computers, operating systems, and operating system utilities
- Experience in using relational databases and an understanding of database concepts
- Computer programming experience
- Experience in database server, operating system or network administration

Software Environment

This manual has been written assuming Altibase 6.3.1 or higher is used as the database server.

Organization

This manual has been organized as follows:

- [Chapter1: Introduction](#)

This chapter explicates the concept of Adapter for JDBC and its operation structure for replicating modified data in Altibase to other database.

- [Chapter2: Installation and Configuration](#)

This chapter will cover instructions for installing Adapter for JDBC and its configuration.

- [Chapter3: Usage Instruction](#)

This chapter thoroughly demonstrates how to use Adapter for JDBC.

Documentation Conventions

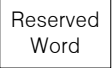




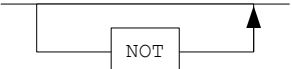
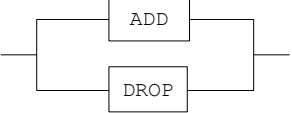
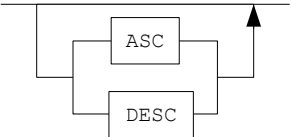
This section describes the conventions used in this manual. Understanding the following conventions will make it easier to find information in this manual and other manuals in the series.

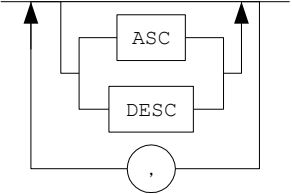
The conventions described in this chapters are as follows.

- Syntax diagram conventions
- Sample code conventions

Syntax Diagram Conventions

This manual describes command syntax using diagrams composed of the following elements:

Elements	Meaning
	Indicates the start of a command. If a syntactic element starts with an arrow, it is not a complete command.
	Indicates that the command continues to the next line. If a syntactic element ends with this symbol, it is not a complete command.
	Indicates that the command continues from the previous line. If a syntactic element starts with this symbol, it is not a complete command.
	Indicates the end of a statement.
	Indicates a mandatory element.
	Indicates an optional element.
	Indicates a mandatory element comprised of options. One, and only one, option must be specified.
	Indicates an optional element comprised of options.

Elements	Meaning
	Indicates an optional element in which multiple elements may be specified. A comma must precede all but the first element.

Sample Code Conventions

The code examples explain SQL statements, stored procedures, iSQL statements, and other command line syntax.

The following table describes the printing conventions used in the code examples.

Rules	Meaning	Example
[]	Indicates an optional item.	VARCHAR [(size)] [[FIXED] VARIABLE]
{ }	Indicates a mandatory field for which one or more items must be selected.	{ ENABLE DISABLE COMPILE }
	A delimiter between optional or mandatory arguments.	{ ENABLE DISABLE COMPILE } [ENABLE DISABLE COMPILE]
. . . .	Indicates that the previous argument is repeated, or that sample code has been omitted.	iSQL> select e_lastname from employees; E_LASTNAME ----- Moon Davenport
Other Symbols	Symbols other than those shown above are part of the actual code.	EXEC :p1 := 1; acc NUMBER(11,2);
Italics	Statement elements in italics indicate variables and special values specified by the user.	SELECT * FROM table_name; CONNECT <i>userID/password</i> ;
Lower case words	Indicate program elements set by the user, such as table names, column names, file names, etc.	SELECT e_lastname FROM employees;

Rules	Meaning	Example
Upper case words	Keywords and all elements provided by the system appear in upper case.	DESC SYSTEM_.SYS_INDEX_;

Related Documents

For more detailed information, please refer to the following documents:

- Installation Guide
- Administrator's Manual
- Replication Manual
- Log Analyzer User's Manual
- iSQL User's Manual
- Utilities Manual
- Error Message Reference

Online Manual

Online versions of our manuals (PDF or HTML) are available from Altibase's Customer Support site (<http://altibase.com/support-center/>).

Altibase Welcomes Your Opinions

Please feel free to send us your comments and suggestions regarding this manual. Your comments and suggestions are important to us, and may be used to improve future versions of the manual. When you send your feedback, please make sure to include the following information:

- The name and version of the manual you are using
- Your comments and suggestions regarding the manual
- Your full name, address, and phone number

In addition to suggestions, this address may also be used to report any errors or omissions discovered in the manual, which we will address promptly.

If you need immediate assistance with technical issues, please contact Altibase's Customer Support site (<http://altibase.com/support-center/>).

We always appreciate your comments and suggestions.

1 Introduction

This chapter delineates the concept and structure of Adapter for JDBC and the operational structure of how modified data in Altibase is replicated to other database.

1.1 Adapter for JDBC

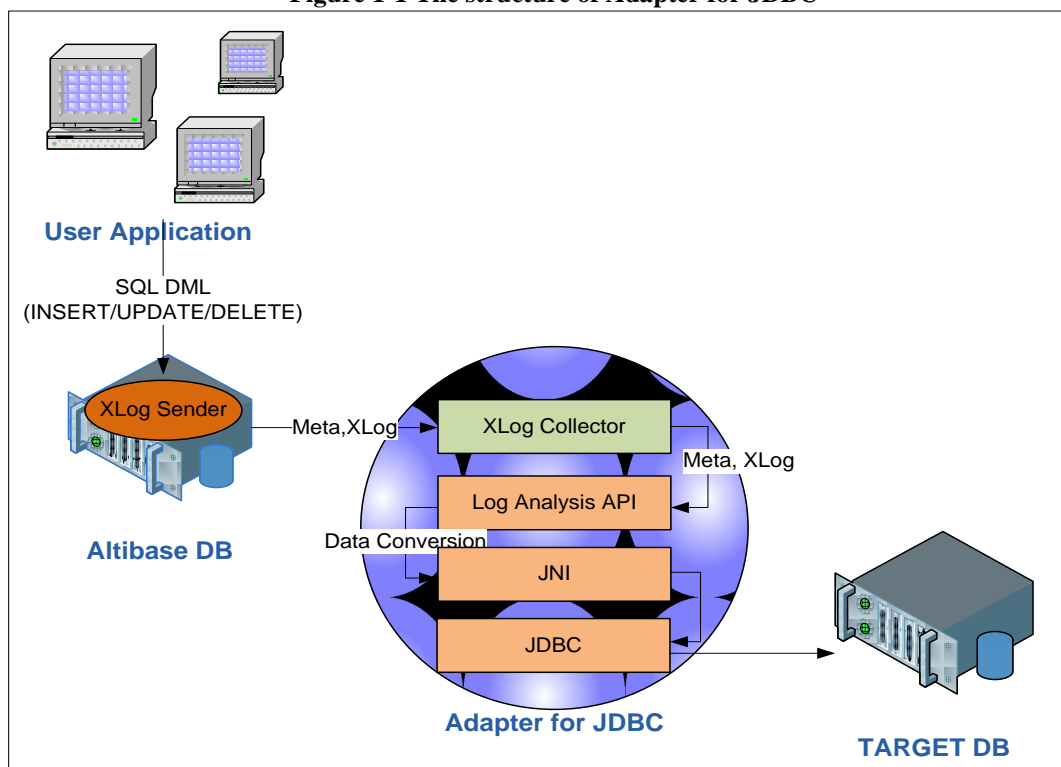
Altibase's Adapter for JDBC(jdbcAdapter) is an utility which applies modified data in Altibase to other database supporting JDBC. jdbcAdapter has been implimented with Altibase Log Analysis API.

1.1.1 Structure and Concepts

In order to replicate modified data in Altibase to other databse, Altibase, jdbcAdapter, and other database, which supports JDBC, should be installed in the first place shown in Figure1-1. jdbcAdapter has been implimented with integration of Altibase Log Analysis API(ALA) and Java data base connectivity (JDBC). The ALA utility receives data that has been modified in Altibase whereas JDBC is used to send the data to other database. Refer to the *Log Analyzer User/s Manual* for detailed information on ALA.

The following figure demonstrates how jdbcAdapter replicates from Altibase to other database.

Figure 1-1 The structure of Adapter for JDBC



1. XLogs within Altibase server creates XLog and meta information, and sends them to XLog collector. The meta information is only exchanged when handshaking takes place.
2. The XLog collector existing within jdbcAdapter uses ALA to provide XLog and meta

information to the user. If the call to ALA fails, a trace log will be written to the trc directory.

3. jdbcAdapter uses ALA to covert data to apply obtained data to other database.
4. jdbcAdapter applies modified data to other database using JDBC through JNI.

1.1.2 Terminology

1.1.2.1 XLog

An XLog is a logical log converted from a physical log. It stores transaction history involving DML(INSERT/UPDATE/DELETE) statements.

1.1.2.2 XLog Sender

XLog Sender analyzes active redologs and converts them into XLog form to send to XLog collector.

1.1.2.3 XLog Collector

XLog Collector recieves metat data and XLog from the XLog Sender. XLog Collector contains meta data, an XLog queue, a transaction table, and an XLog pool.

1.1.2.4 Handshaking

Handshaking is the task of checking the protocol version and meta data before the XLog Sender sends XLogs to the XLog Collector.

1.1.2.5 Log Analysis API

Log Analysis API is an interface provided by Altibase and it is used to implement jdbcAdapter. The API provides XLogs and meta data that are used to interpret the XLogs.

2 Installation and Configuration

This chapter describes how to install and configure the Adapter for JDBC.

2.1 Pre-installation Tasks

The following system requirements should be satisfied in order to install and run jdbcAdapter. Also, there are some required configuration for jdbcAdapter to properly performs. For detailed information about system requirements, please contact Altibase's Customer Support site (<http://support.altibase.com>).

2.1.1 OS

jdbcAdapter is only supported in the following OS at present.

- LINUX : x86-64bit

2.1.2 Database Versions

- Altibase : Version 6.3.1 or above
- Other Database : JDBC4.1 or lower version of other database.

2.1.3 Database Character Sets

This is the default character set for storing data.

2.1.4 National Character Set

The data for a language not supported by the database character set can be stored with NCHAR and NVARCHAR types.

2.1.5 Installing JDBC Driver

In order to use jdbcAdapter, JDBC driver should be installed on a machine in which jdbcAdapter will be operating. At this point, JDBC driver should be provided by a vendor of the replication target database.

2.1.6 Installing JRE

jdbcAdapter is an application program running in JRE 7 or above versions; thus, JRE 7 or higher version should be installed in which jdbcAdapter will be performed.

If the JDBC driver for the remote database to which jdbcAdapter will connect is running on

JRE version 7 or higher, a version of the JRE compatible to the JDBC driver should be installed.

After installing JRE, environment variables, such as JAVA_HOME and CLASSPATH should be installed. The following is an example of specifying environment variables for JRE in UNIX operation system.

```
$ export JAVA_HOME= The path in which export JAVA_HOME=JRE is installed.
$ export CLASSPATH=${JAVA_HOME}/lib:${CLASSPATH}
$ export PATH=${JAVA_HOME}/bin:${PATH}
$ export LD_LIBRARY_PATH=${JAVA_HOME}/jre/lib/amd64/server:${ LD_LIBRARY_PATH }
```

2.2 Installation

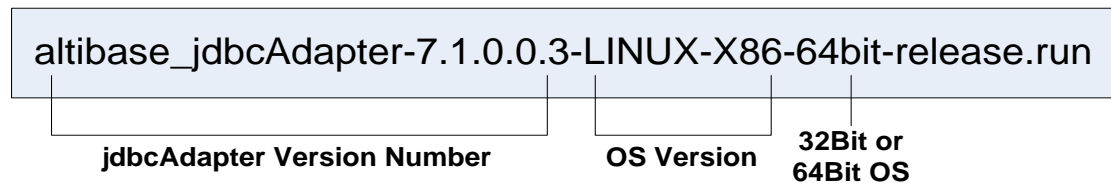
jdbcAdapter installer can be executed in GUI mode if DISPLAY environment variables are properly configured. jdbcAdapter installation is described in this manual with an assumption that the installation is being executed in GUI mode. Also, it is possible to install jdbcAdapter in text mode if the appropriate DISPLAY settings have not been properly made or the GUI mode cannot be used.

2.2.1 Installing jdbcAdapter

It is recommended to install jdbcAdapter on other user's account rather than Altibase server account of the original DB.

1. The first task is to determine the version of jdbcAdapter installer suitable for the operating system in which jdbc Adapter will run. The naming convention for jdbcAdapter installer is shown as follows.

The jdbcAdapter version must be the same as the version of Altibase with which it will be run.



2. When the installer is executed, the dialog box appears. Verify that the version of jdbcAdapter to be installed then click "Forward".
3. Select the directory in which jdbcAdapter will be installed in the next dialog box. A jdbcAdapter directory will be created within the home directory of the user account.
4. In order to use jdbcAdapter, Altibase Log Analyzer (ALA) property should be specified as in the following. Refer to *ALA Properties* section described later in this chapter.
 - ALA_SENDER_IP: This is the IP address of the server on which Altibase is installed. The default value is 127.0.0.1 on the assumption that Altibase and jdbcAdapter will be operating on the same machine.
 - ALA_RECEIVER_PORT: This is a port number for jdbcAdapter to receive data. The number should be specified within the range from 1024 to 65536.
 - ALA_REPLICATION_NAME: This is the name of a replication object existing in Altibase.
 - ALA_XLOG_POOL_SIZE: This is used to specify the maximum size of XLog pool. The default value is set to 10,000 XLogs.
 - ALA_SOCKET_TYPE: This is used to set the communication socket type used by ALA. jdbcAdapter supports TCP/IP and UNIX Domain Socket.

- ALA_LOGGING_ACTIVE: This is used to specify for ALA whether or not to write trace logs. If the value of this property is 1, trace logs are written. The default value is 1.
5. Altibase property configuration should be implemented in the following dialog box. Refer to the *Properties for Checking Constraints* described later in this chapter for detailed information.
 - ALTIBASE_USER: This is the name of user account accessing to Altibase.
 - ALTIBASE_PASSWORD: This is the password for the user account accessing to Altibase.
 - ALTIBASE_IP: This is the IP address of the server on which Altibase is installed.
 - ALTIBASE_PORT: This is the number of the port on which Altibase server is listening.
 6. Other DB properties should also be properly configured in order to use jdbcAdapter. Refer to the *Properties for DML* and *JDBC Properties* for detailed information on properties.
 - OTHER_DATABASE_USER: This is the name of a user account with which to access the Other DB.
 - OTHER_DATABASE_PASSWORD: This is the password corresponding to the user account accessing to other database which is the target database.
 - OTHER_DATABASE_SKIP_INSERT: If "Yes" is selected, INSERT statement executed in Altibase will not be performed in Other DB.
 - OTHER_DATABASE_SKIP_UPDATE: If "Yes" is selected, UPDATE statement executed in Altibase will not be performed in Other DB.
 - OTHER_DATABASE_SKIP_DELETE: If "Yes" is selected, DELETE statement executed in Altibase will not be performed in Other DB.
 - OTHER_DATABASE_GROUP_COMMIT: This property allows multiple transactions to be executed at once.
 - OTHER_DATABASE_BATCH_DML_MAX_SIZE: "Batch DML" means to process multiple DML statements with batch processing.
 - OTHER_DATABASE_SET_USER_TO_TABLE : This property specifies the target table user as a user specified in XLog Sender when applying DML in Other DB. If you do not wish to use this function, set the value of this property to 0.
 - OTHER_DATABASE_JDBC_MAX_HEAP_SIZE : This property determines the maximum size of Heap used in JVM.
 - OTHER_DATABASE_JDBC_DRIVER_PATH : This property specifies JDBC driver path for Other DB.
 - OTHER_DATABASE_JDBC_DRIVER_CLASS : This property sets the name for Other DB JDBC driver class.
 - OTHER_DATABASE_JDBC_CONNECTION_URL : This property specifies the connection URL of Other DB.
 7. Once all of the property settings pertaining to the use of jdbcAdapter, a dialog box showing specified values will appear. Then, verify if every property is properly specified,

and click "Forward" to proceed to the next.

8. Installation will promptly start once you click "Forward" in the "Ready to Install" dialog box.
9. The following two environment variables are configured while jdbcAdapter is being installed. It is required to log out and log back in to apply new environment variables to the system.
 - JDBC_ADAPTER_HOME: This environment variable will have jdbcAdapter home directory specified in previous step before the installation process as a value. PATH: \$JDBC_ADAPTER_HOME/bin path is included in this environment variable.
10. A completion dialog box will appear after the installation is successfully completed.

2.3 Post-installation Tasks

2.3.1 Setting Environment Variables

After installing jdbcAdapter, it is required to configure environment variables, add a library path, and set the database and national character sets.

Refer to the "Configuration" described later in this chapter for more detailed information on configuring the environment variables.

- This environment variable is automatically set when installing jdbcAdapter.
- The character set used in Altibase is specified in this environment variable. Refer to the Getting Started Guide for further information on the character set.

2.3.2 Confirmation on Installation Directory

After jdbcAdapter installation is complete, verify the bin, conf, msg and trc directories have been created under \$JDBC_ADAPTER_HOME directory. The role and structure of each directory is as follows.

- The executable and internally used files of contains jdbcAdapter (Adapter for JDBC) and oaUtility (Adapter for JDBC utility) are located in this directory.
- This directory is located in jdbcAdapter.conf file storing jdbcAdapter property configuration.
- If an error occurs while jdbcAdapter is being installed, the error is written to the trace log. The error message which is located in the directory will be used.
- jdbcAdapter writes trace logs to files located in this directory.

2.4 Configuration

The following environment variables should be configured in order to use jdbcAdapter.

2.4.1 ORA_ADAPTER_HOME

This is an environment variable specifying the directory in which jdbcAdapter was installed. This environment variable is automatically configured during the jdbcAdapter installation.

2.4.2 NLS_LANG

This environment variable specifies the character set used in Altibase for use in ALA. Refer to Getting Started Guide > Multilingual Support for more information on the character set.

2.5 Properties

jdbcAdapter properties are used by ALTIBASE Log Analyzer and JDBC, and they are also used for determining an operation mode.

The property file is jdbcAdapter.conf located in \$JDBC_ADPTER_HOME/conf directory.

The properties used in jdbcAdapter are classified as in the following.

- Properties for ALA
- Properties for verifying constraints
- Properties of other database which will be the target to which to send dataDML related properties

2.5.1 ALA Properties

The following property should be configured in order for jdbcAdapter to appropriately use Altibase Log Analyzer (ALA). Refer to *Log Analyzer User's Manual* for much detailed information.

2.5.1.1 ALA_SENDER_IP

This is a property specifying the IP address of Xlog sender. This property enables Altibase to set the IP address of server equipment on which Altibase has been installed.

- Default Value: 127.0.0.1

2.5.1.2 ALA_RECEIVER_PORT

This property specifies the port number for XLog collector to receive XLog. This property is used to specify the port number on which jdbcAdapter is waiting.

- Range : 1024 – 65535

2.5.1.3 ALA_RECEIVER_PORT

This property specifies the port number for XLog collector to receive XLog. This property is used to specify the port number on which jdbcAdapter is waiting.

- Range : 1024 – 65535

2.5.1.4 ALA_SENDER_REPLICATION_PORT

This is used to specify how ALA replication sender is connected with in a state of operating ALA replication object in Altibase server.

- Default Value : 0
- Range : 0 ~ 65535
- 0: Adapter waits until ALA replication object sender attempts to connect.

2.5.1.5 ALA_RECEIVE_XLOG_TIMEOUT (Unit: second)

This is a property specifying the waiting time for XLog collector to receive XLogs.

- Default Value : 300
- Range : 1 – 4294967295

2.5.1.6 ALA_REPLICATION_NAME

This property specifies the name of replication object which is used as XLog sender. The name is identical to that of the replication object created within Altibase.

2.5.1.7 ALA_SOCKET_TYPE

- This is a property specifying the socket type which will be used by Altibase Log Analyzer. However, to use Unix Domain socket, Altibase and jdbcAapter should be located on the same machine. TCP: Use of TCP/IP socket (Default value)
- UNIX: Use of UNIX Domain socket

2.5.1.8 ALA_XLOG_POOL_SIZE (Unit: count)

This is a property specifying the maximum size of XLog pool in jdbcAdapter.

- Default Value : 10,000
- Range : 1 – 2147483647

2.5.1.9 ALA_LOGGING_ACTIVE

- This property determines whether or not to allow Altibase Log Analyzer to output trace logs.
- 0: Do not output the trace log.
- 1: Output the trace log (Default)

2.5.2 Properties for Checking Constraints

2.5.2.1 ALTIBASE_USER

This property specifies the name of user account with which to access Altibase.

2.5.2.2 ALTIBASE_PASSWORD

This property specifies the password of user account with which to access Altibase.

2.5.2.3 ALTIBASE_IP

This property specifies the IP address of server machine on which Altibase is installed.

- Default Value : 127.0.0.1

2.5.2.4 ALTIBASE_PORT

This property specifies the number of a port at which Altibase listens.

- Range: 1024 – 65535

2.5.2.5 ADAPTER_ERROR_RESTART_COUNT (Unit: count)

This property specifies additional operation on all errors of Adapter.

- Default Value : 0
- Range : 0 ~ 65535
- 0: An error message is output as terminating Adapter.
- Above 1: "Re-start Adapter and apply sync target DBMS access/record " is executed for specified number of times. If it exceeds the specified counts, error message is output as terminating Adapter.

2.5.2.6 ADAPTER_ERROR_RESTART_INTERVAL (Unit: count)

- This property specifies the interval when re-attempting for the number of times specified in ADAPTER_ERROR_RESTART_COUNT. Default Value : 0
- Range : 0 ~ 65535
- 0 : Immediately re-attempt without any interval.

2.5.3 Other Database Properties

The following properties should be configured in order to use Other DB to which jdbcAdapter

sends data.

2.5.3.1 OTHER_DATABASE_USER

This property specifies the name of the user account to connect to the other database to which data is sent.

2.5.3.2 OTHER_DATABASE_PASSWORD

This property specifies the password of user account which will connect to the other database to which data is sent.

2.5.3.3 OTHER_DATABASE_JDBC_MAX_HEAP_SIZE (Unit:Mega Bytes)

This specifies the maximum size of Heap JVM uses.

- Default Value : 2048
- Range : 0 – 10240
- This property should be set to 0 to let JVM to automatically set the maximum size of Heap.

2.5.3.4 OTHER_DATABASE_JDBC_DRIVER_PATH

This property specifies JDBC driver path for Other DB.

2.5.3.5 OTHER_DATABASE_JDBC_DRIVER_CLASS

This property specifies the class name of JDBC Driver for Other DB.

2.5.3.6 OTHER_DATABASE_JDBC_CONNECTION_URL

The connection URL of Other DB is specified by this property.

2.5.4 DML-Related Properties

The following properties are used to set whether DML statements executed in Altibase will also be executed in the Other DB.

2.5.4.1 OTHER_DATABASE_GROUP_COMMIT

Multiple transactions can be processed at once. Even if commit execution is performed in the original Altibase server, the Target DB postpone to commit until certain amount of transactions are accumulated. Therefore, the overall performance can be improved, but the

response time of individual transactions might be postponed.

- Do not commit in group.
- Commit in group. (Default)

2.5.4.2 OTHER_DATABASE_BATCH_DML_MAX_SIZE (Unit: count)

"Batch DML" indicates batch processing multiple DML statements of the same kind.

- Default value: 10
- Range: 1 – 32767
- In order to turn off Batch DML, this property should be set to 1.

2.5.4.3 OTHER_DATABASE_ERROR_RETRY_COUNT (Unit: count)

This indicates the number of retry attempts if an error occurs when applying to records.

- 0 Default Value" 0
- Range: 0 ~ 65535
- 0: Do not retry.

2.5.4.4 OTHER_DATABASE_ERROR_RETRY_INTERVAL (Unit: second)

This indicates retry intervals between error occurrences when applying records.

- 0 Default Value :0
- Range: 0 ~ 65535
- 0: Immediately retry without any intervals.

2.5.4.5 OTHER_DATABASE_ERROR_SKIP_ERROR

This determines whether or not to discard writing the relevant records if it fails to record even though retry was attempted as much as OTHER_DATABASE_ERROR_RETRY_TIME at intervals of OTHER_DATABASE_ERROR_RETRY_COUNT.

- Default value: 1
- Range: 0,1
- 0: Error message is not output as terminating Adapter. (Discard writing the relevant records.)
- 1: Write from the next records. (Do not discard writing the relevant records.)

2.5.4.6 OTHER_DATABASE_SKIP_INSERT

This property determines whether the INSERT statement performed in Altibase is also executed in Other DB to which data is sent. If this property is set to 1, the INSERT statement performed in Altibase is not executed in Other DB.

- 0: Do not omit statement execution. Thus, the statement execution is normally performed.
- 1: Omit statement execution.

2.5.4.7 OTHER_DATABASE_SKIP_UPDATE

This is a property determines whether the UPDATE statement executed in Altibase is also executed in other DB to which data is sent. If this property is set to 1, the UPDATE statement executed in Altibase is not executed in Other DB.

- 0: Do not omit statement execution. That is to say, the statement execution is normally executed.
- 1: Omit statement execution.

2.5.4.8 OTHER_DATABASE_SKIP_DELETE

This property determines whether the DELET statement executed in Altibase is also executed in Other DB which is the target database to which data is sent. If this property is set to 1, the DELETE statement execute in Altibae is not execute in Other DB.

- 0: Do not omit statement execution. That is, the statement is normally executed.
- 1: Omit statement execution.

2.5.4.9 OTHER_DATABASE_SET_USER_TO_TABLE

- This property sets a user of the table applying as the user specified in XLog Sender when executing DML on Other DB0: Do not specify a user.
- 1: Specify a user.

2.5.5 Property Constraints

Spaces or a tabs cannot be used when specifying property values. Double quotation marks("")should be used in order to use characters including special characters.

3 Usage Instructions

This chapter thoroughly covers instructions on how to start, shut down, and operate jdbcAdapter.

3.1 jdbcAdapter Constraints

There are several constraints in order to properly use jdbcAdapter. jdbcAdapter cannot be used if the following conditions are not satisfied.

3.1.1 Prerequisite

- If there is a conflict in input/modify/delete operation in the target DB (Other DB), the operation is canceled and the message is left in the error log file or ignored according to the setting.
- The error occurred during the replication can be partially revoked. That is to say, if there is a redundant data while inputting multiple data, the rest of the data is completed except the redundant data.
- The replication speed might be slower than the service speed.

3.1.2 Data Constraints

- The primary key must exist in the table to be replicated.
- There should not be modification on the table to be replicated.
- The tables to be replicated in each server should have identical column types, primary keys, and NOT NULL constraints.

3.1.3 Connection Constraints

The maximum number of possible XLog Senders and duplicated connections in AltiBase database is determined by the value set in the REPLICATION_MAX_COUNT property.

3.1.4 Allowed DDL Statements

In general, replication target table cannot perform the data definition language (DDL). However, the following DDL can be executed regardless of XLog Sender. Refer to Executing DDL Statements on Replication Target Tables in the Replication Manual for more information on other allowed DDL.

- ALTER INDEX SET PERSISTENT = ON/OFF
- ALTER INDEX REBUILD PARTITION
- GRANT OBJECT
- REVOKE OBJECT

- CREATE TRIGGER
- DROP TRIGGER

3.1.5 DDL statements allowed in Replication Target Tables

Generally, if DDL is executed on a replication target table, jdbcAdapter terminates after applying all the modifications made before current DDL to the target database.

Once jdbcAdapter is terminated, the replication can be performed by re-starting jdbcAdapter after creating the table schema by executing the same DDL on the target database.

Refer to Executing DDL Statements on Replication Target Tables in the Replication Manual for more information on other allowed DDL.

3.2 Startup and Shutdown

This section provides instructions on how to start and terminate jdbcAdapter.

3.2.1 Startup

This section describes how to start and terminate jdbcAdapter.

In order to use jdbcAdapter, Altibase and the target DB must first both be running. Also, Adapter for JDBC property settings and environment variables should be appropriately configured in order for jdbcAdapter to perform. If any environment variables or property settings are changed after jdbcAdapter has been started, it will be necessary to restart jdbcAdapter in order to apply the changes. Refer to Post-installation Tasks in Chapter 2 for further information on setting environment variables.

1. Verify whether the Altibase REPLICATION_PORT_NO property has been set to a port number which is actually available for use with replication. If this property needs to be changed, it is necessary to restart Altibase.
2. Prior to start jdbcAdapter, it is also necessary to configure the XLog Sender so that Altibase Log Analyzer (ALA) can be used. The XLog Sender is used to send XLogs and Meta information from Altibase.

The following statement creates XLog Sender to replicate data in the table t1 owned by the sys user in Altibase to the table t2 which is owned by user2 in Altibase DB.

```
CREATE REPLICATION ala FOR ANALYSIS WITH '127.0.0.1', 25090
FROM sys.t1 TO user1.t2;
```

CREATE REPLICATION ala FOR ANALYSIS WITH '127.0.0.1', 25090 FROM sys.t1 TO scott.t2;		
ALA_REPLICATION_NAME	Address of jdbcAdapter	Table Name in Altibase DB
	ALA_RECEIVER_PORT	Table Name in Other DB

3. Now it is time to start jdbcAdapter. jdbcAdapter can be started either by executing it directly or by using Adapter for JDBC utility. For detailed information on how to start jdbcAdapter with the Adapter for JDBC utility, refer to Adapter for JDBC Utility in this manual. It should be noted that the jdbcAdapter can be started with the following command in LINUX operating system.

```
$ cd $JDBC_ADAPTER_HOME/bin
$ ./jdbcAdapter
```

4. Start the XLog Sender for Altibase Log Analyzer. Any attempt to start the XLog Sender before jdbcAdapter has been started will fail.

```
iSQL> ALTER REPLICATION ala START;
```


3.2.2 Shutdown

The process of shutting down jdbcAdapter includes the process of stopping the operation of the XLog Sender. If jdbcAdapter is shut down forcefully with the Adapter for JDBC Utility, it will be successfully shut down, but Altibase XLog Sender will continue to attempt to connect to jdbcAdapter.

```
iSQL> ALTER REPLICATION ala STOP;  
Alter success.
```

3.3 Data Types

If data in Altibase is applied to other database through JDBC, it will be applied being converted into JAVA string. However, DATE type data will be converted into JAVA Timestamp, then applied.

The supported data types are FLOAT, NUMERIC, DOUBLE, REAL, BIGINT, INTEGER, SMALLINT, DATE, CHAR, VARCHAR, NCHAR, and NVARCHAR.

3.4 Adapter for JDBC Utility

Adapter for JDBC utility (oaUtility) is a script that runs jdbcAdapter with the daemon and checks its status. This script is executed in the bash shell in which GNU sed is installed.

Constraints on Other Database are not checked.

The Adapter for JDBC Utility supports the following options.

- oaUtility start
- oaUtility stop
- oaUtility status
- oaUtility check

3.4.1 oaUtility Start

3.4.1.1 Syntax

```
oaUtility {start}
```

3.4.1.2 Description

This is used to start jdbcAdapter as a daemon.

3.4.2 oaUtility Stop

3.4.2.1 Syntax

```
oaUtility {stop}
```

3.4.2.2 Description

This option forcibly terminates jdbcAdapter which is currently processing.

3.4.3 oaUtility Status

3.4.3.1 Syntax

```
oaUtility {status}
```

3.4.3.2 Description

This is used to check whether jdbcAdapter is running.

3.4.4 oaUtility Check

3.4.4.1 Syntax

```
oaUtility {check [alive|constraints]}
```

3.4.4.2 Description

This option is used to continuously check whether jdbcAdapter operates or not, and restarts if oaUtility is terminated (regardless of normal shutdown or forcible shutdown).

If the alive option is specified, only one check is made to see if jdbcAdapter is running, and then oaUtility is terminated.

3.5 Command-Line Options

jdbcAdapter provides the following command options.

3.5.1 Syntax

```
jdbcAdapter [-v | -version]
```

3.5.2 Description

This option is used to output the version of Altibase with which jdbcAdapter was compiled.

3.5.3 Example

```
$/jdbcAdapter -v  
Adapter for JDBC version 7.1.0.0.2  
...
```

3.6 FAQ

3.6.1 What do I have to do after modifying environment variables or properties?

If environment variables or properties are changed after jdbcAdapter has been run, jdbcAdapter should be restarted in order to apply the modifications.

3.6.2 What happens if data is not properly applied to Altibase DB?

If jdbcAdapter fails to apply data to Altibase DB, only log messages are left and the next data is applied. The log messages are written to a trace log file located in \$JDBC_ADAPTER_HOME/trc directory.

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