

IBM[®] DB2[®] Everyplace



Sync Server Administration Guide

Version 7 Release 2 Modification 1

IBM[®] DB2[®] Everyplace



Sync Server Administration Guide

Version 7 Release 2 Modification 1

Note:

Before using this information and the product it supports, read the general information under "Notices" on page 137.

Fourth (October 2001)

This edition applies to version 7.2.1 of DB2 Everyplace (product number 5724-A91) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC27-0845-03.

© Copyright International Business Machines Corporation 2001. All rights reserved.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

About this book	v
Who should read this book	v
How this book is structured	v
Conventions and terminology used in this book	vi
How to send your comments	vi

Part 1. Introduction 1

Chapter 1. About DB2 Everyplace.	3
What is DB2 Everyplace?	3
Components of the DB2 Everyplace solution.	3
DB2 Everyplace database	3
DB2 Everyplace Sync Server	4
DB2 Everyplace Sync Client	4
Application development tools	4
A DB2 Everyplace scenario	5

Chapter 2. Mobile synchronization with DB2 Everyplace	7
Components of the DB2 Everyplace solution.	7
How synchronization happens	8
From mobile to source	8
From source to mobile.	10
Canceling a synchronization	11
How conflicts are handled	11

Part 2. Using Sync Server 13

Chapter 3. Synchronization quickstart	15
Preparing to synchronize	15
Setting up the Palm OS emulator	16
Configuring the Palm OS emulator	16
Setting up the Palm OS device	17
Configuring the Palm OS device	17
Configuring IBM Sync	18
Synchronizing and verifying data on the Palm OS emulator or device.	19
Setting up the Symbian OS V6.0 device	19
Configuring m-Router Connect on a PC	19
Configuring m-Router Connect on the device	20
Configuring ISync	20
Synchronizing data on a Symbian OS V6.0 device	21

Chapter 4. Synchronization Tutorial	23
Creating a JDBC subscription to data	24
Creating a DataPropagator subscription to data	25
Setting up sources for DataPropagator subscriptions	25
Creating the DataPropagator subscription	26
Configuring the databases and starting capture for DataPropagator subscriptions.	27
Grouping subscriptions into mobile subscription sets	27
Creating mobile users	28

Creating a data synchronization group	28
Starting the application server	29
Using a Remote Access Service	29
Synchronizing	30

Part 3. Working with data sources 31

Chapter 5. JDBC data sources	33
Supported JDBC databases	33
Using local and remote configurations	33
Setting up Sync Server to use JDBC databases.	34
Adding JDBC driver path for non-DB2 sources	35
Updating driver list file to use third-party driver with Microsoft SQL Server	35
Specifying JDBC driver on Create JDBC or Upload Subscription notebooks.	36

Chapter 6. DB2 DataPropagator data sources	37
Configuring the source database for the Capture program	37
Starting the DataPropagator Capture program.	38
Windows and UNIX systems	38
AS/400 systems	39
OS/390 systems	40
Configuring the mid-tier mirror database for the Capture program	40

Chapter 7. Filtering data from data sources	41
Horizontal filtering at the subscription level, group level, or user level	41
Defining simple horizontal filters	41
Defining complex horizontal filters at the group level or user level	43
Syntax for filters.	44
Vertical filtering	47

Chapter 8. The remote query and stored procedure adapter.	49
Creating an AgentAdapter subscription	49
Using the remote query and stored procedure adapter in an application.	49
Sample application using the remote query and stored procedure adapter.	50

Part 4. Managing users and data . . . 57

Chapter 9. Mobile Devices Administration Center and synchronization objects	59
--	-----------

Working with the Mobile Devices Administration Center	59
Starting the Mobile Devices Administration Center	59
The Mobile Devices Administration Center interface	59
Manipulating synchronization objects.	61
What is a synchronization object?	61
Where synchronization objects are stored	62
Creating synchronization objects	62
Viewing objects in the contents pane	63
Editing a synchronization object	65
Deleting an object	65
Chapter 10. Managing users and data	67
The administration process	67
Evaluating the characteristics of your mobile users	68
Creating a data synchronization group	68
Identifying the group	69
Enabling the group to access data and files.	69
Filtering the data available to the group	70
Assigning users to the group	71
Defining mobile users to the Sync Server	72
Creating users in the Mobile Devices Administration Center.	72
Registering the user's device.	73
Importing user definitions from another source	74
Setting up data and file replication	75
Creating a JDBC subscription	75
Creating a DataPropagator subscription	81
Creating an upload subscription	87
Creating a file subscription	90
Creating a custom subscription.	92
Creating a custom adapter	93
Replicating on demand	95
Enabling groups to access their data and files	96
Identifying the subscription set.	96
Specifying what information the subscription set accesses	97
Making the subscription set available to a group	97

Enabling and disabling synchronization	98
When a user or group is enabled for synchronization	98
Enabling synchronization.	98
Disabling synchronization	99

Chapter 11. Handling synchronization problems 101

Understanding the order of synchronization and reception of error messages.	101
Viewing the error log to diagnose problems	101
Managing the error log and the trace files	102
Purging error log entries automatically	102
Defining tracing level.	102
Providing your own error-handling logic	103
Viewing the log on the client	105
Resetting the user ID.	105

Part 5. Appendixes 107

Appendix A. Error messages. 109

Appendix B. Using the DB2 Everyplace library 135

DB2 Everyplace PDF and HTML files	135
DB2 Everyplace information	135
DB2 Everyplace online documentation	136
Accessing online help	136

Notices 137

Trademarks	140
----------------------	-----

Glossary 141

Index 145

Contacting IBM 149

Product Information	149
-------------------------------	-----

About this book

This information provides instructions on how to configure and administer DB2 Everyplace Sync Server. This book covers:

- Using and maintaining the Sync Server.
- Connecting the Sync Server to data sources.
- Configuring communications between the Sync Server and mobile and embedded devices.
- Managing users and data.

This book does not cover installing DB2 Everyplace and applications to a workstation, mobile, or embedded device. Installation and using the DB2 Everyplace sample applications is covered in the *DB2 Everyplace Installation and User's Guide*.

This book does not cover application development using DB2 Everyplace. Application development is covered in the *DB2 Everyplace Application Development Guide*.

Who should read this book

You should use this book if you want to synchronize DB2 Everyplace to other data sources.

This book does not explain some basic operations of the mobile or embedded devices that you may need to perform when using DB2 Everyplace. Refer to the documentation included with the mobile or embedded device for instructions on performing these operations. Basic knowledge of how to use the mobile or embedded devices is required to use DB2 Everyplace.

This book is written for system and database administrators who are involved in setting up data synchronization between a source server and one or more mobile devices.

How this book is structured

This book is divided into the following parts:

- **Part 1** gives a brief introduction to the DB2 Everyplace solution for mobile computing and synchronization. An example scenario is included in this introduction.
- **Part 2** details getting started with the DB2 Everyplace Sync Server and provides a tutorial on synchronization.
- **Part 3** explains how to connect the DB2 Everyplace Sync Server to data sources.
- **Part 4** details managing mobile users and their data. Error handling is also explained.
- **Part 5** contains error messages, information about the DB2 Everyplace library, a glossary, and information on how to contact IBM.

Conventions and terminology used in this book

The following highlighting conventions are used in this book.

Bold	Indicates commands, keywords, and other items whose names are predefined by the system.
<i>Italics</i>	Indicates one of the following things: <ul style="list-style-type: none">• The introduction of a new term• Names or values (variables) that must be supplied by the user• A reference to another source of information• General emphasis
Monospace	Indicates one of the following things: <ul style="list-style-type: none">• Files and directories• Information that you are instructed to type at a command prompt or in a window• Examples of specific data values• Examples of text similar to what may be displayed by the system• Examples of system messages

How to send your comments

Your feedback helps IBM to provide quality information. Please send any comments that you have about this book or other DB2 Everyplace documentation. You can use any of the following methods to provide comments:

- Send your comments from the Web. Visit the Web site at:
<http://www.ibm.com/software/data/db2/everyplace/>

The Web site has a feedback page that you can use to enter and send comments.

- Send your comments by e-mail to comments@vnet.ibm.com. Be sure to include the name of the product, the version number of the product, and the name and part number of the book (if applicable). If you are commenting on specific text, please include the location of the text (for example, a chapter and section title, a table number, a page number, or a help topic title).
- Complete the readers' comment form at the back of the book and return it by mail, by fax (800-426-7773 for the United States and Canada), or by giving it to an IBM representative.

Part 1. Introduction

Chapter 1. About DB2 Everyplace	3
What is DB2 Everyplace?	3
Components of the DB2 Everyplace solution.	3
DB2 Everyplace database	3
DB2 Everyplace Sync Server	4
DB2 Everyplace Sync Client	4
Application development tools	4
A DB2 Everyplace scenario	5
Chapter 2. Mobile synchronization with DB2 Everyplace	7
Components of the DB2 Everyplace solution.	7
How synchronization happens	8
From mobile to source	8
From source to mobile.	10
Canceling a synchronization.	11
How conflicts are handled	11

Chapter 1. About DB2 Everyplace

This chapter provides an introduction to DB2 Everyplace, a description of the components that make up the DB2 Everyplace solution, and an example of a typical DB2 Everyplace scenario.

What is DB2 Everyplace?

DB2 Everyplace is part of IBM's solution for pervasive computing. With DB2 Everyplace, mobile professionals (such as sales people, inspectors, auditors, field service technicians, doctors, realtors, and insurance claim adjusters) can keep in touch with vital data that they need while away from the office.

Organizations are now able to deliver their DB2 enterprise data to mobile and embedded devices. With DB2 Everyplace, you can access and perform updates to a database on your mobile device. DB2 Everyplace Sync Server enables you to synchronize data from the mobile device to other data sources in your enterprise. The File Adapter enables you to distribute files and applications to mobile users.

The DB2 Everyplace database is a relational database that resides on your mobile device. To access data on the mobile device, you can write applications using the supported set of DB2 Call Level Interface (CLI) functions or Java™ Database Connectivity (JDBC) methods.

Components of the DB2 Everyplace solution

The DB2 Everyplace solution has the following key components:

- DB2 Everyplace database on the mobile device.
- DB2 Everyplace Sync Server. A bi-directional synchronization service running on a mid-tier server that synchronizes data between the mobile device and enterprise data sources. DB2 Everyplace Sync Server is included with DB2 Everyplace Enterprise Edition.
- DB2 Everyplace Sync Client. The client, which runs on mobile devices, is comprised of applications that work with the DB2 Everyplace Sync Server, handling bi-directional synchronization of enterprise relational data with the DB2 Everyplace database. The DB2 Everyplace Sync Client is included with DB2 Everyplace Enterprise Edition.
- DB2 Everyplace Mobile Application Builder, which includes sample applications and tools. DB2 Everyplace Mobile Application Builder is a visual tool that develops applications on Palm OS devices. The Mobile Application Builder is not included with DB2 Everyplace, but can be downloaded from the DB2 Everyplace Web site at <http://www.ibm.com/software/data/db2/everyplace/downloads.html>

DB2 Everyplace database

The DB2 Everyplace database is available for:

- Palm OS
- Symbian OS Version 6
- EPOC Release 5
- Windows CE®/Pocket PC

- Win32 (Windows® NT® and Windows® 2000®)
- QNX Neutrino, Linux, and embedded Linux devices

DB2 Everyplace includes a Query-by-Example application for Palm OS devices that users can use to view and update the database. All supported devices include a Command Line Processor. The SQL statements supported by DB2 Everyplace enable you to create or drop a table or index, and delete, insert, or update rows of a table. Information about supported SQL statements is found in the *DB2 Everyplace Application Development Guide*.

DB2 Everyplace Sync Server

You can synchronize data and applications between DB2 Everyplace client devices and enterprise data sources by using DB2 Everyplace Sync Server and DB2 Everyplace Sync Client.

Data synchronization can be bi-directional or uni-directional. Data can be updated at the DB2 Everyplace mobile device or the enterprise database. For example, users could download a subset of data from a DB2 for z/OS database to a DB2 Everyplace database on the mobile device, view the data, make changes to the data, and then synchronize the changed data back to the z/OS server. The synchronization server also provides a mechanism for conflict resolution.

DB2 Everyplace Sync Server supports synchronizing relational data with the following operating systems:

- DB2 Universal Database for z/OS
- DB2 Universal Database for iSeries
- DB2 Universal Database for UNIX®, OS/2®, Windows 2000 and Windows NT
- Any data sources with a JDBC interface

DB2 Everyplace Sync Client

The DB2 Everyplace Sync Client, which runs on mobile devices, is comprised of applications that work with the DB2 Everyplace Sync Server. It handles bi-directional synchronization of enterprise relational data with the DB2 Everyplace database on the device. The client also manages operations related to file subscriptions for easy distribution of mobile applications to the device and can execute stored procedures stored on a DB2 UDB database. The Sync Client is available for the following operating systems:

- Palm OS
- Symbian OS Version 6
- EPOC Release 5
- Windows CE®/Pocket PC
- Win32 (Windows® NT® and Windows® 2000®)
- QNX Neutrino, Linux, and embedded Linux devices

For information about the Application Programming Interfaces (APIs) provided with the Sync Client, see *DB2 Everyplace Application Development Guide*.

Application development tools

You can develop DB2 Everyplace applications on a workstation with off-the-shelf C/C++ and Java development tools, such as: DB2 Everyplace Mobile Application Builder; Visual Age Micro Edition; Metrowerks CodeWarrior, Release 6; or the GNU Software Developer's Kit.

DB2 Everyplace Mobile Application Builder can build Palm OS applications without writing a single line of code. DB2 Everyplace Mobile Application Builder is available from the DB2 Everyplace Web site.

The DB2 Everyplace CLI/ODBC interface is a subset of DB2 UDB CLI. For more information on the DB2 UDB CLI functions supported by DB2 Everyplace, see the *DB2 Everyplace Application Development Guide*.

A DB2 Everyplace scenario

Insurance claims adjusters are responsible for inspecting the damaged property of customers who file claims. In most companies, the adjuster visits the claimant's property, fills out paper forms to validate or refute the claim, and assesses the amount of the damages to be paid to the claimant. Later, when the adjuster returns to the office, the forms are manually put into the company's computer system in a tedious and expensive process.

Empowering the adjusters with a mobile device running a DB2 Everyplace application can considerably streamline this process. Using their mobile devices wherever they are, the adjusters can access their inspection schedule, route, and claimant policy information. The adjusters can also complete the adjustment form on the mobile device. When the adjusters return to the office, they can synchronize the data on their mobile devices with the company's computer system, uploading the new adjustment form data to the company's enterprise database. If the adjusters need information in the field, they can synchronize the data on their mobile devices with the company's computer system immediately via modem. The claims adjustment process can now be completely paper free, which translates into huge cost savings for the insurance company. Claims are also settled faster because adjusters can have instant access to their company's enterprise databases.

Chapter 2. Mobile synchronization with DB2 Everyplace

Organizations employing mobile workers need to provide employees with the ability to access and update enterprise data while away from the office. For example, salespeople might require quotation information for proposals or scheduling information about customer meetings for a particular day. Vending-machine service people require inventory information for each machine on their scheduled routes, and they must update this data as they restock items. Home health care workers and visiting nurses must download lists of scheduled patients, as well as each patient's health statistics, and update this information as examinations are conducted throughout the day.

Although these mobile workers have diverse needs for data access, all require a reliable software solution that allows them to access their organization's data locally on a mobile device, modify this data, and synchronize these changes with a database on a remote server in a timely fashion. IBM's DB2 Everyplace solution provides this capability, allowing two-way synchronization of files and data between an enterprise data source and mobile and embedded devices. DB2 Everyplace Sync Server can also manage one-way subscriptions where DB2 Everyplace only inserts data into the data source.

Use this chapter to understand:

- How the components of the DB2 Everyplace solution interact
- How mobile data synchronization happens
- What steps to take to set up the solution

Components of the DB2 Everyplace solution

The DB2 Everyplace solution for mobile data synchronization includes the following main components:

DB2 Everyplace database engine

Software that runs on the mobile device and allows users to access and modify a local copy of data from a source system. See the *DB2 Everyplace Application Development Guide* for information about the DB2 Everyplace database engine and how to write applications that use the database software.

DB2 Everyplace Sync Server

A client/server program that manages two-way data synchronization between a source and a target database.

The Sync Server acts as an intermediary between the synchronization client software on the mobile device and the DB2 UDB database or the JDBC database on the source server. The Mobile Devices Administration Center, a graphical administration tool for the Sync Server, allows you to define subsets of data and files to be accessed by groups of users. The Sync Server accesses this administration information each time a user requests data synchronization.

DB2 Everyplace Mobile Application Builder

A rapid application development tool that allows you to both build and

test DB2 Everyplace applications for mobile devices. Refer to the online help for DB2 Everyplace Mobile Application Builder for more information about this tool.

Figure 1 shows how the tools in the solution work together.

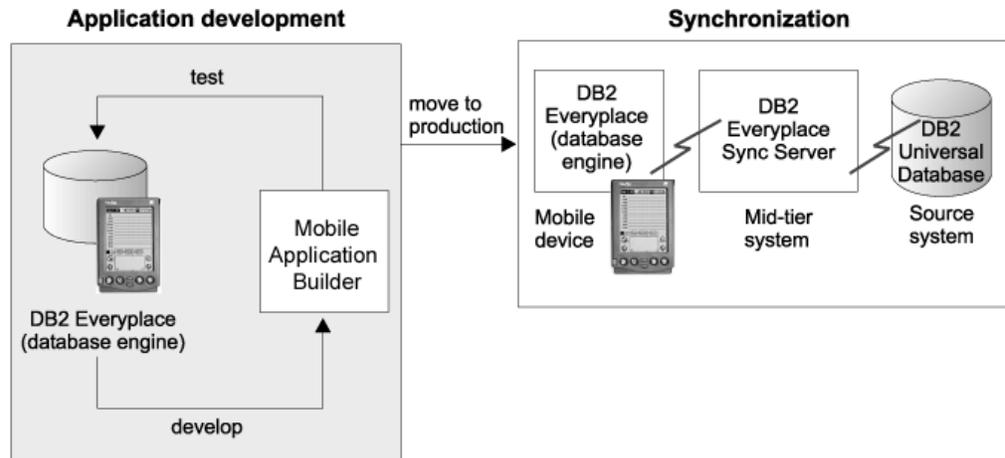


Figure 1. How the tools in the DB2 Everyplace solution work together

To set up the DB2 Everyplace solution, you perform two main tasks:

1. Develop DB2 Everyplace applications.

These applications provide mobile users access to DB2 Everyplace database tables on their mobile devices. You can develop DB2 Everyplace applications using DB2 Everyplace Mobile Application Builder or another suite of application development tools for mobile devices. See the *DB2 Everyplace Application Development Guide* for more information on developing applications for DB2 Everyplace.

2. Set up and monitor synchronization.

You define data from the source server to be accessed by each group of users. Mobile workers use the DB2 Everyplace Sync Client's API or icon to connect to the server and copy source data to their mobile devices. They modify this data using these applications and then synchronize their changes with the source database.

How synchronization happens

The synchronization process can be one- or two-way. This section covers two-way synchronization. The two-way synchronization process has two steps:

- Mobile users submit changes that they made to local copies of source data.
- Users receive any changes that were made to source data residing on the enterprise server since the last time they synchronized.

This two-step process is known as a *synchronization session*.

From mobile to source

Figure 2 on page 9 shows how changes that a user submits are applied to the source database during synchronization. The numbers in the figure correspond to the explanation following it:

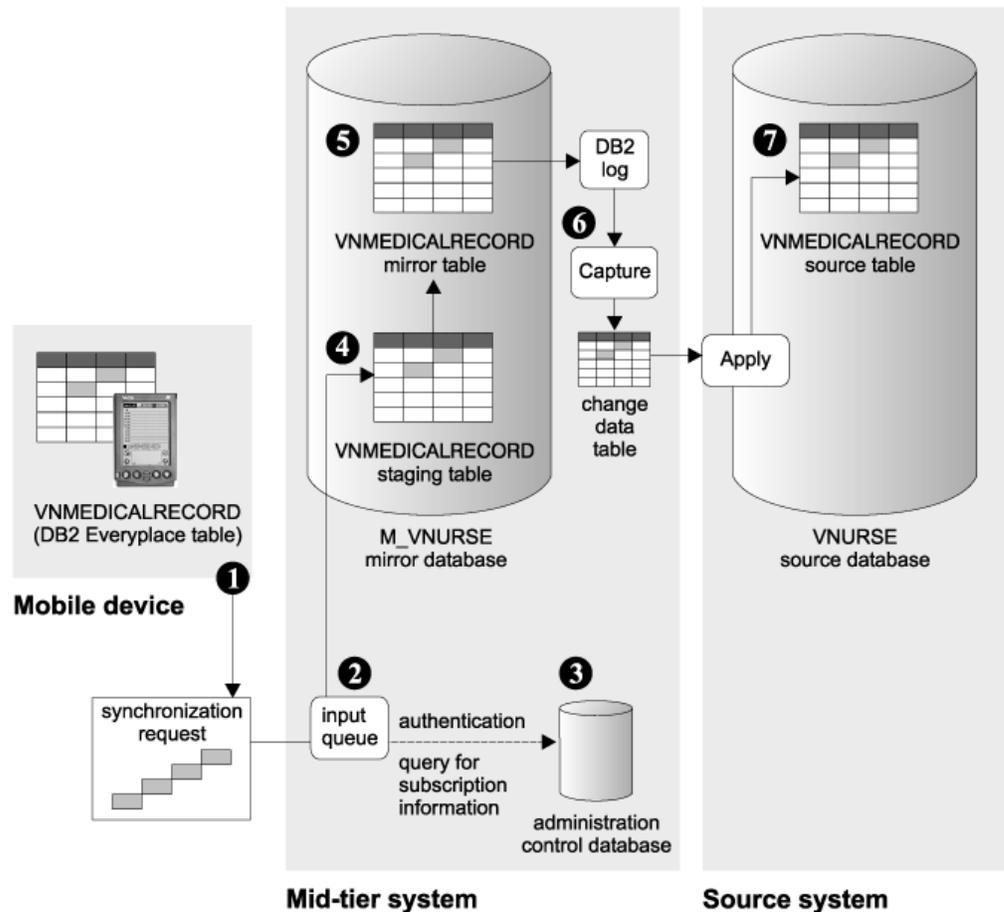


Figure 2. How changes that a user submits for synchronization are applied to the source database

1. A home health care specialist or visiting nurse updates the blood pressure of a patient in a local copy of the VNMEDICALRECORD table on a Palm OS device. The nurse exits the application used to edit the table, then taps the **IBM Sync** icon to start the synchronization client software on the device. When the synchronization client application starts, the nurse chooses the name of the application to synchronize, then taps **Synchronize** to request synchronization.
2. The request is authenticated and then placed on an input queue on the mid-tier system. The synchronization client software on the device waits for a synchronization reply from the source server (see “From source to mobile” on page 10).
3. Users can synchronize only the subset of data and files to which they have been subscribed.
4. The data is placed into a staging table. Staging tables help improve throughput capacity of synchronization requests because changes can be staged while other updates are taking place.
5. The data is copied from the staging table to the mirror table (VNMEDICALRECORD in this example) and potential update conflicts are resolved. Changes to the mirror table are recorded in the DB2 log.
6. The DB2 DataPropagator Capture program starts. This program captures changes to the mirror table from the DB2 log and writes them to a change data (CD) table.

- The DB2 DataPropagator Apply program starts and applies changes from the CD table to the source table, VNMEDICALRECORD, in the VNURSE database on the source system.

From source to mobile

Figure 3 shows how changes from a source table are applied to a DB2 Everyplace table on the user's mobile device during synchronization. The Sync Server sends to the user all relevant source data changes that have been made since the user's last synchronization. The Sync Server sends only changed data that the user is subscribed to.

The numbers in the figure correspond to the explanations following it.

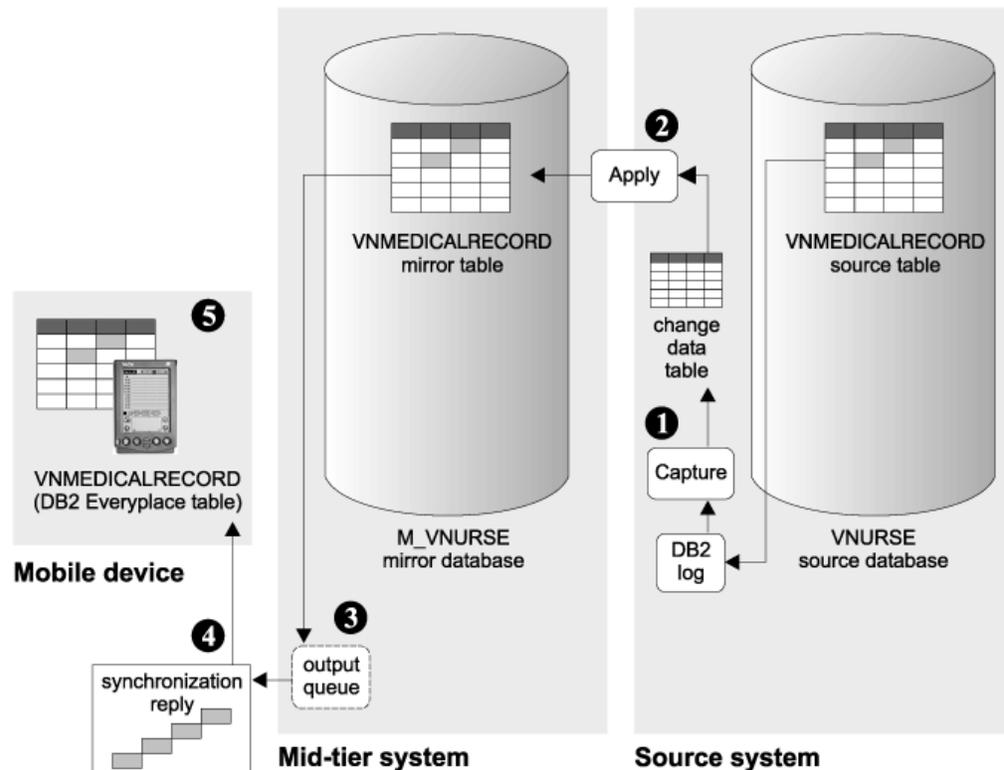


Figure 3. How changes to the source database are applied to the mobile database

- The DB2 DataPropagator Capture program, running continuously on the source system, captures changes to the VNMEDICALRECORD source table from the DB2 log and writes them to the CD table.
- The DB2 DataPropagator Apply program applies changes from the CD table to the mirror table, VNMEDICALRECORD. If update conflicts are identified they are resolved during this step of the process.
- The changes to data are sent to an output queue on the mid-tier system as a synchronization reply message.
- The synchronization client software retrieves the synchronization reply message from the output queue. The client retrieval request is authenticated.
- The changes to data are applied to the client's local copy of the table. The synchronization session ends.

Canceling a synchronization

A synchronization can consist of several synchronization sessions. If you cancel the synchronization process and restart it later, the Sync Server attempts to resume from the first synchronization session that was not completed, rather than starting over.

For example, suppose you requested synchronization of 100 records for one subscription and 50 for another subscription. If the 100 records of the first subscription had been synchronized completely at the time you canceled, the remaining 50 records will only be synchronized when you re-initiate the synchronization. This is because only the first synchronization session had been completed.

If the user cancels synchronization during a synchronization session, no records in that particular session are synchronized. If the user successfully sends all changed records from the device to the server but cancels during the server's reply, the server will resume the reply when the user reconnects to the Sync Server.

How conflicts are handled

At times, changes that a client submits to the DB2 Everyplace Sync Server conflict with changes that other clients previously made or are simultaneously making to the source tables. The Sync Server tracks the version of each record in each table in a replication subscription. Each client is similarly tracked to maintain a version of each record for each client's last synchronization with each table. This information allows the Sync Server to determine whether or not a client is attempting to update a row based on an obsolete version of the data for that row. If a client attempts to update a row based on an obsolete version of the data for that row, the update is rejected.

Conflict resolution happens when data is staged to the mirror tables on the mid-tier system, as shown in Figure 4 on page 12. This occurs during the next replication cycle. Conflicts that result from a client's updates will not be detected until after response messages are returned to the client during that synchronization. Any rejections of client changes will not be communicated back to the client until the next synchronization. If a client change is based on an obsolete record, a correct version of that record will be returned in the original synchronization request.

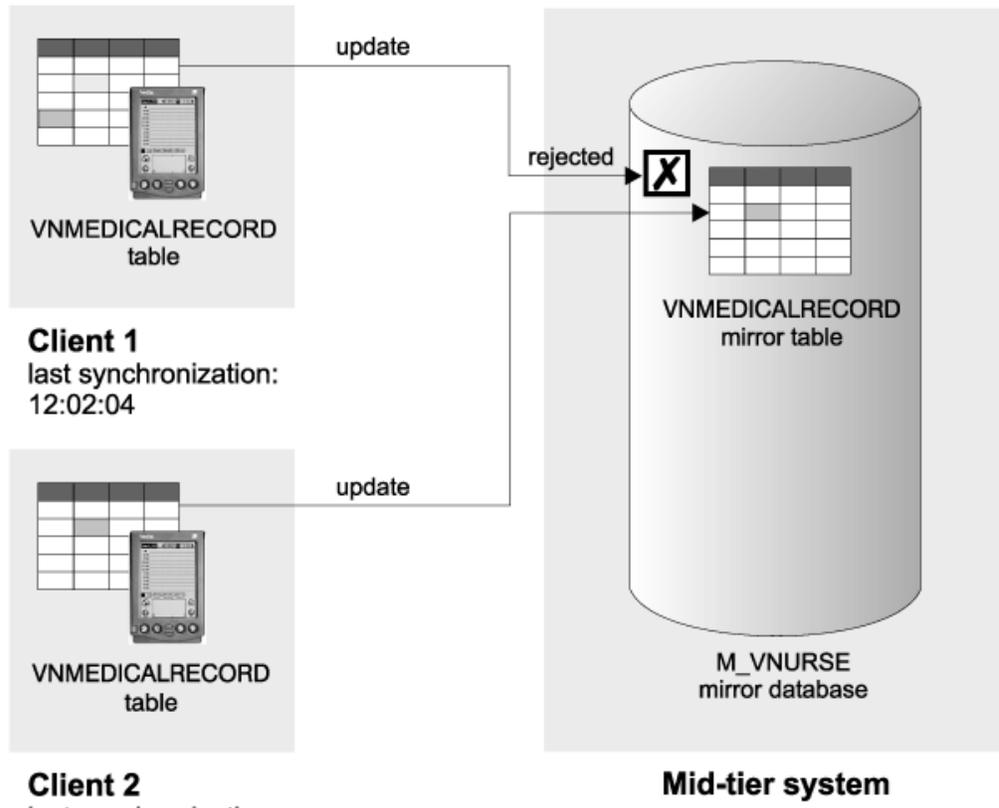


Figure 4. How the Sync Server handles conflicts

The client whose update was rejected receives both the rejected record and a correct version of that record. The rejected record is recorded in the log on the client. The correct version of that record replaces the original (rejected) record on the client's DB2 Everyplace database.

When DataPropagator applies the changed data from the mid-tier to the source database, additional types of conflicts can occur. See the *DB2 Universal Database Replication Guide and Reference* and the *DB2 Universal Database Administration Guide* for more information on how these conflicts are managed and resolved.

Part 2. Using Sync Server

Chapter 3. Synchronization quickstart	15
Preparing to synchronize	15
Setting up the Palm OS emulator	16
Configuring the Palm OS emulator	16
Setting up the Palm OS device	17
Configuring the Palm OS device	17
Configuring IBM Sync	18
Synchronizing and verifying data on the Palm OS emulator or device	19
Setting up the Symbian OS V6.0 device	19
Configuring m-Router Connect on a PC	19
Configuring m-Router Connect on the device	20
Configuring ISync	20
Synchronizing data on a Symbian OS V6.0 device	21
Chapter 4. Synchronization Tutorial	23
Creating a JDBC subscription to data	24
Creating a DataPropagator subscription to data	25
Setting up sources for DataPropagator subscriptions	25
Creating the DataPropagator subscription	26
Configuring the databases and starting capture for DataPropagator subscriptions	27
Grouping subscriptions into mobile subscription sets	27
Creating mobile users	28
Creating a data synchronization group	28
Starting the application server	29
Using a Remote Access Service	29
Synchronizing	30

Chapter 3. Synchronization quickstart

Before performing a synchronization quickstart, you must first install DB2 Everyplace database engine and the Sync Client applications on the client mobile device and on the server. The same version of DB2 Everyplace Database and Sync Server must be installed on both the client and server. For information about how to install these applications on the mobile device, see *DB2 Everyplace Application Development Guide*.

The DB2 Everyplace Sync Server includes a sample database and configuration that you can use to test synchronization after you install the Sync Server. The sample data can be installed when you install the Sync Server. If you did not install the sample data during installation, you need to install it now.

To install the sample on a Windows operating system:

1. Run `dsysample.exe` in the `\SyncServer\Sample\` directory. The Create sample window opens.
2. Enter your DB2 user ID in the **Username** field.
3. Enter your DB2 password in the **Password** field. The user ID and password will be used to create the JDBC sample databases and configuration.
4. Click **Create**.

To install the sample on a UNIX operating system:

1. Open a DB2 Command Window.
2. Change the directory to `$DSYINSTDIR/Sample`.
3. Run `dsysample.sh db2userid db2password` where `db2userid` is a valid DB2 user ID and `db2password` is the corresponding password.

Preparing to synchronize

After installing the sample data, prepare for first-time synchronization:

1. Set up the mobile device or emulator for synchronization.
 - For a Palm OS emulator, download and configure the emulator. See “Setting up the Palm OS emulator” on page 16.
 - For a Palm OS device, establish a TCP/IP connection to the device and configure it. See “Setting up the Palm OS device” on page 17.
 - For a Symbian device such as a Nokia’s 9210 Communicator, establish a TCP/IP connection to the device and configure it. See “Setting up the Symbian OS V6.0 device” on page 19.
2. Start the Sync Server. For Windows, click **Start** → **Programs** → **DB2 Everyplace** → **Start Servlet for Sync Server** from the Start menu. On UNIX, change to `x/db2everyplace/SyncServer/Server` (where `x` is the home directory of the DB2 Everyplace instance user ID.)
3. To verify that the Sync Server is running, go to `http://localhost:8080/db2e/db2erdb` and ensure that you see the following message:
`com.ibm.mobileservices.adapter.rdb.RDb Information`
4. Synchronize and verify the data.

After you have verified your Sync Server installation, it is recommended that you complete the synchronization tutorial in the following chapter.

Setting up the Palm OS emulator

The Palm OS emulator is available for download from the Palm OS Web site at:
<http://www.palmos.com/dev/tech/tools/emulator/>

After downloading the emulator, unzip the files to a directory.

The Palm OS emulator requires a ROM image file to run. You can obtain ROM image files from Palm by joining the Palm Solution Provider Program or you can download a ROM image from your Palm OS device. For information on the Palm Solution Provider Program, visit www.palmos.com/dev/. To transfer a ROM image from your Palm OS device:

1. Use the install tool included with your Palm OS device to install ROM Transfer.prc and then synchronize with the Palm OS device to install this program. The ROM Transfer.prc file is included with the Palm OS emulator.
2. Place the Palm OS device in the HotSync cradle that is connected to your Windows workstation.
3. Start the Palm OS emulator by running Emulator.exe.
4. Click **Download** in the Palm OS emulator window.
5. Complete the transfer of the ROM image by following the instructions displayed by the Palm OS emulator.

After you have a ROM image, configure the emulator to test synchronization.

Configuring the Palm OS emulator

The Palm OS emulator allows you to test Palm OS applications using your workstation. After you have installed the Palm OS emulator and obtained a ROM image, configure the Palm OS emulator and IBM Sync. To configure the Palm OS emulator:

1. Start the Palm OS emulator.
2. Click the **New** push button in the Palm OS emulator window.
3. Select the **Device**, **Skin**, and **RAM Size** for the Palm OS emulator. The **Device** type must be the compatible with the ROM image you obtained.
4. Click the **Browse** push button and select the ROM image you obtained.
5. Click **OK**. The Palm OS device emulation begins.
6. Right click on the Palm OS emulator window and select **Install Application/Database** —> **Other**. Alternatively, you can drag and drop or copy and paste the files to the Palm OS emulator window.
7. Install the following applications from the DB2 Everyplace installation directory:

```
\SyncServer\Clients\PalmOS\imsaconfig.prc
\SyncServer\Clients\PalmOS\imsadb2e.prc
\SyncServer\Clients\PalmOS\imsafile.prc
\SyncServer\Clients\PalmOS\isync1.prc
\SyncServer\Clients\PalmOS\isynce.prc
\SyncServer\Clients\PalmOS\isyncui.prc
\SyncServer\Clients\PalmOS\PBSPkcs11.prc (only for encryption support, Palm OS 3.3 or later req
\SyncServer\Clients\PalmOS\wbxml1lib.prc
\DB2e\Clients\PalmOS\DB2eCat.prc
```

```
\DB2e\Clients\PalmOS\DB2eCLI.prc
\DB2e\Clients\PalmOS\DB2eComp.prc
\DB2e\Clients\PalmOS\DB2eRunTime.prc
\DB2e\Clients\PalmOS\qbe\qbe31.prc
```

PBSPkcs11.prc is only needed for encryption support and requires Palm OS Version 3.3 or later.

8. Right-click on the Palm OS emulator and select Reset. The Palm OS emulator resets.
9. Right-click on the Palm OS emulator and select **Settings** → **Properties**.
10. Select **Redirect NetLib calls to host TCP/IP**.
11. Click **OK**. The Properties window closes.
12. Next, you need to configure IBM Sync with the DB2 Everyplace Sync Server information. See “Configuring IBM Sync” on page 18.

Setting up the Palm OS device

Before you can test synchronization using a Palm OS device, you need a TCP/IP connection to the device. You can set up a TCP/IP connection by using either Windows Remote Access Service, or Mocha W32 PPP, which is a shareware utility. The Windows Remote Access Service or Mocha W32 PPP must be running on the PC when a Palm OS device attempts to establish a TCP/IP connection.

Palm OS devices come with the HotSync Manager application, which runs on the PC to synchronize personal information such as contacts and to-do lists. Most Palm OS devices connect to the PC through a COM port. HotSync Manager, Mocha W32 PPP, or Remote Access Service must have access to this COM port to work properly. To avoid conflict, before you start Remote Access Service or Mocha W32 PPP, you must exit the HotSync Manager. Similarly, if you want to use the HotSync Manager, you must terminate Remote Access Service or exit Mocha W32 PPP.

To set up a Remote Access Service, refer to “Using a Remote Access Service” on page 29. To use Mocha:

- Download W32 PPP from www.mochasoft.dk/.
- Follow the directions included with the download.
- After you have finished downloading and installing W32 PPP, configure the Palm OS device using the directions in “Configuring the Palm OS device”.

Configuring the Palm OS device

Once you have ensured that the Palm OS device is connected to the DB2 Everyplace Sync Server, you can configure the software on the Palm OS device:

1. Use the DB2 Everyplace Install on the mobile device tool to install DB2 Everyplace. The Install on the mobile device tool is available from the IBM DB2 Everyplace folder of the start menu.
2. Perform a HotSync operation to complete the installation of the files to the Palm OS device.
3. After using the HotSync operation to install the files, close the HotSync manager.
4. After installing the applications on the device, open the Palm OS **Prefs** application.
5. Select **Network**.

6. Tap **Connect**. If device fails to connect, verify that you have correctly configured Mocha W32 PPP or Windows Remote Access Service. See page 29 for more information about Windows Remote Access Service.
7. Click **OK**. The Properties window closes.
8. Next, you need to configure IBM Sync with the DB2 Everyplace Sync Server information. See “Configuring IBM Sync”

Configuring IBM Sync

To set up IBM Sync on your Palm OS device or Palm OS emulator:

1. Locate the IBM Sync application in the Palm OS emulator.
2. Click **IBM Sync**.
3. Click **Menu**.
4. Select **Settings** from the menu.
5. Type the IP address or hostname of the workstation in the **Server IP** field.
6. Type 8080 in the **Port #** field. This is the default port used by the application server included with Sync Server. If port 8080 is used by another program, you can change the default port number for IBM Sync by opening file \$DSYIMSTDIR/WebSphere/AppSrv/bin/servletengine.bat and changing the following line to include any free port number:

```
-Dcontrolserver.websphere.websphere.port=xxxx ...
```
7. Type nurse1 in the User ID field. This is the sample user created by the Create Sync Server Sample program.
8. Type nurse1 in the Password field. This is the sample password set by the Create Sync Server Sample program.
9. Optional: Select the **Save password** check box if you want IBM Sync to remember the password.
10. Click **OK**.

For Palm operating systems, you can specify the following advanced settings:

1. Click **Advanced**.
2. To specify the timeout parameter for a server reply, select the length of time that you want. If you select **Never**, IBM Sync will wait indefinitely for a reply.
3. To view the log that contains detailed information about your synchronization, select **Detailed synchronization log**.
4. To enable starting IBM Sync by using the HotSync button on your Palm device, select **Use HotSync button to start**.
5. If your mobile device has a limited network bandwidth (for example, a wireless device), or if the network connection is not stable, you can drop the network connection after synchronization completes by selecting **Drop connection after sync**.
6. Tap **OK** to exit.

For more information on using IBM Sync, refer to the *DB2 Everyplace Installation and User's Guide*.

The Palm OS device and software are now ready to synchronize.

Synchronizing and verifying data on the Palm OS emulator or device

Ensure that the DB2 Everyplace Sync Server is running. If the Sync Server needs to be started, refer to “Preparing to synchronize” on page 15.

1. Open **IBM Sync** on the Palm OS emulator or device.
2. Click the **Synchronize** icon to begin synchronization.
3. When synchronization is complete, the Palm OS emulator or device displays the message **Synchronization ended**.
4. Open **QBE** on the Palm OS emulator or device.
5. Select the **VNMEDICALRECORD** table. The contents of the table show on the screen.
6. Open the Mobile Devices Administration Center and DB2 Control Center. For Windows, select **Start** → **Programs** → **IBM DB2 Everyplace** → **Start Mobile Devices Administration Center**.

For UNIX, change the directory to `x/db2everyplace/SyncServer/Server` (where `x` represents the home directory of the DB2 Everyplace instance user ID.)

7. Expand the object tree in the DB2 Control Center until you see the **VNURSE** database. Select the **Tables** folder of the **VNURSE** database to show the **VNURSE** tables.
8. Locate the **VNMEDICALRECORD** table and right-click the table.
9. Select **Sample Contents** from the menu.
10. Compare the contents of the table on the Palm OS emulator or device to the sample contents of the table in the DB2 Control Center.

You have successfully synchronized data between your mobile device and DB2 Everyplace Sync Server. For learn more about synchronization, you can complete the synchronization tutorial in “Chapter 4. Synchronization Tutorial” on page 23.

Setting up the Symbian OS V6.0 device

Before you can test synchronization on a Symbian OS V6.0 device, you need a TCP/IP connection to the device. You can set up a TCP/IP connection from a mobile device to a PC running on a Win32 platform by using m-Router Connect from Intuwave. You can find information about obtaining a beta version of m-Router Connect from the Intuwave Web site <http://www.intuwave.com>.

The m-Router Connect consists of two parts: m-Router Connect for the PC and m-Router Connect for the device. In order for the device to connect to the PC, m-Router Connect must be installed both on the device and on the PC.

To use m-Router Connect to establish a connection between the mobile device and the PC:

- Install m-Router Connect on the device using the documentation that comes with the device.
- Install m-Router Connect on the PC.
- Configure m-Router Connect on the PC.
- Configure m-Router Connect on the device.

Configuring m-Router Connect on a PC

To configure m-Router Connect on a PC:

1. Connect the Symbian OS V6.0 device to a COM port in the PC using a serial cable.
2. Start m-Router Connect. A program icon appears in the system tray of the desktop.
3. Right-click the icon. The m-Router Overview window opens.
4. In the m-Router Overview window, click the icon that represents the COM port your device connects to. If you have connected properly and the m-Router detects the connection, the icon is shown as a plug that has been plugged into a socket.
5. On the **General** page of the Properties of COM *x* window, select **serial port** from the **Mode** drop-down list. *x* is the port number.
6. Select **115200** from the **Baud** drop-down list.

Configuring m-Router Connect on the device

To configure m-Router Connect on the device:

1. Press the **Extras** button on the keyboard of the device. The Extras window opens.
2. Select **m-Router Connect** from the list.
3. Press **Open**. The m-Router Connect window opens.
4. Press **Configure**. The Settings window opens.
5. In the Settings window, select **Cable**.
6. Press **OK** to exit the window.
7. Press **Close** to exit m-Router Connect.

Configuring ISync

The DB2 Everyplace Sync Server provides ISync, a sample synchronization client application. You must configure ISync before its first synchronization with the Sync Server. To configure ISync:

1. Press the **Extras** button on the keyboard of the device. The Extras window opens.
2. Select **ISync** from the applications list.
3. Press **Open** to start ISync. The ISync window opens.
4. Press **Settings**. The User Info window opens.
5. Type a unique identifier for the device in the **Device ID** field.
6. Type the IP address or hostname of the workstation in the **ServerIP** field.
7. Type 8080 in the **Port** field. This is the default port used by the application server of Sync Server.
8. Type nurse1 in the **User ID** field. This is the sample user created by the Create Sync Server Sample program.
9. Optional: Select the **Detailed Log** check box if you want ISync to register detailed logs during synchronization. Detailed logs are useful in troubleshooting.
10. Press **Set Password**. The Set Password window opens.
11. Type nurse1 in the **Enter Password** field. This is the sample password set by the Create Sync Server Sample program.
12. Optional: Tap **Save password** if you want ISync to remember the password.
13. Press **OK**. The Set Password window closes.
14. In the User Info window, press **OK** to save the changes and exit.

The Symbian OS V6.0 device and software are now ready to synchronize.

Synchronizing data on a Symbian OS V6.0 device

Ensure that the DB2 Everyplace Sync Server is running. If the Sync Server needs to be started, refer to “Preparing to synchronize” on page 15.

1. Follow the directions in “Configuring m-Router Connect on a PC” on page 19 to navigate to the **General** page of the COM port properties window.
2. On the Symbian OS V6.0 device, press **Extras**.
3. Select **m-Router Connect** and press **Open**. The m-Router Connect window appears.
4. Press **Connect**. Now m-Router attempts to establish a connection with the PC.
5. With m-Router Connect still running, press **Extras**.
6. Select **ISync** and press **OK**. The ISync screen opens.
7. Press **Synch**.
8. In the COM port properties window, click the drop-down arrow in the **Mode** list and select **serial port** again to start the communication between the device and the PC.
9. After the synchronization ends, press the **Menu** button on the device.
10. Highlight **Close** on the **File** menu.
11. Press **Select** to exit ISync.
12. Press **Extras** on the keyboard.
13. Select **m-Router Connect** from the list and press the button next to **Open** to switch to the application.
14. Press **Disconnect**.
15. Press **Exit** to exit m-Router Connect.

Chapter 4. Synchronization Tutorial

After installing the DB2 Everyplace database and the DB2 Everyplace Sync Server and setting up your device, you are ready to synchronize. For more information on installing DB2 Everyplace, see the *DB2 Everyplace Installation and User's Guide*. This chapter tests synchronization using sample data and sample DataPropagator and JDBC subscriptions, but does not use sample upload subscription types. The source tables specified in a DataPropagator subscription must be on a DB2 UDB database. For a JDBC subscription, the source tables can be on any JDBC-compliant database, including DB2 UDB. For more information on working with different data sources, see "Part 3. Working with data sources" on page 31.

This tutorial assumes understanding of database administration for DB2 UDB and JDBC-compliant databases. The following steps are covered:

1. Creating a JDBC subscription to data.
2. Creating a DataPropagator subscription to data.
 - a. Setting up sources for DataPropagator subscriptions.
 - b. Creating the DataPropagator subscription.
 - c. Binding the tables and starting capture for DataPropagator subscriptions.
3. Grouping subscriptions into a subscription set.
4. Creating mobile users.
5. Creating a data synchronization group and assigning users and a subscription set to the group.
6. Starting the application server.
7. Configuring the mobile device.
8. Synchronizing for the first time.

The DB2 Everyplace Sync Server includes sample databases and configuration for testing JDBC subscriptions and DataPropagator subscriptions. The JDBC sample data can be installed at the end of the installation process. If you installed the JDBC sample data during installation, you only must follow steps 1, 2 and 4. If you did not install sample data during installation, you must install the sample database by following steps 1 to 4.

To install the sample database:

1. Open a DB2 Command Window
2. For Windows, change to the `\SyncServer\Sample\` directory. For a UNIX operating system, change the directory to `$DSYINSTDIR/Sample`.
3. Install the JDBC sample data.
 - For Windows, run `dsysample.exe`. You will be prompted to provide your DB2 user ID and password, which will be used to create the JDBC sample databases and configuration.
 - For UNIX, run `dsysample.sh db2userid db2password`.
4. Install the DataPropagator sample data:
 - For Windows, run `dsysampleDPropr.bat db2userid db2password`. Click **Install**.
 - For UNIX, run `dsysampleDPropr.sh db2userid db2password`.

The DB2 user ID and password will be used to create the DataPropagator sample databases.

DB2 Everyplace Sync Server includes a servlet that requires an application server to run. A simple application server is installed by default. DB2 Everyplace Sync Server can be used with many different application servers. For information on how to use the DB2 Everyplace Sync Server with a different application server such as the IBM WebSphere Application Server, see the DB2 Everyplace Web site (<http://www.ibm.com/software/data/db2/everyplace/>).

Creating a JDBC subscription to data

The Mobile Devices Administration Center is used to manage the Sync Server subscriptions and mobile users. To create a JDBC subscription:

1. Open the Mobile Devices Administration Center and DB2 Control Center:
 - For Windows, select **Start** → **Programs** → **IBM DB2 Everyplace** → **Start Mobile Devices Administration Center**.
 - For UNIX, change the directory to `$DSYINSTDIR/Server`, then run `dsyadmin.sh`.
2. Right-click on the Subscriptions folder in the Mobile Devices Administration Center. Select **Create** → **Table subscription** → **JDBC Subscription**.
3. Type a name for the JDBC subscription in the **Name** field. This example uses `SCHEDULE`.
4. Type a description for the JDBC subscription in the **Description** field. This example uses `VNSchedule test subscription`
5. Select the encryption level for the JDBC subscription in the **Encryption level** field. This example uses `None`
6. On the Source page, identify the name of the source database from which data is to be synchronized.
7. Type the source database URL in the **Database URL** field. This example uses `jdbc:db2:vnurse`
8. Type a valid source database user ID and password in the **User ID**, **Password**, and **Verify password** fields. This example uses user ID `db2admin`. It is required that the same user ID and password is used for each Sync Server subscription that connects to a single source database if multiple subscriptions are connecting to the same database.
9. Click the **Test Connection** push button to test the connection to the JDBC source database.
10. Click **Close**.
11. On the Mirror page, identify the mirror database that the Sync Server will use to temporarily cache data.
12. Click the  push button next to the **Database URL** field and select `M_VN2` in the Select Mirror Database window. Click **OK**.
13. Type a valid mirror database user ID and password in the **User ID**, **Password**, and **Verify password** fields. This example uses user ID `db2admin`.
14. Click the **Test Connection** push button to test the connection to the JDBC mirror database. Click **Close** on the DB2 Message.
15. Click the **Identification** tab.
16. Select the **Define Subscription** push button. The Define Replication Subscription window opens.

17. In the Define Replication Subscription window, click **Add**. The Add Table window opens.
18. Identify the tables in the source database whose content will be synchronized. From the Table list of the Add Table window, select the replication source to add to this subscription. To change the source filter used to limit the available tables in the table list, click **Filter**.
19. Type the % symbol in the Source schema and Source table fields. The % symbol is a wildcard symbol that displays all available tables in the table list. Click **OK**.
20. Select DSYSAMPLE.VNSCHEDULE from the Table list. The **Target schema** and **Target table** fields are automatically completed.
21. Optional: If you want to include the constraints and indexes from the source tables, select **Use Constraints defined in DB2 source** and **Use indexes defined in DB2 source**.
22. Click **Add**. Click **Close**.
23. Click the **Timing** push button in the Define replication subscription window.
24. In the **Batch Window** field, specify the amount of time, in seconds, to wait before starting replication. For example if you type 60, changes will be replicated to the source database after 60 seconds. Click **OK**.
25. Click **OK** to close the Define Replication Subscription window.
26. Click **OK** to close the Create JDBC Subscription notebook. If the **OK** button is grayed out, all of the fields have not been filled in correctly.

DB2 Everyplace Sync Server is now configured to synchronize the data in this table using JDBC. Next you will create a DataPropagator subscription.

Creating a DataPropagator subscription to data

When using DataPropagator subscriptions, DB2 Everyplace Sync Server uses DB2 DataPropagator to replicate data between Sync Server and DB2 Universal Database. The sample that you installed includes a complete DataPropagator sample database and Sync Server configuration. This tutorial walks you through the steps to manually create a DataPropagator subscription.

Setting up sources for DataPropagator subscriptions

Before creating DataPropagator subscriptions, the database table must be defined as a replication source in DB2. In this example, we will define the VNURSE sample table as a replication source:

1. Open the DB2 Control Center and Mobile Devices Administration Center.
 - For Windows, select **Start** —> **Programs** —> **IBM DB2 Everyplace**—> **Start Mobile Devices Administration Center**.
 - For UNIX, change to \$DSYINSTDIR/Server, then run dsyadmin.sh.
2. From the DB2 Control Center, expand the object tree until you see the VNURSE database. Select the VNURSE database **Tables** folder to show the VNURSE tables.
3. Locate the VNCONTACT table and right-click it.
4. Select **Define as replication source** —> **DB2 Everyplace Sync Server**.
5. Select **Run now**.
6. Click **OK**.

The VNCONTACT table of the VNURSE database is now a replication source. You can verify this by looking in the replication sources folder of the VNURSE database.

Creating the DataPropagator subscription

The Mobile Devices Administration Center is used to manage the Sync Server subscriptions and mobile users. To create a DataPropagator subscription:

1. Select **DB2 Everyplace Mobile Devices Administration Center** from the Tools menu at the top of the Control Center window. The DB2 Everyplace Mobile Devices Administration Center opens.
2. Right-click on the Subscriptions folder. Select **Create —> Table subscription —> DataPropagator Subscription**.
3. Type a name for the DataPropagator subscription in the **Name** field. This example uses CONTACT.
4. Type a description for the DataPropagator subscription in the **Description** field. This example uses VNCONTACT test subscription.
5. Select the encryption level for the DataPropagator subscription in the **Encryption level** field. This example uses None.
6. Click the  push button next to the **Source Database** field and select VNURSE in the **Database** list of the **Database Selection** window. Click **OK**.
7. Click the  push button next to the **Mirror database** field. Select M_VNURSE from the list in the **Select Mirror database** window. If a mirror database does not exist for your database, click the **Create** push button to launch the Create Database Wizard.
8. Click the **Define Subscription** push button to open the Define replication subscription window.
9. Click the **Add** push button to open the Add window.
10. Select DSYSAMPLE.VNCONTACT from the **Replication Source** list and click **Add**. Then click **Close**.
11. Click the **Timing** push button in the Define replication subscription window.
12. In the **Batch Window** field, specify the amount of time, in seconds, to wait before starting replication. For example if you type 60, changes will be replicated to the source database after 60 seconds.
13. Click **OK** to close the Define replication subscription window.
14. Click the **Authentication** tab.
15. Enter a username and password in the **User ID**, **Password**, and **Verify password** fields. This must be a valid DB2 UDB user ID with DBADM authority.
16. Click **OK** to close the Create Table Subscription notebook. If all of the fields are filled in correctly, **OK** should not be grayed out.

DB2 Everyplace Sync Server is now configured to synchronize the data in this table. Next you will bind the tables and start capture for the DataPropagator subscriptions.

Configuring the databases and starting capture for DataPropagator subscriptions.

DB2 Everyplace Sync Server uses DB2 DataPropagator to replicate data between Sync Server and DB2 Universal Database. Before you can synchronize data using DataPropagator subscriptions, you must configure the databases you are synchronizing. To configure the databases:

1. Exit the DB2 Control Center and the Mobile Devices Administration Center.
2. For Windows, open a DB2 Command window by selecting **Start** → **Programs** → **IBM DB2** → **Command Window**. For UNIX, open a window and ensure that you have started the DB2 database manager. If not, issue a **db2start** command.
3. Change directories to `\SQLLIBDIR\bnd`, where `SQLLIBDIR` is the directory in which DB2 Universal Database is installed.
4. Type `bindcap vnurse` to configure the source database. `vnurse` is the name of the database used in this example.
5. Type `bindcap m_vnurse` to configure the mirror database. `m_vnurse` is the name of the mirror database used in this example.
6. Close the DB2 Command Window.

After configuring the DataPropagator subscription databases, you must start the DataPropagator capture program for the source database. To start the DataPropagator capture program:

1. On the source database server, open a DB2 command window.
2. Start the Capture process by typing the following command:

```
ASNCCP vnurse
```

Leave this command window open. The capture process will run continuously in the background. If the capture process stops, repeat these steps.

Grouping subscriptions into mobile subscription sets

Administrators use subscription sets to define subscription and user groups. A subscription set can contain several subscriptions. A subscription set links the Sync Server to the Sync Client on a mobile device. The name of a subscription set that is defined on the Sync Server must match the name of the subscription set that is defined for the Sync Client on the mobile device.

To create a subscription set:

1. Open the DB2 Control Center and Mobile Devices Administration Center. For Windows, select **Start** → **Programs** → **IBM DB2 Everyplace** → **Start Mobile Devices Administration Center**.
For UNIX, change to `$DSYINSTDIR/Server`, then run `dsyadmin.sh`.
2. Right-click on the Subscription sets folder in the Mobile Devices Administration Center. Select **Create**.
3. Type a name for the subscription set in the **Name** field. Note that the name must match the name of a subscription set on the mobile device. This example uses `VNurse`.
4. Type a description for the subscription set in the **Description** field. This example uses `Nurse Test Subscription set`.
5. Click the **Subscriptions** tab.

6. Select the subscriptions you created from the **Available subscriptions** list. This example uses SCHEDULE and CONTACT. Click the > push button to move the subscription to the **Selected subscriptions** list.
7. Click **OK** to close the Create Subscription set notebook.

Next you will create users.

Creating mobile users

The user ID and password of a mobile user is used when connecting a mobile device to the Sync Server. The user ID and password of a mobile user is not a login user ID on the workstation that is running Sync Server. Mobile users can connect to the Sync Server individually or they can be assigned to groups that are associated with applications. In the following steps, the user is not assigned to a group

To create a mobile user:

1. Right-click the Users folder. Select **Create**.
2. Type a name for the user in the **Name** field. This example uses testuser.
3. Type a description for the table subscription in the Description field. This example uses Test user
4. Leave the **Group** field empty.
5. Click the **Authentication** tab.
6. Enter a password in the **Password** and **Verify password** fields. This example uses test as the password.
7. Click **OK** to close the Create User notebook.

The user is not enabled for synchronization until after it is assigned to a group and has connected with the server for the first time.

Creating a data synchronization group

With DB2 Everyplace Sync Server, you can use groups to manage users, and to combine users and groups with subscription sets. To create a group:

1. Right-click on the **Groups** folder. Select **Create**.
2. In the Create Group notebook, type a name for the group in the **Name** field. This example uses Nurse.
3. Type a description for the group in the Description field. This example uses Nurses Test Group.
4. Click the **Users** tab.
5. Select the user you created from the **Available users** list. This example uses testuser. Click the > push button to move the user to the **Selected users** list.
6. Click the **Subscription Sets** tab.
7. From the **Available subscription sets** list, select a subscription set. The subscription set must be created before you can assign groups to it. This example uses VNurse. Click the > push button to move the subscription set to the **Selected subscription sets** list.
8. Complete the Identification, Clients, and Subscription sets pages of the Create Group notebook.
9. Select **Enable Synchronization**.
10. Click **OK** to close the Create Group notebook.

Now you are ready to begin synchronizing data.

Starting the application server

If you are using the default application server included with DB2 Everyplace Sync Server, start the application server:

- On windows, select **Start** —> **Programs** —> **IBM DB2 Everyplace**—> **Start Servlet for Sync Server**. A command prompt window opens that provides status messages from the default application server.
- On UNIX, change to \$DSYINSTDIR/Server, then run dsysync.sh.

If you are using a different application service with DB2 Everyplace Sync Server, see the DB2 Everyplace Web site at

To test if the Sync Server servlet is running correctly, go to <http://localhost:8080/db2e/db2erdb> and check for the following message:
`com.ibm.mobileservices.adapter.rdb.RDb Information`

Using a Remote Access Service

After the DB2 Everyplace Sync Server is running, you must configure a mobile device to communicate with the server. The DB2 Everyplace Sync Server uses TCP/IP to communicate with mobile devices. Most devices support TCP/IP connections using modems, wireless LAN (802.11b), or ethernet interfaces. This section covers how to use Windows Remote Access Service to make a TCP/IP connection to a Palm OS device connected to the server using a serial cradle. You do not need to complete these steps if you have an ethernet cradle for your Palm OS device.

Alternatively, you can use the MochaSoft Mocha W32 PPP shareware program to connect to the device. For information on Mocha W32 PPP, visit

<http://www.mochasoft.dk/>

To set up the serial cradle for use with Windows Remote Access Service:

1. Connect the serial cradle to the Windows workstation.
2. Open the Control Panel and double-click **Modems**.
3. The Modems Properties window opens. If you have a modem connection currently defined, click **Add** to open the Install New Modem window. If you do not have a modem connection defined, the Install New Modem window displays automatically.
4. In the Install New Modem window, select **Don't detect my modem**.
5. Click **Next**.
6. Select **Dial-Up Networking Serial Cable between 2 PCs** in the **Models** field.
7. Click **Next**.
8. Choose the serial port the serial cradle is connected to.
9. Click **Next**.
10. Click **Finish** to complete the setup of the Serial cradle for use with Window Remote Access Service.

To configure the Windows Remote Access Service on the Windows workstation:

1. Double-click the **Network** icon in the Control Panel.
2. Select the **Services** tab.

3. Remote Access Service should be listed under **Network Services**. If it is not listed. Click **Add**.
4. Select Remote Access Service from the **Network Service** list and Click **OK**.
5. Double-click **Remote Access Service**. The system displays the Remote Access Setup window.
6. Select the Dial-Up Networking Serial Cable between 2 PCs Device.
7. Click **Configure**. The Configure Port Usage window displays, which allows you to specify whether RAS is expecting to dial out on this port, receive connections on this port, or both.
8. For data synchronization, select the **Receive calls only** radio button, then click **OK**.
9. To change the network options, click **Network**. The system displays the Network Configuration window.
10. To ensure that network passwords are received correctly, select the **Allow any authentication including clear text** check box.
11. Select **TCP/IP**. Next to the **TCP/IP** check box, click **Configure**. The system displays the RAS TCP/IP Configuration window. In this window you can set whether the client can access the entire network and how IP addresses are allocated.
12. Select **Entire Network** under Allow remote TCP/IP clients to access.
13. If you have DHCP installed on your network, select **Use DHCP to assign remote TCP/IP client addresses**. If you do not have DHCP installed on your network (or you do not use it), select **Use static address pool**. Set the **Begin** field to a static TCP/IP address provided by the system administrator. Set the **End** field to a static TCP/IP address provided by the system administrator.
14. Click **OK**.
15. Click **OK** to exit the Network Configuration window.
16. Click **Continue** to exit the Remote Access Setup window.
17. Click **Close** to exit the Network window.
18. Reboot the workstation.

Note: After rebooting the workstation, you must restart the capture process and Sync Server.

After you have completed configuring the connection to the device, follow the steps on “Configuring the Palm OS device” on page 17 to complete the configuration of the Palm OS device using the user ID and password you supplied during this tutorial.

Synchronizing

To synchronize the data, follow the steps in “Synchronizing and verifying data on the Palm OS emulator or device” on page 19 .

Part 3. Working with data sources

Chapter 5. JDBC data sources	33
Supported JDBC databases	33
Using local and remote configurations	33
Setting up Sync Server to use JDBC databases	34
Adding JDBC driver path for non-DB2 sources	35
Updating driver list file to use third-party driver with Microsoft SQL Server	35
Specifying JDBC driver on Create JDBC or Upload Subscription notebooks	36
Chapter 6. DB2 DataPropagator data sources	37
Configuring the source database for the Capture program	37
Starting the DataPropagator Capture program	38
Windows and UNIX systems	38
AS/400 systems	39
OS/390 systems	40
Configuring the mid-tier mirror database for the Capture program	40
Chapter 7. Filtering data from data sources	41
Horizontal filtering at the subscription level, group level, or user level	41
Defining simple horizontal filters	41
Defining complex horizontal filters at the group level or user level	43
Syntax for filters	44
Syntax	44
Description	46
Vertical filtering	47
Chapter 8. The remote query and stored procedure adapter	49
Creating an AgentAdapter subscription	49
Using the remote query and stored procedure adapter in an application	49
Sample application using the remote query and stored procedure adapter	50

Chapter 5. JDBC data sources

DB2 Everyplace supports connecting with data sources using a JDBC driver. The data source must support JDBC triggers. This chapter discusses the following topics:

- Supported JDBC databases
- JDBC drivers property file
- Connecting to non-JDBC databases

Supported JDBC databases

There are two types of subscriptions that can connect to JDBC compliant databases.

- Upload subscriptions, which can connect to any JDBC compliant database.
- JDBC subscriptions, which can connect to DB2 Oracle, Microsoft SQL Server, Sybase, and Informix databases.

For more information about upload subscriptions and JDBC subscriptions, see “Creating a JDBC subscription” on page 75 and “Creating an upload subscription” on page 87.

Using local and remote configurations

For local configurations, the mirror and source databases are located on the same server. You can use the following data sources for JDBC subscriptions:

- DB2 Universal database, Version 7.2 on Windows NT
- DB2 Universal database, Version 7.2 on Windows 2000
- DB2 Universal database, Version 7.2 on AIX
- DB2 Universal database, Version 7.2 on Linux
- DB2 Universal database, Version 7.2 on Solaris

For remote configurations, the source database and mirror database are located on different servers. For JDBC subscriptions, use the data sources described in Table 1.

Table 1. Remote configurations

Source database	Mirror database	Driver
DB2 Universal database, Version 7.2 for Windows 2000	DB2 Universal Database, Version 7.2	IBM DB2 UDB local
DB2 Universal database, Version 7.1.0 for z/OS	DB2 Universal Database, Version 7.2	IBM DB2 UDB local
Oracle 8i	DB2 Universal Database, Version 7.2	Oracle Thin drivers 8.1.5 classes111.zip
DB2 iSeries Version, 5R1 for OS/400	DB2 Universal Database V7.2	IBM DB2 UDB local
Microsoft SQL Server, Version 7.0 for Windows NT	DB2 Universal Database, Version 7.2	NetDirect JSQ 2.25 driver
Sybase Adaptive Server Enterprise, Version 11.93	DB2 Universal Database, Version 7.2	Sybase J-Connect 4.2 driver

Table 1. Remote configurations (continued)

Source database	Mirror database	Driver
Informix Server, Version 9	DB2 Universal Database, Version 7.2	Informix JDBC driver 1.5

NetDirect JSQL is a third-party driver. Microsoft does not provide a JDBC driver for SQL Server.

Setting up Sync Server to use JDBC databases

Before you create a JDBC or upload subscription that uses a non-DB2 JDBC driver, you need to configure the Sync Server. This usually includes adding the JDBC driver path to a Sync Server configuration file. For connecting to Microsoft SQL Server and other JDBC-compliant databases, you also must update a driver list file.

After you configure the Sync Server, you can create subscriptions that use the JDBC driver. On the Create JDBC Subscription or Create Upload Subscription notebook, you must specify the correct database type and in some cases, the full name of the driver.

Table 2 and Table 3 list the necessary steps for JDBC and upload subscriptions:

Table 2. Steps for setting up the Sync Server to use JDBC driver for JDBC subscriptions

	DB2 UDB	Informix, Sybase, or Oracle	Microsoft SQL Server
When setting up the Sync Server before using the JDBC driver for the first time:	None	Add a JDBC driver path	<ol style="list-style-type: none"> 1. Add a JDBC driver path 2. Update the driver list file
When creating the subscription, on the Source tab of the Create JDBC Subscription notebook:	Select IBM DB2 UDB local from the Driver drop-down list	Select the database type from the Driver drop-down list	Select Other from the Driver drop-down list and enter the driver's full name in the field to the right

Table 3. Steps for setting up the Sync Server to use JDBC driver for upload subscriptions

	DB2 UDB	Informix, Sybase, or Oracle	Microsoft SQL Server	All other JDBC-compliant database
When setting up the Sync Server before using the JDBC driver for the first time:	None	Add a JDBC driver path	Add a JDBC driver path	Add a JDBC driver path
When creating the subscription, on the Source tab of the Create Upload Subscription notebook:	Select a DB2 UDB driver from the Driver drop-down list	Select the database type from the Driver drop-down list	Select Other from the Driver drop-down list and enter the driver's full name in the field to the right	Select Other from the Driver drop-down list and enter the driver's full name in the field to the right

Adding JDBC driver path for non-DB2 sources

For non-DB2 source databases, you must add the path of the JDBC client driver to a Sync Server configuration file (see the tables on page 34). The JDBC client driver is provided by the data source vendor.

To add the JDBC driver path:

1. Exit the Mobile Devices Administration Center if it is running.
2. Stop the Sync Server servlet if it is running.
3. Using a text editor, open `\SyncServer\Server\dsysetjavahome.bat` file. It is located in the `\SyncServer\Server\` directory.
4. Add the complete path of the JDBC driver to the `SET JDBC_DRV_CP` line of the file. For example, to configure access to an Oracle source using the JDBC client driver installed to `C:\Oracle\Ora81\jdbc\lib\`, add the following path to the `SET JDBC_DRV_CP` line of the `dsysetjavahome.bat` file:

```
SET JDBC_DRV_CP=C:\Oracle\Ora81\jdbc\lib\classes111.zip
```

You can specify multiple JDBC client drivers. For example:

```
SET JDBC_DRV_CP=C:\Oracle\Ora81\jdbc\lib\classes111.zip;E:\Informix\JDBC\lib\ifxjdbc-g.jar
```

5. Restart the Sync Server servlet to make the changes effective.

Updating driver list file to use third-party driver with Microsoft SQL Server

1. Exit the Mobile Devices Administration Center if it is running.
2. Stop the Sync Server servlet if it is running.
3. Using a text editor, open `DSYJdbcDriverList.properties` file in `\SyncServer\Server\classes\com\ibm\mobileservices\` directory. The default contents of the file are:

```
# This file specifies which JDBC drivers are used for which databases.
#
# Format:
# {JDBC driver full-name}={database identifier}
#
# The following database identifiers are supported:
# DB2 ----- for DB2 databases
# Ifx ----- for Informix databases
# Oracle ----- for Oracle databases
# SQLServer ----- for Microsoft SQL Server databases
# Syb ----- for Sybase databases
```

```
# Here is a list of DB2 JDBC drivers:
COM.ibm.db2.jdbc.app.DB2Driver=DB2
COM.ibm.db2.jdbc.net.DB2Driver=DB2
com.ibm.as400.access.AS400JDBCdriver=DB2
```

```
# Here is a list of Informix JDBC drivers:
com.informix.jdbc.IfxDriver=Ifx
```

```
# Here is a list of Oracle JDBC drivers:
oracle.jdbc.driver.OracleDriver=Oracle
```

```
# Here is a list of SQL Server JDBC drivers:
com.jnetdirect.jsql.JSQLDriver=SQLServer
```

```
# Here is a list of Sybase JDBC drivers:
```

```
com.sybase.jdbc.SybDriver=Syb
```

4. Add a line to the file to specify the third-party JDBC driver that you want, using the following format:

```
JDBC_driver_full_name=SQLServer
```

For example:

```
com.myfastdriver.jdbc.SQLDriver=SQLServer
```

5. Restart the Sync Server servlet to effect the changes.

Specifying JDBC driver on Create JDBC or Upload Subscription notebooks

When you create a JDBC or upload subscription, you must specify the correct driver on the **Source** tab of the Creating JDBC Subscription or Create Upload Subscription notebook.

In most cases, you only need to select the correct source database type from the **Driver** drop-down list. The field to the right will be automatically updated with the full name of the JDBC driver.

For DB2 UDB, select **DB2 UDB local** if the DB2 database is running on the same machine as the Sync Server. Select **DB2 UDB remote** if the DB2 database is running remotely. For the latter case, make sure the remote DB2 database is configured correctly to allow proper JDBC connection.

If the database is Microsoft SQL Server (for both JDBC and upload subscriptions) or any other JDBC-compliant database (for upload subscriptions), you must:

1. Select **Other** from the list.
2. Enter the full name of the driver path in the field to the right.

Chapter 6. DB2 DataPropagator data sources

As you set up your databases for synchronization, each source table to be synchronized with a DataPropagator subscription must be defined as a replication source.

To use the DB2 Control Center to define replication sources on the source system:

1. Start Mobile Devices Administration Center.
 - For Windows, select **Start Mobile Devices Administration Center** from the DB2 Everyplace program group in the Start menu.
 - For the UNIX operating system, change directory to \$DSYINSTDIR/Server and run dsyadmin.sh.

Two windows appear: the DB2 Control Center and the Mobile Devices Administration Center.

2. In the DB2 Control Center window, expand the object tree until the contents pane displays the table you want to define as a replication source.
3. Right-click the table.
4. Select **Define as replication source** → **DB2 Everyplace Sync Server**. In the Run now or save SQL window, select **Run now** and click **OK**.

At least one primary key column must be defined for each table serving as a replication source. The *DB2 Universal Database Administration Guide* provides more information on how to choose the columns for a primary key.

Configuring the source database for the Capture program

The Capture program runs continuously on the source system to capture changes made to the source database. For Windows or UNIX source systems, the Capture program must be bound to the source database to work properly. See the instructions in this section or the *DB2 Universal Database Replication Guide and Reference* for information on how to bind the Capture program

For OS/390 and AS/400 source systems, you must issue a bind-capture job to start the Capture program on the source system. See the *DB2 Universal Database Replication Guide and Reference* for information on how to issue a bind-capture job.

To configure the source database for the Capture program on a Windows source system:

1. Exit the DB2 Control Center.
2. Open a DB2 command window. The command line processor displays a window with the following prompt:

```
x:\installation_directory\BIN>
```

where *x* is the hard disk drive and *installation_directory* is the directory in which DB2 UDB is installed.

3. From the source system, issue the bindcap command for the source database in the following format:

```
bindcap source_database_name
```

where *source_database_name* is the name of the database on the source server

For example, the command for the VNURSE database is:

```
bindcap VNURSE
```

4. Close the DB2 command window.

To configure the source database for the Capture program on a UNIX source system:

1. Exit the DB2 Control Center.
2. Make sure you have started the DB2 database manager. If not, issue a **db2start** command.
3. On the UNIX terminal, issue the bindcap command for the source database in the following format:

```
bindcap source_database_name
```

where *source_database_name* is the name of the database on the source server.

For example, the command for the VNURSE database is:

```
bindcap VNURSE
```

You must issue the command in a directory for which you have the write privileges.

Starting the DataPropagator Capture program

The Capture program on the source system must be running continuously not only to capture changes made to the source database by the Sync Server, but possibly by other applications as well. If the source server is restarted, you must restart the Capture program before attempting to synchronize.

See the *DB2 Universal Database Replication Guide and Reference* for information on the authorization you need to run the Capture program.

How you start the Capture program depends on the operating system of the source server.

Windows and UNIX systems

Use the **ASNCCP** command to start capturing changes to a Windows or UNIX source database.

To start the Capture program on a Windows source server:

1. On the Windows NT workstation desktop, open a DB2 command window by selecting **Start** → **Programs** → **DB2 for Windows** → **Command Window**.
2. The first time you start the Capture process, enter the following command:

```
ASNCCP database_name
```

where *database_name* is the name of the source database with which you will synchronize.

If you are restarting the Capture process, issue the following command:

```
ASNCCP database_name warmns
```

The Capture process started by the **ASNCCP** command runs continuously.

You can also operate the Capture program by using the Windows NT Service Control Manager. The Service Control Manager enables you to automatically start the Capture and Apply programs as services from the NT Control Panel. See the *DB2 Universal Database Replication Guide and Reference* for information on how to set up the NT service.

To start the Capture program on a UNIX source server:

1. Make sure the DB2 database manager has started. If not, issue the **db2start** command on the UNIX terminal.
2. On the UNIX terminal, the first time you start the Capture process, enter the following command:

```
ASNCCP database_name
```

where *database_name* is the name of the source database with which you will synchronize. The command must be issued in a directory for which you have the write privilege.

If you are restarting the Capture process, issue the following command:

```
ASNCCP database_name warmns
```

The Capture process started by the **ASNCCP** command runs continuously.

Note: The **warmns** parameter of the **ASNCCP** command forces a warm start of the Capture program so that processing continues where it ended in its previous run. Additional program parameters for the **ASNCCP** command are documented in the *DB2 Universal Database Replication Guide and Reference*. Although you might issue parameters with the **ASNCCP** command, avoid using the following parameters, which negatively affect synchronization:

COLD

This parameter causes the Sync Server to treat every row in the source database as a changed row, and will seriously degrade performance.

AUTOSTOP

This parameter forces the Capture program to stop after capturing all transactions in the source database log. The Sync Server requires the Capture program to run continuously on the source server.

CHGONLY

This parameter is not recommended. See the *DB2 Universal Database Replication Guide and Reference* for more information.

AS/400 systems

Use the **STRDPRCAP** (Start DPR Capture) command to start capturing changes to the AS/400 source database. Because this command processes all replication sources in the register table, make sure that the user running this command has the proper authority.

Specify a value of 5 for the **DPRVSN** (DataPropagator version) parameter. Do not cold start the Capture program (by issuing a value of N0 for the **RESTART** parameter), because this causes the Sync Server to treat every row in the source database as a changed row, seriously degrading performance.

OS/390 systems

If your source system is an OS/390 system, you can use JCL to start the Capture program or you can start the program as a system-started task. See the *DB2 Universal Database Replication Guide and Reference* for more information on how to perform these tasks. Do not use the **COLD** and **CHGONLY** parameters for reasons given in “Windows and UNIX systems” on page 38.

Configuring the mid-tier mirror database for the Capture program

The Capture program runs on the mid-tier system on an as-needed basis as synchronization requests are issued. The program must be bound to the mid-tier mirror database for DataPropagator to capture changes submitted by users and to apply them to the source database.

To configure the mid-tier mirror database for the Capture program on a Windows NT source system:

1. Exit the DB2 Control Center.
2. Open a DB2 command window. The command line processor displays a window with the following prompt:

```
x:\installation_directory\BIN>
```

where *x* is the hard disk drive and *installation_directory* is the directory in which DB2 UDB is installed.

3. From the source system, issue the bindcap command for the mirror database on the mid-tier server in the following format:

```
bindcap mirror_database_name
```

where *mirror_database_name* is the name of the mirror database on the mid-tier server.

For example, the command for the M_VNURSE database is:

```
bindcap M_VNURSE
```

4. Close the DB2 command window.

To configure the mid-tier mirror database for the Capture program on a UNIX source system:

1. Exit the DB2 Control Center.
2. Make sure you have started the DB2 database manager on the UNIX source system. If not, issue a **db2start** command.
3. On the UNIX terminal of the source system, issue the bindcap command for the mirror database in the following format:

```
bindcap mirror_database_name
```

where *mirror_database_name* is the name of the mirror database on the mid-tier server.

For example, the command for the M_VNURSE database is:

```
bindcap M_VNURSE
```

You must issue the command in a directory for which you have the write privileges.

Chapter 7. Filtering data from data sources

DB2 Everyplace Sync Server includes several filtering options for horizontal-, vertical-, and user-based filtering methods. Filtering data from the server is an important part of controlling the data available to the client. Filtering can also help control client database size by synchronizing the minimum amount of data necessary for a specific client. This chapter explains how to use the DB2 Everyplace Sync Server filtering methods with users, groups, and subscriptions to control client data.

Horizontal filtering at the subscription level, group level, or user level

Horizontal filtering at the subscription level, group level, or user level uses an SQL clause to select data from the source data source. The contents of the SQL clause are controlled by the Rows page of the **Advanced Subscription Definition** notebook for DB2 DataPropagator subscriptions and the Rows page of **Advanced Replication Subscription** notebook for JDBC subscriptions. To open either of these notebooks:

1. Create or edit a JDBC subscription or DataPropagator subscription.
2. Click **Define Subscription**. The Define Replication Subscription window opens.
3. Click **Advanced**. For DB2 DataPropagator subscriptions, the Advanced Subscription Definition notebook opens. For JDBC subscriptions, the Advanced Replication Subscription notebook opens.

Defining simple horizontal filters

To filter data at the subscription level:

On the rows page of the subscription notebook, type an SQL clause in the **All rows needed** box. The entire SQL clause must be typed on one line using the following format:

```
city='myValue'
```

Do not type WHERE at the beginning of the SQL clause. WHERE is automatically appended to the clause typed in the box. For example, the following clause will synchronize only columns that have a city column value equal to Los Angeles:

```
city='Los Angeles, CA 90061'
```

To filter data at the group level:

1. On the rows page of the subscription notebook, type an SQL clause in the **Subset of rows for individual users** box. Do not type WHERE at the beginning of the SQL clause. WHERE is automatically appended to the clause typed in the box. Instead of using a value in the SQL clause, insert a parameter. For example, to filter the VNPERSOIN table based on the value of the parameter **:fcity**, for the city column, type:

```
city=':fcity.'
```

where **:fcity** is a parameter for the column value.

2. Open a Create or Edit Group notebook for the group that you want to filter. The subscription that you created with the filter parameter must be assigned to the group you are editing.

3. On the Data filter page of the Group notebook, Click **Add**.
4. Type `:fcity.` in the **Parameter name** field.
We recommend that you uniquely identify your parameter names with additional text. For example, start the parameter name with a colon (:) and end it with a period (.).
5. Type a default value in the **Default value** field. For example:
Los Angeles, CA 90061

A special value can also be used. The value \$USERNAME allows a Sync Server user ID to be inserted as the value of the parameter. This allows you to have rows created by specific users inserted into the data source with their Sync Server user IDs in a specific field.

6. Click **OK**.

Each user assigned to this group will receive only rows from the VNPERSO^N table with a city column value equal to Los Angeles, CA 90061. Other groups will receive the entire VNPERSO^N table or a specific subset of the VNPERSO^N table, depending on the filters configured.

To filter data at the user level:

1. On the Rows page, type an SQL clause in the **Subset of rows for individual users** box. Do not type WHERE at the beginning of the SQL clause. WHERE is automatically appended to the clause typed in the box. Instead of using a value in the SQL clause, insert a parameter. For example, to filter the VNPERSO^N table based on the value of the parameter `:fcity.` for the city column and the value of the parameter `:fid.` for the id column, type:
`city=':fcity.'` and `id=':fid.'`

where `:fcity.` is a parameter for the city column value and `:fid.` is a parameter for the id column value.
2. Complete and close the Create Subscription notebook.
3. Open a Create or Edit Group notebook for the group of users you want to filter. The subscription you created with the filter parameters must be assigned to the group you are editing.
4. On the Data filter page of the Group notebook, click **Add**.
5. Type `:fcity.` in the **Parameter name** field.
6. Type a default value in the **Default value** field. For example:
Los Angeles, CA 90061
7. Click **OK**.
8. Click **Add** again to add the second parameter.
9. Type `:fid.` in the **Parameter name** field.
10. Click **OK**.
11. Complete and close the Group notebook.
12. Open a Create or Edit User notebook for the user you want to filter. The user must be assigned to the group with the filter parameters.
13. On the Data filter page of the Group notebook, select the `:fid.` parameter and click **Change**.
14. Type a value in the **User override** field. For example, to override the value of `:fid.` for this user and set it to 900000401, type:
900000401
15. Click **OK**.

The user will only receive records with a city column value of Los Angeles, CA 90061 and an id column value of 900000401. There is one record in VNPERSO_N with this value. Other users assigned to the same group will only receive rows from the VNPERSO_N table with a city column value equal to Los Angeles, CA 90061 and the user column value set by their data filters. Other groups will receive the entire VNPERSO_N table or a specific subset of the VNPERSO_N table, depending on the filters configured.

Defining complex horizontal filters at the group level or user level

Some situations in database and user management call for the definition of a complex SQL WHERE clause in **Subset of rows for individual users** field in order to limit the rows that a group or a user can see. When defining the filter, you might refer to a table in the mirror database, use parameters for the group or the user, or use a combination of these methods. For the basic steps in creating a simple horizontal filter, see “Defining simple horizontal filters” on page 41.

DB2 Everyplace Sync Server provides a subset of the standard SQL WHERE implementation to use with the filter. For the syntax of the subset, see “Syntax for filters” on page 44.

The following example demonstrates how you may refer to other tables in the mirror database and use a parameter for horizontal filtering.

Suppose you manage two tables named Ziptab and Business, both of which are in the mirror database. Ziptab contains ZIP codes for certain cities (see Table 4), while Business keeps track of some companies and their ZIP codes (see Table 5). You want users in San Jose, California to view only the businesses in their city. You have created a group and assigned these users to the group.

Table 4. Ziptab table

City	Zipcode
San Jose	95141
San Jose	95123
Los Angeles	93002

Table 5. Business table

Business	Zip
IBM	95141
My Company	95123
Your Company	93002
Another Company	94888

You would type the following clause in the **Subset of rows for individual users** field of the Rows page:

```
(Zip) IN (SELECT Zipcode FROM Ziptab WHERE City = ':fcity.')
```

:fcity. is a parameter for the City column value, which you set to San Jose for the group.

Then complete and close the Create Subscriptions notebook. As a result, after synchronization, the users will only see the following rows in Business table on their devices:

Table 6. Rows that the users will see on their devices

Business	Zip
IBM	95141
My Company	95123

Syntax for filters

You can use a clause similar to the WHERE clause in SQL to filter for individual users when you create a replication subscription in the Mobile Devices Administration Center (MDAC). Enter the clause in the **Subset of rows for individual users** field of the Advanced Replication Subscription notebook for DataPropagator subscriptions, or Advanced Replication Subscription notebook for JDBC subscriptions.

There are limitations when you use the syntax diagram below. These limitations include:

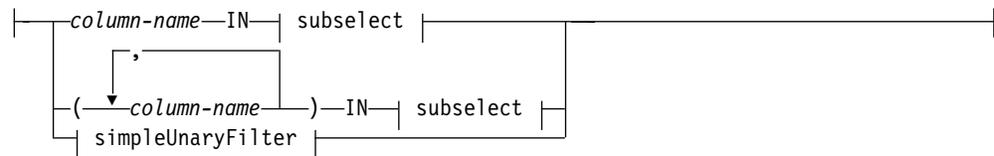
- There can be several look-up tables (such as the Ziptab table in the example above). However, each look-up table cannot be mentioned more than once in the clause.
- Parameters can only appear where a constant is expected. If the parameter is a character data type, such as VARCHAR or CHAR, it must be enclosed in single quotes. For example, JOBCODE=':JOB.'

Syntax

Filter



dimension:



subselect:



selectClause:



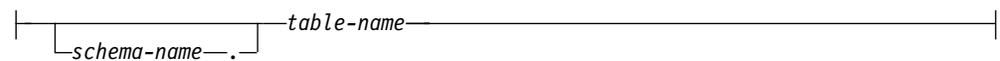
fromClause:



whereClause:



tableReference:



simpleFilter:



simpleUnaryFilter:



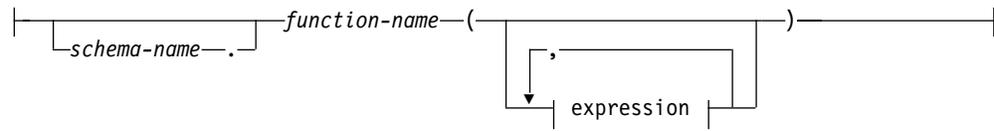
simplePredicate:



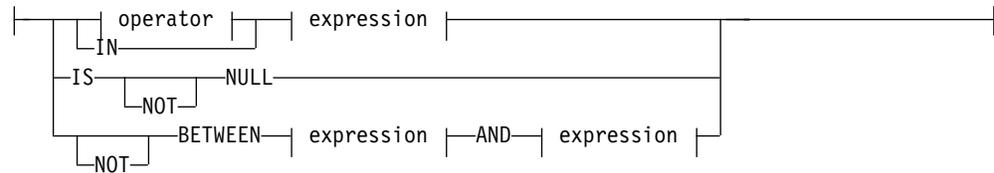
expression:



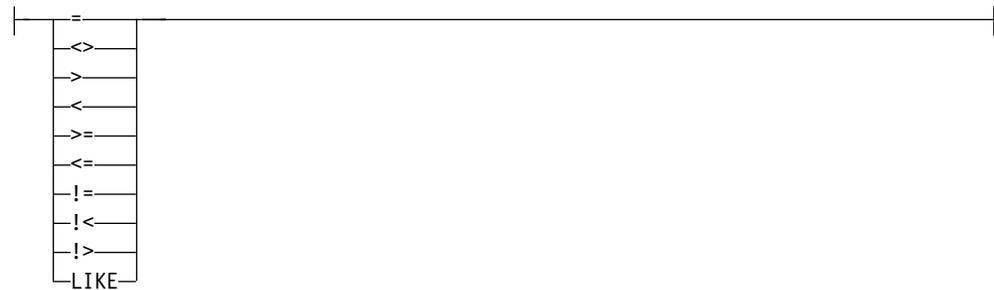
function:



simplePredicateEnd:



operator:



Description

Operators

You can use any of the following operators:

- `=` Equal to.
- `<>` Not equal to.
- `<` Less than.
- `>` Greater than.
- `<=` Less than or equal to.
- `!>` Less than or equal to.
- `>=` Greater than or equal to.
- `!<` Greater than or equal to.

LIKE Matches one character string. Use a single-byte character-set (SBCS) underscore to refer to one SBCS character. Use a double-byte character-set (DBCS) underscore to refer to one DBCS character. For example, a condition `WHERE PART_NUMBER LIKE '_0'` (here the underscore is in SBCS) returns all 2-digit part numbers ending in 0 (20, 30, and 40, for example). Use a percent (either SBCS or DBCS) to refer to a string of zero or more SBCS or DBCS characters. For example, a

condition WHERE DEPT_NUMBER LIKE '2%' returns all department numbers beginning with the number 2 (20, 27, or 234, for example).

Vertical filtering

Vertical filtering uses the Target columns page of the Advanced Subscription Definition notebook for DB2 DataPropagator subscriptions and the Rows page of Advanced Replication Subscription notebook for JDBC subscription. To open either of these notebooks:

1. Create or edit a JDBC subscription or DataPropagator subscription.
2. Click **Define Subscription**. The Define Replication Subscription window opens.
3. Click **Advanced**. For DB2 DataPropagator subscriptions, the Advanced Subscription Definition notebook opens. For JDBC subscriptions, the Advanced Replication Subscription notebook opens.

This section uses a sample table with 7 columns. The characteristics of this sample table are:

Column name	data type	nullable?	default value
NOTNULLINT1	INTEGER	NO	
NOTNULLCHAR1	CHAR	NO	
NOTNULLDATE1	DATE	NO	
DEFAULTINT1	INT	YES	1000
DEFAULTCHAR1	CHAR	YES	'a'
DEFAULTDATE1	DATE	YES	'2001-06-29'
ID	INTEGER	NO	

The ID column is the primary key.

To vertically filter data:

1. On the Target Columns page, unsubscribe the columns you do not want to synchronize to the client. To unsubscribe a column, clear the **Subscribe** check box. For example using the sample table, clear the **Subscribe** check box for the first four columns: NOTNULLINT1, NOTNULLCHAR1, NOTNULLDATE1, and DEFAULTINT1.
2. Select each unsubscribed column, and click **Change** to add a default value data filter. The Change Column window opens.
3. Type a default value data filter parameter in the **Default value data filter** field. Repeat for all unsubscribed columns. The example table uses the parameters: :PARAMINT1., :PARAMCHAR1., :PARAMDATE1., and :PARAMINT2..
4. Close the Subscription notebook.

The default value data-filter parameters are used by the group to provide a default value for the unsubscribed columns. Data inserted to the data source from the client will be composed of the columns of data on the client combined with default column values defined for the group to complete the rows of data inserted to the data source. The next step is to define the default value data filter parameter values.

Defining the default value data-filter parameters:

1. Open a Create or Edit Group notebook for the group you want to filter. The subscription you created with the filter variable must be assigned to the group you are editing.
2. On the Data filter page of the Group notebook, Click **Add**.
3. Type the default value data-filter parameter name in the **Parameter name** field.
4. Type a default value in the **Default value** field. For example, for the default value data-filter parameter, :PARAMINT1., type:

A special value can also be used. The value \$USERNAME allows a Sync Server user ID to be inserted as the value of the parameter. This allows you to have rows created by specific users inserted into the data source with their Sync Server user ID in a specific field. For example, for :PARAMCHAR1. type:

```
$USERNAME
```

Now all rows inserted into the sample table will have the Sync Server user ID inserted into the NOTNULLCHAR1 column. For the example table, add two more parameters:

```
:PARAMDATE1.    '2001-06-29'
:PARAMINT2.     15
```

5. Complete and close the Group notebook.
6. Open a Create or Edit User notebook for the user you want to filter. The user must be assigned to the group with the filter parameters.
7. On the Data filter page of the User notebook, you can override specific default values for this user. If a \$USERNAME filter is in use, the user ID for this user is automatically inserted into the User override column. For example, to override the value of :PARAMINT2.:
 - a. Click **Change**.
 - b. Type a value in the **User override** field. For example, to override the value of :PARAMINT2. for this user and set it to 20, type 20.
 - c. Click **OK**.
8. Complete and close the User notebook.

Every user assigned to the filtered group will receive only 3 of the 7 columns of the sample table. When a user inserts a new row in the table, it is synchronized to the data source using default values for the group in each of the unsubscribed columns. If the \$USERNAME keyword is used in the data filter, the user ID of the user who inserted the row will be inserted for the value of that filtered column. Also, individual users may have specific default values that differ from the group default value configured on a user basis.

Chapter 8. The remote query and stored procedure adapter

DB2 Everyplace includes a remote query and stored procedure adapter. This adapter enables DB2 Everyplace application to use the Sync Server architecture to call a stored procedure located at a remote data source. The results of the stored procedure are returned directly to the application on the device. The stored procedure call allows a DB2 Everyplace application to directly access data in a remote server without synchronizing. This chapter shows how to configure an Agent Adapter subscription and stored procedure and use the remote query and stored procedure adapter in an application.

Creating an AgentAdapter subscription

To create an AgentAdapter subscription:

1. Open the Mobile Devices Administration Center.
2. Select the **Subscriptions** folder of the Mobile Devices Administration Center.
3. Right-click on the **Subscriptions** folder of the Mobile Devices Administration Center and select **Create Custom Subscription**.
4. Type a name for the subscription in the **Name** field.
5. Select the AgentAdapter in the **Adapter** field.
6. Select None in the **Encryption** field. Encryption is not supported with the AgentAdapter.
7. Click the **Launch Customizer** button. The Source database window opens.
8. Type a DB2 user ID with access privileges to the database into the **User ID** field
9. Type the password for the user ID in the **Password** and **Verify password** fields.
10. In the **Other** field, type the following line:
`dbname=DATABASE;procname=PROCEDURE`

where *DATABASE* is the name of the database used by the stored procedure, and *PROCEDURE* is the name of the stored procedure. For example to use stored procedure SP1 from data source DS1 and stored procedure SP2 from data source DS2, the following string is used:

```
dbname=DS1;procname=SP1;dbname=DS2;procname=SP2
```

11. Click **OK** to close the Source database window. Click **OK** to close the Create Custom Subscription notebook.

Using the remote query and stored procedure adapter in an application

The remote query and stored procedure adapter enables some unique capabilities of the DB2 Everyplace database engine. The following sections detail the requirements and techniques for using the remote query and stored procedure adapter in a DB2 Everyplace application.

Passing parameters:

DB2 Everyplace supports calling stored procedures on a remote DB2 server through the CLI interface. The client application uses the CALL statement to run the remote stored procedure. The CALL statement names the procedure to be called and specifies its parameters. The following types are supported: INTEGER, SMALLINT, DECIMAL, CHAR, VARCHAR, DATE, TIME, TIMESTAMP and BLOB.

Using the result set:

Result sets are a useful way to retrieve data from a stored procedure. If a client application runs a stored procedure that generates a result set, it can then use the regular CLI functions such as SQLFetch() and SQLGetData() to retrieve the data. DB2 Everyplace does not support multiple result sets.

Current limitations:

- Multiple connections
DB2 Everyplace does not support multiple local database connections. DB2 Everyplace supports one connection to the local database and one connection to the remote database with some limitations. The application must connect to the local database first (if a local connection is needed), then connect to the remote database (if a remote connection is needed). The allocated connection handles should be freed together.
- Statement handle
User should allocate only one statement handle for the remote connection.
- Local transaction
If the AUTOCOMMIT property of an DB2 Everyplace application is set to "off" on either the local or remote connections, the application must not call a remote stored procedure that returns a result set. This is because temporary tables will be created during such a remote stored procedures call, and the subsequent data definition statements will trigger errors during a transaction.

Supported platforms:

The remote query and stored procedure adapter supports the Win32 and Palm OS client platforms. The remote query and stored procedure adapter requires that the stored procedures are registered to DB2.

Programming tips:

- On Palm OS, the application stack size may need to be increased.
- On Win32 operating systems, at run time the IBM Sync Client DLL files must be included in the local directory or system path.
- In a DB2 UDB stored procedure, if a binary large object (BLOB) is used as an input or output parameter, the first four bytes of the BLOB data are reserved to indicate length.

Sample application using the remote query and stored procedure adapter

The following example will create a stored procedure, a subscription to the stored procedure, and a DB2 Everyplace application to use the stored procedure. The purpose of the example application is to allow a mobile user to check an account balance and transfer money between a savings and a checking account by using a

DB2 Everyplace remote stored procedure call. For information on how to create stored procedures on DB2 Universal Database, please see *DB2 Universal Database Application Development Guide*.

Create a data source:

This example uses a DB2 database named MYSAMPLE. You need to manually create the MYSAMPLE database. To create the MYSAMPLE database, enter the following statements at the DB2 command prompt:

```
CREATE table db2e.MYACCOUNT ( Name char(16), Saving int, Checking int)
INSERT into db2e.MYACCOUNT values('Michael', 5000, 5000)
INSERT into db2e.MYACCOUNT values('Frank', 5000, 5000)
```

After creating the database, create a stored procedure to modify the data in the database.

Create a stored procedure:

This example uses a stored procedure named MYPROC(). This procedure takes five parameters: Account Name, Option, Transfer Amount, Saving Balance, Checking Balance. The following list identifies the purpose of each of the parameters:

- Account Name: Input Parameter to identify the account.
- Option: Input Parameter to determine what to do. There are three options:
 - 1: Check balance.
 - 2: Transfer from saving to checking.
 - 3: Transfer from checking to saving.
- Transfer Amount: Input Parameter of the amount to transfer between checking and saving.
- Saving Balance: Output Parameter returning the balance of saving account
- Checking Balance: Output Parameter returning the balance of checking account

The following code builds the stored procedure:

```
SQL_API_RC SQL_API_FN
myProc(char * szName, int * nCmd, int * nAmount, int * nSaving, int * nChecking)
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLRETURN rc;
    int nRetSize;

    SQLCHAR str1[]="select saving, checking from db2e.myaccount where name = ?";
    SQLCHAR str2[]="update db2e.myaccount set saving=saving - ?,
        checking=checking + ? where name=?";
    SQLCHAR str3[]="update db2e.myaccount set saving=saving + ?,
        checking=checking - ? where name=?";

    /******
    /* Prepare connection and statement
    /******
    rc = SQLAllocHandle( SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv);
    //checkerror
    rc = SQLAllocHandle( SQL_HANDLE_DBC, henv, &hdbc);
    //checkerror
    rc = SQLSetConnectAttr(hdbc, SQL_ATTR_AUTOCOMMIT, SQL_AUTOCOMMIT_OFF, SQL_NTS);
    //checkerror
    rc = SQLConnect(hdbc, NULL, SQL_NTS, NULL, SQL_NTS, NULL, SQL_NTS);
    //checkerror
    rc = SQLAllocHandle( SQL_HANDLE_STMT, hdbc, &hstmt);
    //checkerror

    /******
    /* Update account
```

```

//*****
if ( *nCnd == 2 || *nCnd == 3 ){
if ( *nCnd == 2 ){ //Transfer from saving to checking
rc = SQLPrepare(hstmt, str2, SQL_NTS); //checkerror
}
if ( *nCnd == 3 ){ //Transfer from checking to saving
rc = SQLPrepare(hstmt, str3, SQL_NTS); //checkerror
}
rc = SQLBindParameter(hstmt,
1,
SQL_PARAM_INPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)nAmount,
0,
NULL ); //checkerror
rc = SQLBindParameter(hstmt,
2,
SQL_PARAM_INPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)nAmount,
0,
NULL ); //checkerror

rc = SQLBindParameter(hstmt,
3,
SQL_PARAM_INPUT,
SQL_C_CHAR,
SQL_CHAR,
0,
0,
(SQLPOINTER)szName,
0,
NULL ); //checkerror
rc = SQLExecute(hstmt); //checkerror
}

//*****
/* Retrieve account balance
//*****
rc = SQLPrepare(hstmt, str1, SQL_NTS); //checkerror
rc = SQLBindParameter(hstmt,
1,
SQL_PARAM_INPUT,
SQL_C_CHAR,
SQL_CHAR,
0,
0,
(SQLPOINTER)szName,
0,
NULL );//checkerror
rc = SQLExecute(hstmt);//checkerror
if ( rc == SQL_SUCCESS || rc == SQL_SUCCESS_WITH_INFO )
{
while ( (rc = SQLFetch(hstmt) ) == SQL_SUCCESS ){
rc = SQLGetData( hstmt,
(SQLSMALLINT)1,
SQL_C_LONG,
nSaving,
sizeof(int) ,
&nRetSize ) ; //checkerror
rc = SQLGetData( hstmt,

```

```

(SQLSMALLINT)2,
SQL_C_LONG,
nChecking,
sizeof(int) ,
&nRetSize ) ; //checkerror
}
}
//*****
/* Clean up
//*****
rc = SQLEndTran( SQL_HANDLE_DBC, hdbc, SQL_COMMIT );
SQLFreeHandle(SQL_HANDLE_STMT, hstmt);
SQLDisconnect(hdbc);
SQLFreeHandle(SQL_HANDLE_DBC, hdbc);
SQLFreeHandle(SQL_HANDLE_ENV, henv);
return (0);
}

```

On the Win32 platform, after building the stored procedure into a dynamic link library (mydll.dll), copy it to the \SQLLIB\function directory. Next, register the stored procedure.

1. Open a DB2 command window.
2. Connect to the MYSAMPLE database using the following command:
DB2 CONNECT TO MYSAMPLE
3. Register the stored procedure using a script named regscript.scr to configure options. The following code is used for this script:

```

CREATE PROCEDURE db2e.MYPROC (IN szName CHAR(16),
                              IN nCmd INTEGER,
                              IN nAmount INTEGER,
                              OUT nSaving INTEGER,
                              OUT nChecking INTEGER )

DYNAMIC RESULT SETS 1
LANGUAGE C
PARAMETER STYLE GENERAL
NO DBINFO
FENCED
MODIFIES SQL DATA
PROGRAM TYPE SUB
EXTERNAL NAME 'mydll!myProc'@

```

To run the script, enter the following command:

```
db2 -td@ -vf regscript.scr
```

The stored procedure db2e.MYPROC is now configured. Next, create a subscription using the Mobile Devices Administration Center.

Create the Agent Adapter subscription:

1. Open the Mobile Devices Administration Center from the start menu.
2. Select the **Subscriptions** folder of the Mobile Devices Administration Center.
3. Right-click on the **Subscriptions** folder of the Mobile Devices Administration Center and select **Create Custom Subscription**.
4. Type subex in the **Name** field.
5. Select the AgentAdapter in the **Adapter** field.
6. Select None in the **Encryption** field. Encryption is not support with the AgentAdapter.
7. Click the **Launch Customizer** button. The Source database window opens.
8. Type a DB2 user ID with access privileges to the database into the **User ID** field

9. Type the password for the user ID in the **Password** and **Verify password** field.
10. In the **Other** field, type the following line:
`dbname=mysample;procname=db2e.MYPROC`

The **dbname** is the database used by the stored procedure. The **procname** is the name of the stored procedure.

11. Click **OK** to close the Source database window. Click **OK** to close the Create Custom Subscription notebook.

After creating the AgentAdapter subscription, create a user, group, and subscription set.

Create a DB2 Everyplace application to use the remote query and stored procedure adapter:

This sample uses a DB2 Everyplace Win32 console application to test the remote query and stored procedure adapter. The sample application is called `myclient.exe`. The sample application uses the following three parameters:

```
Account Name:  Identify the account to access.
Option:       Identify the action to perform. The options are:
              1: Check balance.
              2: Transfer from savings to checking.
              3: Transfer from checking to savings.
Amount:       Amount to transfer between checking and saving.
```

For example, to transfer \$1000 from savings to checking on the Michael account, enter the following command:

```
myclient.exe Michael 2 1000
```

The following response is returned:

```
Saving = 4000
Checking = 6000
```

Sample application code:

The following section contains the code for the sample application. The code requires a connection string for the `SQLConnect()` function to connect to the remote data source. The format of the connection string is:

```
http://IPAddr:port/db2e/servlet/com.ibm.mobileservices.adapter.agent.AgentServlet?DB=mysample
```

where `IPAddr:port` is the IP address and port number of the server. For example:

```
http://192.168.0.11:8080/db2e/servlet/
com.ibm.mobileservices.adapter.agent.AgentServlet?DB=mysample
```

```
int main(int argc, char * argv[])
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLRETURN rc;
    SQLCHAR strSQL[] = "CALL db2e.MYPROC(?,?,?,?)";
    int nInd4, nInd5;
    int nSaving = 0, nChecking = 0;
    int nCmd = 0, nAmount=0;
    SQLCHAR strConnect[254];

    /******
    /* Check input parameters
    /******
    if ( argc < 4 ){
        printf("\nUsage : myClient AccountName Cmd Amount");
```

```

printf("\n    cmd 1 : query balance");
printf("\n    cmd 2 : Transfer from Saving to Checking");
printf("\n    cmd 3 : Trnasfer from Checking to Saving");
return (99);
}
nCmd = atoi(argv[2]);
nAmount = atoi(argv[3]);

/*****
/* Allocate handles
*****/
rc = SQLAllocHandle( SQL_HANDLE_ENV,
SQL_NULL_HANDLE,
&henv); //checkerror
rc = SQLAllocHandle( SQL_HANDLE_DBC,
henv,
&hdbc); //checkerror
if (argc == 5){
strcpy(strConnect,"http://");
strcat(strConnect,argv[4]);
strcat(strConnect,"/db2e/servlet/com.ibm.mobileservices.adapter.agent.AgentServlet?DB=mysample");
}else{
strcpy(strConnect,"http://127.0.0.1:8080/db2e/servlet/com.ibm.mobileservices
.adapter.agent.AgentServlet?DB=mysample");
}

/*****
/* Connect to remote database
*****/
rc = SQLConnect(hdbc,
strConnect,
SQL_NTS,
"userex", SQL_NTS,
"userex", SQL_NTS ); //checkerror
rc = SQLAllocHandle( SQL_HANDLE_STMT,
hdbc,
&hstmt); //checkerror
/*****
/* Prepare, Bind , and Execute the statement
*****/
rc = SQLPrepare(hstmt,strSQL, SQL_NTS); //checkerror
rc = SQLBindParameter(hstmt,
1,
SQL_PARAM_INPUT,
SQL_C_CHAR,
SQL_CHAR,
0,
0,
(SQLPOINTER)argv[1],
0,
NULL ); //checkerror
rc = SQLBindParameter(hstmt,
2,
SQL_PARAM_INPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)&nCmd,
sizeof(int),
NULL); //checkerror
rc = SQLBindParameter(hstmt,
3,
SQL_PARAM_INPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)&nAmount,
sizeof(int),
NULL ); //checkerror
rc = SQLBindParameter(hstmt,
4,
SQL_PARAM_OUTPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)&nSaving,
sizeof(int),

```

```

&nInd4); //checkerror
rc = SQLBindParameter(hstmt,
5,
SQL_PARAM_OUTPUT,
SQL_C_LONG,
SQL_INTEGER,
0,
0,
(SQLPOINTER)&nChecking,
sizeof(int),
&nInd5 ); //checkerror
rc = SQLExecute(hstmt); //checkerror
/*****
/* Print the balance
*****/
printf("\nSaving = %d",nSaving);
printf("\nChecking = %d",nChecking);

SQLFreeHandle(SQL_HANDLE_STMT, hstmt);
SQLDisconnect(hdbc);
SQLFreeHandle(SQL_HANDLE_DBC, hdbc);
SQLFreeHandle(SQL_HANDLE_ENV, henv);
return 0;
}

```

After compiling the sample application, test the remote query and stored procedure adapter application.

Part 4. Managing users and data

Chapter 9. Mobile Devices Administration Center and synchronization objects	59
Working with the Mobile Devices Administration Center	59
Starting the Mobile Devices Administration Center	59
The Mobile Devices Administration Center interface	59
Manipulating synchronization objects.	61
What is a synchronization object?	61
Where synchronization objects are stored	62
Creating synchronization objects	62
Creating an object from the object tree	62
Creating a new object when working in another.	63
Viewing objects in the contents pane	63
Information displayed	63
Refreshing the view	64
Filtering the contents pane	64
Sorting the contents pane.	64
Editing a synchronization object	65
Deleting an object	65
Chapter 10. Managing users and data.	67
The administration process	67
Evaluating the characteristics of your mobile users	68
Creating a data synchronization group	68
Identifying the group	69
Enabling the group to access data and files.	69
Filtering the data available to the group	70
Assigning users to the group	71
Defining mobile users to the Sync Server	72
Creating users in the Mobile Devices Administration Center.	72
Identifying the user.	72
Assigning the user to a group	72
Setting the user's password	73
Filtering the data available to the user	73
Registering the user's device.	73
Importing user definitions from another source	74
Setting up data and file replication	75
Creating a JDBC subscription	75
Identify the JDBC subscription	75
Specify the encryption level	76
Specify the source database driver and URL	76
Specify the mirror database driver and URL	77
Specifying source tables, target tables, and privileges for the subscription	77
Filtering data in the subscription	78
Batching synchronization requests.	80
Assigning a subscription set to a JDBC subscription	80
Creating a DataPropagator subscription	81
Identifying the subscription	82
Specify the encryption level	82
Mapping the source to the target	82
Identifying the mirror database.	83
Adding a replication source	83
Filtering data in the subscription	84
Batching synchronization requests.	85
Providing a user ID and password for the subscription	86
Specifying subscription sets that use the subscription	86
Creating an upload subscription	87
Identifying the upload subscription	88
Specifying the encryption level	88
Specify the source database driver and URL	88
Specifying source tables and target tables	89
Assigning a subscription set to an upload subscription	89
Creating a file subscription	90
Identifying the subscription	90
Specify the encryption level	91
Specifying the name of the source file	91
Specifying subscription sets that use the subscription	92
Flagging a subscription that references a changed file	92
Creating a custom subscription.	92
Identifying the Custom subscription	93
Specify the encryption level	93
Launch the customizer	93
Assigning a subscription set to a Custom subscription	93
Creating a custom adapter	93
Identifying the Custom Adapter	94
Specify the Customizer class name and the Signature	94
Specify the Communication Attributes	94
Specify the File Attributes	95
Replicating on demand	95
Enabling groups to access their data and files	96
Identifying the subscription set.	96
Specifying what information the subscription set accesses	97
Making the subscription set available to a group	97
Enabling and disabling synchronization	98
When a user or group is enabled for synchronization	98
Enabling synchronization.	98
Disabling synchronization	99
Chapter 11. Handling synchronization problems 101	
Understanding the order of synchronization and reception of error messages.	101
Viewing the error log to diagnose problems	101
Managing the error log and the trace files.	102
Purging error log entries automatically.	102
Defining tracing level.	102
Providing your own error-handling logic	103
Viewing the log on the client	105

Resetting the user ID 105

Chapter 9. Mobile Devices Administration Center and synchronization objects

The data synchronization needs of mobile workers often differ by their job responsibilities. For example, a nursing shift supervisor might need real-time access to information about which beds are taken, as well as status of patients in observation rooms. Doctors working a rotation need access to the list of patients they are to see that day, as well as status information about the patients. These hospital workers need mobile access to the hospital's enterprise data, but they work with different applications and different sets of data to perform their jobs.

The DB2 Everyplace Sync Server provides an administration tool that helps you manage and deliver synchronization services to groups of users with similar data synchronization needs. With the Mobile Devices Administration Center, you can define what information a group of users is allowed to access and how that information is to be replicated to each user's mobile device.

This chapter explains how to navigate the interface of Mobile Devices Administration Center and how to manipulate the synchronization objects using the Mobile Devices Administration Center.

Working with the Mobile Devices Administration Center

The Mobile Devices Administration Center is a tool that allows you to deliver synchronization services to groups of users who have the same needs for access to applications and data. The Mobile Devices Administration Center makes it easier to handle multiple users, because you can define data to be replicated for a group of users, yet make some adjustments to the replication definition for individual users as necessary.

This section explains how to start the Mobile Devices Administration Center and use the interface. It also includes an overview of the steps that you perform to set up mobile data synchronization with the Mobile Devices Administration Center.

Starting the Mobile Devices Administration Center

To open the Mobile Devices Administration Center and DB2 Control Center For Windows, select **Start** → **Programs** → **IBM DB2 Everyplace** → **Start Mobile Devices Administration Center**.

To open the Mobile Devices Administration Center and DB2 Control Center on UNIX, change the directory to `$DSYINSTDIR/Server`, then run `dsyadmin.sh`.

The Mobile Devices Administration Center interface

The Mobile Devices Administration Center is very similar to the DB2 Control Center. This section explains aspects of the interface that you will encounter in the main window and within object notebooks.

Controls in the main window:

The main window contains an object tree and a contents pane, as well as toolbars to help you manage objects.

Object tree



Use the object tree to display and work with synchronization objects.

Contents pane

Name	Enabled	Description
 SAMPLE	No	SAMPLE DE...
 DATA1	Yes	DATA1 DES...

Use the contents pane to display and work with individual synchronization objects. The contents pane displays the objects within the object folder that you select in the object tree.

Mobile Devices Administration Center toolbar



This toolbar is similar to the toolbar found in the DB2 Control Center. By clicking icons in this toolbar, you can work within different areas of the Control Center (such as the Command Center or Script Center), schedule and run jobs, change tools settings, and access help.

For more information about the Control Center toolbar, see the Control Center help.

On AIX, to view the help file for the DB2 Control Center, open `~/sql1lib/doc/html/db2help/index.htm` in an HTML browser. To view the help file for the Mobile Devices Administration Center, open `~/sql1lib/doc/html/db2help/dsync/dsyhmsttfrm.htm` in an HTML browser.

Contents pane toolbar



Use the toolbar below the contents pane to tailor the view of synchronization objects and information in the contents pane to suit your needs.

Entry fields:

Required fields in notebooks and windows are surrounded with a red box. Optional fields are surrounded with a blue box. Additionally, the system warns you with pop-up messages when you are entering invalid information.

Accessing custom controls with the keyboard:

You can use the keyboard to access controls found on the graphical user interface. The following control may be unique to DB2.



To access this push button using the keyboard, use the Tab key until the push button is selected then press Enter.

Manipulating synchronization objects

What is a synchronization object?

In the Mobile Devices Administration Center, you administer the synchronization process through a set of *synchronization objects*. A synchronization object contains information about aspects of the synchronization process in your organization.

There are six types of synchronization objects:

Group A group of users with similar mobile data synchronization needs. You define synchronization characteristics for each group, such as which applications the users in the group need to access to perform their jobs and what subsets of enterprise data they need to access.

User A user who uses the DB2 Everyplace Sync Server to synchronize data between a source (the enterprise system) and a target (the mobile device). You assign a user to a group to provide access to the subscriptions defined in the group's subscription sets.

Subscription

A specification for what information in a source database or server is to be replicated to a target database (the DB2 Everyplace database on the mobile device). Like a magazine subscription where you choose the types of information you want to see on a periodic basis, a subscription allows you to define which subsets of your enterprise's data and files the group members are allowed to access. Members can then access and synchronize just this subset of data and files, improving both security and performance. You can create two types of subscriptions: file subscriptions for files stored at the source server, and table subscriptions in the source database using either DataPropagator or JDBC subscriptions.

Subscription set

A collection of subscriptions. To provide group members with access to the data and files defined in subscriptions, you collect the subscriptions together in a container called an *subscription set*, then assign this container object to the group. This two-step process of enabling members of a group to access the information that they need makes administration easier because you can bundle a set of subscriptions and assign that bundle to multiple groups if necessary.

When users start the synchronization client software on the device, they choose which subscription set to synchronize. The menu of subscription sets that appears on the client is created from the list of subscription sets associated with the user's group.

During a synchronization, if the client failed to synchronize a subscription successfully, it skips the remaining subscriptions in the same subscription set, and continues with the next subscription set.

Tip: Group closely related subscriptions into a subscription set instead of randomly assigning different subscriptions to a subscription set. This can make troubleshooting easier if a subscription set fails to synchronize successfully.

Adapter

An adapter is used to synchronize and communicate with the Sync Server. A collection of adapters is included for synchronizing files, relational data with DB2, relational data with JDBC, and remote query and stored procedure functionality.

Log After you implement mobile data synchronization, you can monitor any synchronization problems using the error messages written to the error log. Monitoring log activity is explained in “Viewing the error log to diagnose problems” on page 101.

You can create and edit groups, subscriptions, subscription sets, and users to handle your organization’s synchronization requirements. Logs are available for viewing only.

Where synchronization objects are stored

As you create, edit, or delete synchronization objects, the Mobile Devices Administration Center records this administration information in a control database stored on the source system. The name of this database is DSYCTLDB. DSYCTLDB is a reserved name; you cannot rename the database or use the name DSYCTLDB for any other database in the system.

Created at installation time, the control database helps the Sync Server authenticate users and obtain subscription information to determine what to replicate for the synchronization requests. Because it contains synchronization setup information as well as status information about synchronization operations, ensure that you regularly back up the administration control database. Passwords and other information in this database are not encrypted; thus, ensure that you take appropriate steps to protect this database.

Creating synchronization objects

Although each object requires different input, you create all objects using the same basic process in the Mobile Devices Administration Center. You can create an object from the object tree or when you are working within another object.

Creating an object from the object tree

To create a synchronization object:

1. In the object tree, right-click the object folder that corresponds to the type of object that you want to create.
2. Select **Create**. If you are creating a subscription, a submenu displays. Select either **File subscription**, **Table subscription**, or **Custom subscription**, depending on the type of subscription that you want to create.

The Create notebook opens with the object type displayed in the title of the notebook.

For details on how to complete the notebook pages for each object, see one of the following topics:

- For groups, see “Creating a data synchronization group” on page 68
- For users, see “Defining mobile users to the Sync Server” on page 72
- For subscriptions, see “Setting up data and file replication” on page 75
- For subscription sets, see “Enabling groups to access their data and files” on page 96

After you save an object, you can edit the object to complete it or make changes. See “Editing a synchronization object” on page 65 for more information.

Creating a new object when working in another

The Mobile Devices Administration Center allows you to create new synchronization objects for a related object without disturbing your workflow. For example, you might be editing the characteristics of a group named Visiting Nurses and realize that you need to add a new nurse who just started work. Without leaving the Edit Group notebook, you could click **Create** on the Users page to open the Create User notebook, where you can add the new nurse and assign the nurse to the Visiting Nurses group.

Viewing objects in the contents pane

After you create an object, information about that object appears in the contents pane. To display objects in the contents pane, select a folder in the object tree.

Information displayed

Different columns appear in the contents pane depending on which folder is currently open. The column headings are listed here alphabetically.

Adapter

This field displays the adapter used by the subscription.

Customizer class name

This field displays Java classname of the custom adapter.

Data filter

This field displays Yes if you set a data filter for the user or group and No if no data filter has been set.

Description

This field displays the description that you gave the object when you created it, and appears for all objects except logs.

Device type

This field displays the type of device registered to the user. You do not enter this information using the Mobile Devices Administration Center; the DB2 Everyplace Sync Server obtains the device type when the user registers the device.

Enabled

This field displays Yes if the group or user has been enabled for synchronization and No if it is not enabled. (See “Enabling and disabling synchronization” on page 98 for information on enabling a group or user for synchronization.)

Encryption Level

This field displays the encryption level used during data transfer.

Group When the **Users** folder is selected, this field displays the name of the group

to which the user is assigned. When the **Subscription sets** folder is selected, this field displays the number of groups associated with the subscription set.

Name This field displays the unique name that you gave the object when you created it, and appears for all objects except logs.

Signature

This field displays the signature used by the adapter.

Subscriptions

This field displays the number of subscriptions assigned to the subscription set.

Subscription sets

This field displays the number of subscription sets associated with a group or subscription.

Synchronization status

This field displays the synchronization status of the user. The synchronization status is retrieved by selecting a user, right-clicking it, and then selecting **Synchronization status**. The status displayed is real-time and indicates whether a synchronization session is starting, is in progress, or is completed.

Type This field displays the type of subscription.

Users This field displays the number of users assigned to a group.

Refreshing the view

When you make changes to an object, those changes might not be immediately displayed in the contents pane. To refresh the contents of an object folder:

1. Right-click the object folder.
2. Select **Refresh**.

Filtering the contents pane

If you have several synchronization objects in a folder, you might need to filter the folder's contents to more easily find what you need. Filtering a folder's contents displays a subset of the contents according to search criteria that you enter.

To filter a folder's contents:

1. Right-click the object folder.
2. Select **Filter**. The Filter notebook opens, displaying the column headings in the contents pane for the selected object folder. Some columns cannot be filtered.
3. In the **Values** field of the Locate page, type your search criteria.

The Mobile Devices Administration Center displays only those objects meeting the specified filter criteria. After you set the filter for an object, you must explicitly clear the filter to display all elements in an object, or all objects in the tree.

For more information about object filters, see the online help for the DB2 Control Center.

Sorting the contents pane

Another way to quickly find what you need is to sort a column in the contents pane alphabetically.

To sort a column, click the column heading. The system rearranges the data rows in alphabetical order according to the column that is currently selected.

Editing a synchronization object

After you save a synchronization object in the administration control database, you can open the object in edit mode to add information or make changes.

To edit an object:

1. In the object tree, open the object folder that corresponds to the type of object that you want to edit. The contents of the folder are displayed in the contents pane.
2. In the contents pane, right-click the object that you want to edit.
3. Select **Edit**. The Edit notebook opens with the object type displayed in the title of the notebook. The Edit notebook contains all the same fields as the Create notebook for the object. For information on specific pages and fields, see the sections for the type of object that you want to edit:
 - To edit a group, see “Creating a data synchronization group” on page 68.
 - To edit a user, see “Defining mobile users to the Sync Server” on page 72.
 - To edit a subscription, see “Setting up data and file replication” on page 75.
 - To edit a subscription set, see “Enabling groups to access their data and files” on page 96.

Deleting an object

You can delete any object in the Mobile Devices Administration Center. Before you delete an object, however, consider the consequences on your users’ synchronization sessions. Will deleting the object cause a synchronization session to fail? If it does, the objects affected by the deletion are automatically disabled. (See “Enabling and disabling synchronization” on page 98 for more information.)

To delete an object:

1. In the object tree of the Mobile Devices Administration Center, open the object folder that corresponds to the type of object that you want to edit.
2. In the contents pane, right-click the object that you want to delete. To select multiple objects serially, hold down the Ctrl key while selecting. To select multiple objects contiguously, hold down the Shift key while selecting.
3. Select **Delete**. A confirmation window displays the objects that you selected for deletion. Clear the **Delete** check box for any items you decide to keep.
4. Click **OK**.

When you delete an object, its information is automatically deleted from the administration control database. When you delete a subscription, mirror tables associated with that subscription are automatically dropped from the mirror database as well.

Chapter 10. Managing users and data

This chapter explains how to use the Mobile Devices Administration Center to set up groups of users, and to configure data and file replication for groups. The following topics are discussed:

- Evaluate the characteristics of your mobile users to determine how to separate them into groups.
- Create a data synchronization group.
- Define mobile users to the DB2 Everyplace Sync Server.
- Create subscription sets that enable users to access the data and files that they need.
- Set up data and file replication.
- Enable and disable synchronization for users and groups.

The administration process

If you are just getting started with administration and have not yet created any objects, you might find it easier to follow these steps to set up synchronization in your organization:

1. Think about the mobile users within your organization and plan their synchronization needs. What data do they need to access? What applications do they use? The answers to questions like these help you determine how many synchronization groups you need and which users will be associated with each group. This step is explained in “Evaluating the characteristics of your mobile users” on page 68.
2. Within the Mobile Devices Administration Center, create groups according to your plan in step 1.
See “Creating a data synchronization group” on page 68 for more information about creating groups.
3. Create and assign users to each group in one of two ways:
 - Import existing user definitions.
If you already have multiple groups set up within your organization, you might be able to import the users assigned to these groups into the Mobile Devices Administration Center and automatically assign them to groups. See “Importing user definitions from another source” on page 74 for more information.
 - Create new users in the Mobile Devices Administration Center and assign these users to groups.
4. Define replication subscriptions for each table and file that the members of the group need to access. See “Setting up data and file replication” on page 75 for more information.
5. To allow a group to access the tables and files they need, create one or more subscription sets that reference the subscriptions that you created in step 4. See “Enabling groups to access their data and files” on page 96 for more information.

After you provide administration information, you need to register each user’s device with a user ID and password as explained in “Registering the user’s device” on page 73, then ensure the user is enabled for synchronization (see “Enabling and

disabling synchronization” on page 98). After users are enabled, they perform an initial synchronization to replicate to the device the configuration information that you defined in the Mobile Devices Administration Center. This information includes what subscription sets the user can synchronize and what data and files are associated with those subscription sets. “Registering the user’s device” on page 73 provides more information about how to register a user and perform an initial synchronization.

Evaluating the characteristics of your mobile users

Before you begin creating groups with the Mobile Devices Administration Center, think about the types of mobile users in your organization. Users in almost any organization naturally fall into groups according to the type of work they do. For example, imagine you are a hospital database administrator responsible for delivering data synchronization services to 10 hospitals throughout the country. Visiting nurses in a home health care program and emergency room shift supervisors would naturally fall into two groups because they have different sets of job responsibilities. However, there are other criteria you should consider when structuring your user groups. Ask yourself the following questions to determine if a given set of users should belong to the same group:

- Will these users all be using the same mid-tier system to synchronize enterprise data?

Each mid-tier system has a different installation of the Sync Server. Thus, all members of a group in the Mobile Devices Administration Center must use the same mid-tier system to synchronize data. For example, in your role as hospital database administrator you might, for performance reasons, have a different Sync Server for each hospital, therefore the users might need to be further divided if their physical locations are different.

- Do these users access the same type of data and files to perform their jobs?
Members of groups must use the same set of replication subscriptions. Thus, users who require access to different files or tables (or even different columns of the same table) must be placed into different groups.
- Do these users have the same access privileges for a given table?

SQL access privileges are defined for each replication source in a subscription, and that subscription is assigned to an entire group. Thus, if users require different types of access to the same replication source, they must be members of different groups.

You might have a group of nurses, for example, who all require access to the same table. However, are some nurses allowed to only insert data, but others are allowed to update or delete data? Are other nurses allowed to only view the data without changing it? For example, you might have a group of nurses in training that you allow to only view the data. When these nurses complete their training, you move them from the Training data synchronization group to another group for which you defined additional SQL privileges.

Creating a data synchronization group

A *data synchronization group* is a collection of uniquely named users, or users that have similar data synchronization requirements. Organizing users into groups helps you minimize the effort required to deliver synchronization services to many users in a uniform way.

To allow the users assigned to a group to access the data and files that they need, you create replication subscriptions referencing the necessary data and files, collect these subscriptions into a subscription set, and assign the subscription set to the group.

To create a group:

1. Open the Create Group notebook. (See “Creating synchronization objects” on page 62 for more information.)
2. Identify the group.
3. Associate subscription sets with the group to enable its members to access the data and files they need.
4. Optional: Filter the source data available to the group, whether to improve performance or for security reasons.
5. Assign users to the group.
6. Click **OK**.

Each of these steps is explained in more detail in this section. After you create the group, enable it for synchronization so that the group’s members can synchronize data. For more information, see “Enabling synchronization” on page 98.

Identifying the group

When a user requests synchronization, the Sync Server authenticates the user, then determines the group to which the user belongs to begin replicating the information referenced in that group’s subscriptions. For this reason, the Sync Server must be able to uniquely identify each group by name.

To name and describe a group, provide information in the following fields on the Identification page of the Create Group notebook:

Name Provide a descriptive, unique name for the group from 1 to 18 characters. Names are case-sensitive.

Description

Optional: Type up to 128 characters of text that describes this group of users.

Enabling the group to access data and files

To enable the group to access data and files stored on a source system, you assign an subscription set to the group.

A *subscription set* is a collection of replication subscriptions. A *replication subscription* is a specification for copying changed data or files from a source system to a target system at a specified frequency. It specifies the subset of data and files that members of a group are allowed to access as well as what SQL access privileges they have for the data.

Bundling subscriptions in a subscription set makes it easier for you to assign a set of subscriptions to multiple groups if necessary. You can assign an unlimited number of subscription sets to a group.

To assign a subscription set to the group:

1. Go to the Subscription Sets page of the Create Group notebook.

2. In the **Available subscription sets** list, select the subscription set that you want to assign. To select multiple subscription sets serially, hold down the Ctrl key while selecting; To select multiple subscription sets contiguously hold down the Shift key.

If no subscription sets are displayed in the **Available subscription sets** list, you can click **Create** to open the Create Subscription set notebook now, or you can create a subscription set later and associate the group with it later. See “Enabling groups to access their data and files” on page 96 for more information about creating a subscription set.

3. Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets appear in the **Selected subscription sets** list.

You can also associate groups with a subscription set from within the Subscription set notebook. For more information, see “Making the subscription set available to a group” on page 97.

Filtering the data available to the group

Suppose that you provide database administration services for several hospitals in your state. For administrative purposes, patient statistics are kept in a master table that tracks data from all hospital sites that you administer. Nurses and doctors within each hospital need access to the PATIENTS table, but they need only the rows that contains the data of the patients in their hospital. To handle the needs of each hospital, you can create a data filter that specifies the subset of data that each group can access.

A *data filter* is a parameter-value pair specifying a table column and its value. The filter specifies which rows of a table will be included in the synchronization request. The column and its value substitute into the WHERE clause of the SELECT statement of the subscription that the group uses. You enter this WHERE clause when you create the subscription (see “Creating a DataPropagator subscription” on page 81 for more information). The WHERE clause is submitted to the source database during synchronization so that the DB2 Everyplace Sync Server returns only the subset of data required by a given group. More than one data filter can be applied for a specific user or group.

Because only subsets of the table are replicated, data filters help improve synchronization performance and provide security for group-specific data.

To set a data filter for your Eastside hospital, the parameter name and value might be something like this:

```
Parameter Name = :Hospital.  
Default Value = Eastside
```

The data filter for Foothill hospital on the west side might look something like this:

```
Parameter Name = :Hospital.  
Default Value = Foothill
```

You can also set data filters for individual users by using a DB2 variable instead of a hard-coded value for the parameter name. You then enter a data filter value when you create each user. In this case, the group filter might look something like this:

```
Parameter Name = :HOSPITAL.  
Default Value = None
```

Then you would assign values for the individual user filters as explained in “Filtering the data available to the user” on page 73.

To define a data filter for a group:

1. On the Data Filter page of the Create Group notebook, click **Add**. The Add Data Filter window opens.
2. In the **Parameter name** field, type the name of the column in the table that you want to filter. The name is case-sensitive.

Recommendation: Uniquely identify your parameter names with additional text. For example, add a colon (:) to the beginning of the **Parameter name** and a period (.) to the end of the **Parameter name**.

3. In the **Default value** field, type the value that will serve as the default filter criteria.

If you assign a data filter for an individual user in the group, the user filter values override this default. See “Filtering the data available to the user” on page 73 for more information about how to define a data filter for an individual user.

4. Click **OK**. The parameter-value pair is displayed on the Data Filter page.

Assigning users to the group

A *user* is a user who needs to synchronize data with an enterprise server. The user uses a mobile device capable of communicating with the DB2 Everyplace Sync Server to replicate data to and from an enterprise system. When a user requests synchronization, the user’s user ID and password are authenticated against the administration control database. The Sync Server determines if the user is defined in the control database and, if so, to what group the user belongs. Data synchronization fails if the user is not assigned to a group.

A user can belong to only one group; however, you can move the user from one group to another to accommodate changes in synchronization needs.

You can assign an unlimited number of users to a group.

To assign a user to a group:

1. Go to the Users page of the Create Group notebook.
2. In the **Available users** list, select the user that you want to assign to the group. To select multiple users serially, hold down the Ctrl key while selecting; To select multiple users contiguously hold down the Shift key.

If no users are displayed in the **Available users** list, you will need to create a user. You can click **Create** to open the Create User notebook now, or you can create a user later and assign the user to a group later. For information on creating a user, see “Defining mobile users to the Sync Server” on page 72.

3. Click > to assign the users. Assigned users are displayed in the **Selected users** list. Click >> to assign all available users at once.

You can also assign users to a group from the Users notebook. See “Assigning the user to a group” on page 72 for more information.

Defining mobile users to the Sync Server

A *user* is a user who needs to synchronize data with an enterprise server. Users form groups, collections of users who have similar needs for data access and synchronization. Organizing users into groups helps you minimize the effort required to deliver synchronization services to many users in a uniform way.

You can define users to the Sync Server by creating users in the Mobile Devices Administration Center (see “Creating users in the Mobile Devices Administration Center”) or importing existing definitions directly into the administration control database (see “Importing user definitions from another source” on page 74).

Creating users in the Mobile Devices Administration Center

To create a user:

1. Open the Create User notebook.
2. Identify the user.
3. Assign the user to a group.
4. Optional: Provide a password for the user.
5. Optional: Filter the source data available to the user. The data filter that you specify for the user overrides the filter that you set for the group.
6. Click **OK**.

Each step is explained further in this section.

After you create the user, the user must register his or her device as explained in “Registering the user’s device” on page 73.

Identifying the user

For authentication purposes, the Sync Server must be able to uniquely identify each user by name.

To name and describe a user, provide information in the following fields on the Identification page of the Create User notebook:

Name Provide a descriptive, unique name for the user from 1 to 18 characters. The name serves as the user’s user ID for accessing the DB2 Everyplace Sync Server on the mid-tier system. Names are case-sensitive.

Description

Type up to 128 characters of text that describes this user.

Assigning the user to a group

To access and synchronize data on a source system, the user must belong to a group. If there is no group assignment, the user can register the device (as explained in “Registering the user’s device” on page 73), but all other data synchronization fails. A user can belong to only one group at a time.

To assign a user to a group:

1. On the Identification page of the Create User notebook, type the name of the group in the **Group** field. To select a group from a list, click the  push button.

If no groups are displayed in the list, you will need to create a group. You can click **Create** to open the Create Group notebook now, or you can create a group

later and associate the group with a user later. See “Creating a data synchronization group” on page 68 for more information on creating a group.

You can also assign users to a group from the Group notebook. For more information, see “Assigning users to the group” on page 71.

Setting the user’s password

For enhanced security and especially if encryption is enabled, use a long password, that includes non-alpha characters. Passwords are case-sensitive.

To assign a password to a user:

1. On the Authentications page of the Create User notebook, type the password that this user will use to gain access to the DB2 Everyplace Sync Server.
2. Type the password again in the **Verify password** field.

Filtering the data available to the user

You can set a data filter value for individual users that overrides the value of the data filter that you set for the group.

To set a user-specific data filter:

1. Ensure that the group filter specifies a DB2 variable for the parameter name instead of a hard-coded value. (For more information about group data filters, see “Filtering the data available to the group” on page 70.)
2. Go to the Data Filter page of the Create User notebook. The filters displayed here are those that you set for the group to which the user is assigned. Select the filter whose value you want to change.
3. Click **Change**. The Change Data Filter window opens.
4. In the **User override** field, type the value of the parameter for this user.
5. Click **OK**.

Registering the user’s device

Either you or the user can register the device; however, after registration you still need to perform some configuration steps for synchronization to work properly, so you might choose to do this step yourself.

To register the device:

1. Start the device.
2. Tap the **APPLICATIONS** icon to display all available subscription sets.
3. Tap the **IBM Sync** icon to start the synchronization client software.
4. In the main IBM Sync window, tap **Synchronize**.
5. When prompted for a user ID and password, enter the user ID and password of the user who will be using the device. Registration proceeds according to whether the user ID and password exist in the administration control database:

- If the user ID and password have been created, the Sync Server checks whether a device is already associated with the user.

If the user is associated with a device, the Sync Server ensures the user is using the assigned device by verifying the device’s unique ID with the unique ID in the administration control database.

If no device is listed in the control database, the Sync Server assumes the user wants to register with the device used to log in and records the device type and the unique device ID in the control database for future authentication purposes.

- If the user ID and password do not exist in the administration control database, the Sync Server rejects the user. A user must be defined in the administration control database before the user can register a device or synchronize.

6. Tap **OK**.

If the user has already been created in the Mobile Devices Administration Center and assigned to an enabled group, the Sync Server automatically enables the user for synchronization after registration.

If a user switches devices, the new device must be registered. When the user begins using a new device, you must:

1. In the Mobile Devices Administration Center, open the **Users** folder.
2. In the contents pane, right-click the user whose device registration you want to delete.
3. Select **Reset**. The system displays a confirmation window listing all objects that you selected for deletion.

This will delete the old device registration information from the control database so that the association with the new device can be registered.

Importing user definitions from another source

If you already have user names, passwords, and descriptions defined in another program, you can import this information directly into the administration control database and bypass creating these users in the Mobile Devices Administration Center. The user import tool that allows you to do this accepts any comma-delimited file exported in DB2 Universal Database DEL format.

To use the tool to import multiple users, go to an MS-DOS command line and enter the following command. You can use one or more of the optional parameters in parentheses. Replace *filename* with the fully-qualified name of the comma-delimited file containing the users to import.

```
DSYImportUsers.bat (-commit) (-exception) (-fail) (-group group_name) filename
```

The optional parameters are:

-commit

Commit each successful insert and do not rollback if an error occurs

-exception

Display exceptions.

-fail Display failed entries only.

-group *group_name*

Assign users in the file to the group specified. Make sure the group exists before you use this parameter.

The required parameter is:

filename

Specifies the file name of the comma-delimited input file.

The format for the comma-delimited input file is: {user name},{password -optional},{description -- optional}

For example, a file formatted with no passwords would look like this:

jay,,Jay Smith Mobile Sales NC
mike,,Michael Doe Mobile Sales CA
...

Setting up data and file replication

To enable a group of users to access the data and files that its members require, you must define one or more replication subscriptions. A *replication subscription* provides specifications for how the information in a source system (an enterprise server) is to be synchronized with a target system (the mobile device).

You can create several types of subscriptions in the Mobile Devices Administration Center: DataPropagator subscriptions, JDBC subscriptions, upload subscriptions, file subscriptions, and custom subscriptions.

- *JDBC subscriptions* provide users with access to data in source tables on a data source with a JDBC interface, including Oracle, DB2, and Microsoft SQL Server.
- *DataPropagator subscriptions* provide users with access to data in source tables on a DB2 server.
- *Upload subscriptions* only allow the user to directly insert rows into a table on a source database. The source table may reside on any database that supports JDBC. Related tables on the mobile devices are not refreshed during synchronization.
- *File subscriptions* allow replication of any type of file stored at the source server. They can be created as a convenient way to distribute and update mobile applications and other data to the devices.
- *Custom subscriptions* allow custom interactions with the Sync Server and data sources.

To determine which subscriptions you need to create, evaluate what information your groups of mobile users currently require to perform their work. What data do their applications access? What files do they view or use regularly?

Creating a JDBC subscription

Use the Create JDBC Subscription notebook to create a JDBC table subscription.

Each table subscription that you create can reference one or more tables.

To create a JDBC subscription::

1. Open the Create JDBC Subscription notebook.
2. Identify the subscription.
3. Specify the encryption level.
4. Specify the source database driver and URL.
5. Specify the mirror database driver and URL.
6. Specify source tables, target tables, and access privileges for the subscription.
7. Specify how to filter the data in the source table.
8. Assign subscription sets to the JDBC subscription.
9. Click **OK**.

Identify the JDBC subscription

After authenticating a user, the Sync Server determines what group the user belongs to, then queries the administration control database to determine what subscription is involved in the request. For this reason, the Sync Server must be able to uniquely identify each subscription by name.

To identify a JDBC subscription::

On the Identification page, fill in these fields:

Name Type a descriptive, unique 1- to 18-character name for the subscription.

Description

Optional: Type up to 128 characters of text that describes this subscription.

Specify the encryption level

Encryption support for Windows CE and Win32 platforms is only available with the Microsoft High Encryption Pack available from Microsoft. The Microsoft High Encryption Pack must be installed to use encryption between Windows CE/Pocket PC clients or Win32 platform clients and the DB2 Everyplace Sync Server. Encryption support on Palm OS requires Palm OS 3.3 or later.

To specify the encryption level::

On the Identification page, select the encryption level using the **Encryption level** field. The following three options are available:

None No encryption will be used during data transfer.

Limited: 56-bit Data Encryption Standard

All data transfers will be encrypted using a 56-bit key. This provides basic security with a small performance penalty.

Strong: 128-bit Data Encryption Standard

All data transfers will be encrypted using a 128-bit key. This provides enhanced security with a larger performance penalty than Limited encryption.

Specify the source database driver and URL

You must specify the source and mirror databases. For *upload* subscriptions, no mirror database is required.

To specify the source database driver and URL:

On the Source page of the Create JDBC Subscription notebook, provide the following information:

Database URL

Type the JDBC Database URL. The correct form for the JDBC driver selected in the Driver field is shown. Replace the variables in braces with the information to connect to the database. For example, the default Database URL for IBM DB2 UDB local is `jdbc:db2:{database}`. Replace `{database}` with the name of the DB2 database you plan to use.

Driver Select the JDBC database driver to use with this subscription.

User ID

Type a valid source database user ID. Ensure this ID has, at a minimum, the SQL privileges that you granted for the subscriptions defined against the database. For example, if you granted the SQL UPDATE privilege in the subscription, the user ID must have UPDATE privileges defined for the source database.

Password

A valid source database password for the user ID.

Verify Password

Use this field to type the password again exactly as you typed it in the **Password** field.

Click **Test connection** to verify the source database settings.

Specify the mirror database driver and URL

You need to specify the mirror database for a *synchronizing* subscription, but not for a *upload* subscription.

To specify the mirror database driver and URL:

On the Mirror page of the Create JDBC Subscription notebook, provide the following information:

Database URL

Select the JDBC Database for the mirror database. Click the  push button to open the Select Mirror Database window.

User ID

Type a valid DB2 UDB database user ID. Ensure this ID has, at a minimum, the SQL privileges that you granted for the subscriptions defined against the database.

Password

A valid password for the user ID.

Verify Password

Use this field to type the password again exactly as you typed it in the **Password** field.

Click **Test connection** to verify the database settings.

Specifying source tables, target tables, and privileges for the subscription

You must define at least one table for every JDBC subscription. If you specified more than one table for the subscription, these tables will be synchronized in the same order that you added them when you created the subscription. The list of tables on the Define Replication Subscription window shows this order.

You must not specify the same source and target tables in two different subscriptions. If you want to create two subscriptions that replicate the same source table, use different target tables.

To add a table to the subscription:

1. On the Identification page of the JDBC Subscription notebook, click **Define subscription**. The Define Replication Subscription window opens.
2. In the Define Replication Subscription window, click **Add**. The Add Table window opens.
3. In the Add Table window, use the **Table** list to select the replication source to add to this subscription.

Click **Filter** to change the source filter used to limit the available tables in the table list. The Filter window opens.

The % symbol is a wildcard. Typing % in the Source schema and Source table fields displays all available tables in the table list.

4. In the **Target schema** field, specify the schema that the table will have on the mobile device. If you do not specify a schema, the system uses the schema of the source table by default.
5. In the **Target table** field, specify the name that the table will have on the mobile device. If you do not specify a name, the system uses the name of the source table by default.
6. Under **Access privileges**, select the SQL access privileges that you want users of this subscription to have for this replication source. For example, if some of your visiting nurses are allowed to insert, update, or delete data, but trainee nurses are allowed only to view the data, you need to create two different subscriptions to handle the difference in access privileges. These subscriptions must use separate mirror tables. For more information about SQL access privileges, see the DB2 Universal Database *Administration Guide: Design and Implementation*.
7. Optional: Select the **Use Constraints defined in selected DB2 source** checkbox. This enables the constraints from the selected DB2 source table for the target table.
8. Optional: Select the **Use Indexes defined in selected DB2 source** checkbox. This enables the indexes from the selected DB2 source table for the target table.
9. Click **Add** to add the replication source to the subscription. Click **Close** to close the Add Table window.

Filtering data in the subscription

When you create a subscription to a particular table (the PATIENTS table for your group of visiting nurses, for example), performance considerations might force you to replicate only a subset of the data in the table. You specify this subset by choosing individual rows or columns to be replicated for each table in the subscription.

For example, you might decide that the only columns relevant for visiting nurses using the PATIENTS table are the PATIENT_NAME, ADDRESS, PHONE, and DOCTOR fields. You might then decide to further filter the data by defining a WHERE clause that filters data for nurses working for a particular doctor.

You can combine data filters for the subscription with filters set for the group or for individual users to pare down the data even further.

To filter the data that will be replicated during synchronization:

1. From the Define Replication Subscription window, click **Advanced**. The Advanced Subscription Definition notebook opens.

Note: The source table primary key columns must be subscribed. If the source table has columns which are not part of the primary key, at least one of those columns must be subscribed.

2. Optional: Select the columns to use in the subscription.
 - a. Go to the Target Columns page of the Advanced Subscription Definition notebook.
 - b. Select the columns to create on the mobile device using the Subscribe checkbox. Columns not selected will not be created on the mobile device.
 - c. Select the columns to replicate to the mirror database using the Replicate checkbox. You may need to replicate a column to the mirror database, but not want to create it on the handheld. For example, if a NOT NULLABLE column without a DEFAULT VALUE exists on the server and you are not creating it on the mobile device, you must replicate it to the mirror database

and supply a default value using the Default value data filter. The Sync Server will replicate any rows created by the mobile device to the source using the DEFAULT VALUE specified in the Default value data filter to complete the contents of the NOT NULLABLE source column that does not have a default value on the server.

- d. Click **Change** to modify a target column name, Default value data filter, or constraint.
- e. Click **Close** to close the Create Index window.
3. Optional: Define indexes for the target table.
 - a. Go to the Indexes page of the Advanced Subscription Definition notebook.
 - b. Click Add to open the Create Index window. The Create Index window opens.
 - c. Type the name index in the Name field.
 - d. Select the columns you want to include in the index using the >, >>, <, and << push buttons.
 - e. Order the index using the **Move Up** and **Move Down** push buttons.
 - f. Select **Ascending** or **Descending** index.
 - g. Click **Add** to add the index.
 - h. Click **Close** to close the Create Index window.
4. Optional: Define a WHERE clause that selects individual rows to be included in the subscription. You might decide that you want only certain rows to be part of the subscription even if all columns appear in the replica. To display sample WHERE clauses, click **Examples**.

- a. Go to the Rows page of the Advanced Subscription Definition window.
- b. In the **All rows needed** field, type a WHERE clause that defines the selection of rows that you want to appear in the subscription. You can only select rows from the table that you selected in Step 1.

For example, suppose you want your visiting nurses to see only the rows of data in the PATIENTS table where the value of the JOBCODE column is VNURSE. You would enter the following WHERE clause:

```
JOBCODE='VNURSE'
```

It is not necessary to type WHERE at the beginning of the clause.

- c. In the **Subset of rows for individual users** field, you can type a clause similar to a SQL WHERE clause to further limit the rows that an individual user can see. Ensure you do not type "WHERE" at the beginning of the clause. You might use a parameter, whose value varies by the user. For detailed information about defining a filter at the group level or user level, see "Horizontal filtering at the subscription level, group level, or user level" on page 41.

For example, suppose that you want users to see only data related to their own job codes. Instead of hard-coding a value for the JOBCODE parameter for the entire subscription, define a variable that references the data filter value defined for each individual user:

```
JOBCODE=':JOB.'
```

In the data filters for individual users, you could then set the :JOB parameter to each user's job code. See "Filtering the data available to the user" on page 73 and "Horizontal filtering at the subscription level, group level, or user level" on page 41 for more information on filtering data for individual users.

- d. Click **OK** to close the Advanced Subscription Definition window.
5. Click **OK** to return to the Define Replication Subscription window.

Note: A series of changes made to a single row in a DB2 Everyplace table on the user's device between synchronizations will be communicated to the Sync Server as a single cumulative change. As a result, a DELETE operation followed by an INSERT operation for the same primary key will be communicated to the SyncServer as an UPDATE operation if the operations occur with no intervening synchronizations. If they occur with an intervening synchronization, then they are communicated separately. Doing a series of changes to a single row can lead to an inconsistency because the subscription does not transfer all columns between the source table and the user table. An UPDATE operation will retain the current values in the unsubscribed column(s), while the INSERT will set the unsubscribed columns to default values.

Batching synchronization requests

For performance reasons, you probably do not want the Sync Server to perform replication for every synchronization request the moment that it queues. To improve performance, you can do one of the following:

- Batch synchronization requests by a fixed elapsed period of time.
- Set the Sync Server to perform replication at any time you issue a special command.

When batching synchronization requests, the Sync Server begins replicating synchronization requests when the number of seconds defined for the batch window has elapsed since the last replication.

For information about how to set the Sync Server to perform replication at any given time, see "Replicating on demand" on page 95.

To batch synchronization requests:

1. Ensure a source and mirror database appear on the Identification page of the Create JDBC subscription notebook. Then click **Define Subscription**. The Define Replication Subscription window opens.
2. Click **Timing**. The Subscription Timing window opens.
3. In the **Batch window** field, specify a number of seconds that you want the Sync Server to wait between replication cycles. You can specify up to 86,400 seconds (24 hours). The default setting is 3600 seconds (60 minutes).
4. Click **OK**.

All subscriptions defined against the same mirror database share the same values for batch parameters. Any changes that you make affect all subscriptions defined against the mirror database.

Assigning a subscription set to a JDBC subscription

After you define the subscription, you must specify what subscription sets use it. When you associate a subscription with a subscription set, you can then assign the subscription set to a group to provide members of the group access to the data and files defined in the subscriptions the subscription set references.

One subscription can be used by an unlimited number of subscription sets. However, two subscriptions that are defined with different privileges cannot belong to the same subscription set.

If two subscriptions with different privileges synchronize with the same table, they must use different mirroring (mid-tier) servers. Two subscriptions with different privileges can use the same mirror only if they synchronize with different tables.

To specify the subscription sets that use this subscription:

1. Go to the subscription sets page of the Create JDBC Subscription notebook.
2. In the **Available subscription sets** list, select the subscription set that you want to associate the subscription with. Hold down the Ctrl key while selecting to select multiple subscription sets serially, or hold down the Shift key to select multiple subscription sets contiguously.

If no subscription sets appear in the **Available subscription sets** list, click **Create** to create a subscription set without closing the current JDBC Subscription notebook. The Create Subscription Set notebook opens.

3. Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets appear in the **Selected subscription sets** list.

Creating a DataPropagator subscription

A DataPropagator subscription provides specifications for how data in a source table is to be synchronized to a table on the mobile device.

Each subscription that you create can reference one or more tables.

To create a DataPropagator subscription:

1. Ensure that the table is defined in DB2 Universal Database as a replication source, and that you defined at least one NOT nullable, primary key column for the table. (For information on defining replication sources, see *DB2 Universal Database Replication Guide and Reference*.)
2. Open the Create DataPropagator subscription notebook. (See “Creating synchronization objects” on page 62 for more information.)
3. Identify the subscription.
4. Specify the encryption level.
5. Map the source database on the enterprise system to its target database on the mobile device.
6. Identify the mirror database. If you set up synchronization in a three-tier structure, the mirror is on the mid-tier system.
7. Add source tables to the subscription and provide information about what SQL privileges you will allow for those tables.
8. Optional: Specify how to filter the data in the source table.
For example, do you want all data in the source table to be replicated in every synchronization? Only certain rows? The data filtering you specify for the subscription applies to all groups that use the subscription.
9. Specify how you want to batch synchronization requests by defining a period of time to elapse between replication processes (see “Batching synchronization requests” on page 85 for information).
10. Provide the user ID and password that will be used to access the source system on the group’s behalf.
11. Specify the subscription sets that will use the subscription.
12. Click **OK**.

Most of these steps are explained in more detail in this section.

Identifying the subscription

After authenticating a user, the Sync Server determines the group that the user belongs to, then queries the administration control database to determine what subscription is involved in the request. For this reason, the Sync Server must be able to uniquely identify each subscription by name.

To identify a DataPropagator subscription, provide information in the following fields on the Identification page of the Create DataPropagator subscription notebook:

Name Provide a descriptive, unique name for the subscription from 1 to 18 characters long.

For DB2 DataPropagator subscriptions, the system converts the name that you specify here to uppercase upon saving it in the administration control database. After the name is saved in the control database, you cannot rename the subscription because this function is not supported by DB2 DataPropagator. You must first delete the existing subscription, then create a new subscription with the new name.

Description

Type up to 128 characters of text that describes this subscription.

Specify the encryption level

Encryption support for Windows CE and Win32 platforms is only available with the Microsoft High Encryption Pack available from Microsoft. The Microsoft High Encryption Pack must be installed to use encryption between Windows CE/Pocket PC clients or Win32 platform clients and the DB2 Everyplace Sync Server. Encryption support on Palm OS requires Palm OS 3.3 or later.

To specify the encryption level::

On the Identification page, select the encryption level using the **Encryption level** field. After the encryption level is modified, all users subscribing to that subscription must be reset. The following three options are available:

None No encryption will be used during data transfer.

Limited: 56-bit Data Encryption Standard

All data transfers will be encrypted using a 56-bit key. This provides basic security with a small performance penalty.

Strong: 128-bit Data Encryption Standard

All data transfers will be encrypted using a 128-bit key. This provides enhanced security with a larger performance penalty than Limited encryption.

Mapping the source to the target

The *source database* is the database serving as the source for data replication.

The *target database* is the database on the mobile device receiving replicated data from a source system.

To map the source database on the enterprise system to its target database on the mobile device, provide information in the following fields on the Identification page of the Create DataPropagator subscription notebook:

Source database

The source database must be cataloged. Choose a name from a list of cataloged databases by clicking the  push button.

Target database

This field automatically defaults to the name that you typed in the **Source database** field. You can override this target database name only if this is the first subscription defined against this source database.

This field does not apply to devices running Palm OS, because that operating system does not use a traditional database structure.

Identifying the mirror database

Before you begin setting up synchronization, you must create the mirror database on the mid-tier system. You can create the mirror database by clicking the **Create** button to launch the Create Database wizard. You can then identify the mirror database in the subscription.

To identify the mirror database, choose a mirror database name from the list in the **Mirror database** field on the Identification page of the Create DataPropagator subscription notebook. This field displays all databases defined on the server where you invoked the Mobile Devices Administration Center.

Adding a replication source

A *replication source* is a table residing on a source system from which data is replicated to a target system. You must define at least one replication source for every DataPropagator subscription. You must not specify the same source and target tables in two different subscriptions. If you want to create two subscriptions that replicate the same source table, use different target tables.

If you specified more than one table for the subscription, these tables will be synchronized in the same order that you added them when you created the subscription. The list of tables on the Define Replication Subscription window shows this order.

To add a replication source to the subscription:

1. Ensure that you defined the table as a DB2 DataPropagator replication source. You can use the DB2 Control Center to define the replication source. For more information, see the *DB2 Universal Database Replication Guide and Reference*.
Because replication sources can be used and managed by tools other than the DB2 Everyplace Sync Server, when you define the source ensure that you control access to the data in a way that all applications can take advantage of.
2. On the Identification page of the Create DataPropagator subscription notebook, click the



push button to choose a source database from a list.

3. Click **Define Subscription**. The Define Replication Subscription window opens. The **Subscription name** field reflects the name of the subscription that you entered on the Identification page. The **Apply qualifier** field represents a unique qualifier that the Sync Server uses for all subscriptions defined for this database.

The Apply qualifier streamlines the process of synchronizing the mid-tier mirror database with its master database on the enterprise system; when the

Apply program runs, DataPropagator replicates data for all subscriptions with the same Apply qualifier. The Apply qualifier defaults to the name of the mirror database.

4. In the Define Replication Subscription window, click **Add**. The Add window opens.
5. In the **Replication source** list, select the replication sources to add to this subscription.
6. In the **Access privileges** field, select the SQL access privileges that you want users of this subscription to have for this replication source. For example, if some of your visiting nurses are allowed to insert, update, or delete data, but training nurses are allowed only to view the data, you need to create two different subscriptions to handle this difference in access privileges. These subscriptions must use separate mirror tables. For more information about SQL access privileges, see the *DB2 Universal Database SQL Reference*.

After you add a replication source to the subscription, you can change only the SQL access privileges defined for the source.

7. In the **Target table** field, specify the name that the table will have on the mobile device. If you do not specify a name, by default the system uses the name of the source table. The **Create target table** check box is always disabled. Within the same subscription, a source table can be mapped to more than one target table name. However, DB2 DataPropagator uses a single change data table to replicate changes to and from both target tables.
8. Click **Add** to add the replication source to the subscription.

Filtering data in the subscription

When you create a subscription to a particular table (the PATIENTS table for your group of visiting nurses, for example), performance considerations might force you to replicate only a subset of the data in the subscription. You specify this subset by choosing individual rows to be replicated for each table in the subscription.

For example, you might decide that the only columns relevant for visiting nurses using the PATIENTS table are the PATIENT_NAME, ADDRESS, PHONE, and DOCTOR fields. You might then decide to further filter the data by defining a WHERE clause that filters data for nurses working for a particular doctor.

You can combine data filters for the subscription with filters set for the group or for individual users to pare down the data even further.

To filter the data that will be replicated during synchronization:

1. In the Define Replication Subscription window, select the table for which you want to define column or row filtering.
2. Click **Advanced**. The Advanced Subscription Definition notebook opens.
3. Optional: Define a WHERE clause that selects individual rows to be included in the subscription. You might decide that you want only certain rows to be part of the subscription even if all columns appear in the replica.
 - a. Go to the Rows page of the Advanced Subscription Definition window.
 - b. In the **All rows needed** field, type a WHERE clause that defines the selection of rows that you want to appear in the subscription. You can only use the table that you selected in Step 1.

For example, suppose you want your visiting nurses to see only the rows of data in the PATIENTS table where the value of the JOBCODE column is VNURSE. You could enter the following WHERE clause:

```
JOBCODE='VNURSE'
```

The WHERE keyword must not be used at the beginning of the clause.

You can click **Examples** to display sample WHERE clauses.

- c. In the **Subset of rows for individual users** field, you can type a clause similar to a SQL WHERE clause to further limit the rows that an individual user can see. Ensure you do not type "WHERE" at the beginning of the clause. You might use a parameter, whose value varies by the user. For detailed information about defining a filter at the group level or user level, see "Horizontal filtering at the subscription level, group level, or user level" on page 41.

For example, suppose that you want users to see only data related to their own job codes. Instead of hard-coding a value for the JOBCODE parameter for the entire subscription, define a variable that references the data filter value defined for each individual user:

```
JOBCODE=':JOB.'
```

In the data filters for individual users, you could then set the :JOB parameter to each user's job code. See "Filtering the data available to the user" on page 73 and "Horizontal filtering at the subscription level, group level, or user level" on page 41 for more information on filtering data for individual users.

- d. Click **OK** to close the Advanced Subscription Definition window.

Note: A series of changes made to a single row in a DB2 Everyplace table on the user's device between synchronizations will be communicated to the Sync Server as a single cumulative change. As a result, a DELETE followed by an INSERT for the same primary key will be communicated to the SyncServer as an UPDATE, if the operations occur with no intervening synchronizations. If they occur with an intervening synchronization, then they are communicated separately. This can lead to an inconsistency when the subscription does not transfer all columns between the source table and the user table, as an UPDATE will retain the current values in the unsubscribed column(s), while the INSERT will set the unsubscribed columns to default values.

Batching synchronization requests

For performance reasons, you probably do not want the Sync Server to perform replication for every synchronization request the moment that it queues. To improve performance, you can do one of the following:

- Batch synchronization requests by a fixed elapsed period of time
- Set the Sync Server to perform replication at any time you issue a special command

When batching synchronization requests, the Sync Server begins replicating synchronization requests when the number of seconds defined for the batch window has elapsed since the last replication.

For information about how to set the Sync Server to perform replication at a given time, see "Replicating on demand" on page 95.

To batch synchronization requests:

1. Ensure a source and mirror database appear on the Identification page of the Create DataPropagator subscription notebook. Then click **Define Subscription**. The Define Replication Subscription window opens.

2. Click **Timing**. The Subscription Timing window opens.
3. In the **Batch window** field, specify a number of seconds that you want the Sync Server to wait between replication cycles. You can specify up to 86,400 seconds (24 hours). The default setting is 3600 seconds (60 minutes).
4. Click **OK**.

All subscriptions defined against the same mirror database share the same values for batch parameters. Any changes that you make affect all subscriptions defined against the mirror database.

Providing a user ID and password for the subscription

All subscriptions defined against a source database share the same user ID and password to gain access to the database. If this is the first subscription created against the source database, you need to specify this user ID and password. To do this, type the following values on the Authentications page of the Create DataPropagator subscription notebook:

- A valid DB2 Universal Database user ID. Ensure that this ID has, at a minimum, the SQL privileges that you granted for the subscriptions defined against the database. For example, if you granted the SQL UPDATE privilege in the subscription, the user ID must have UPDATE privileges defined for the source database.
- A valid DB2 Universal Database password for the user ID. Type the password again in the **Verify password** field.

The Sync Server creates a password file from this information that DataPropagator uses to access the source database. The password file is stored in the directory where the Sync Server runs.

Specifying subscription sets that use the subscription

After you define the subscription, you must specify the subscription sets that use it. When you associate a subscription with a subscription set, you can then assign the subscription set to a group to provide members of the group access to the data and files defined in the subscriptions that the subscription set references.

One subscription can be used by an unlimited number of subscription sets. However, two subscriptions that are defined with different privileges cannot belong to the same subscription set.

If two subscriptions with different privileges point to the same table, they must use different mirroring (mid-tier) servers. Two subscriptions with different privileges can use the same mirror only if they synchronize with different tables.

To specify the subscription sets that use this subscription:

1. Go to the Subscription sets page of the Create DataPropagator subscription notebook.
2. In the **Available subscription sets** list, select the subscription set with which you want to associate the subscription. To select multiple subscription sets serially, hold down the Ctrl key while selecting; to select multiple subscription sets contiguously, hold down the Shift key while selecting.

If no subscription sets are displayed in the **Available subscription sets** list, you will need to create a subscription set. You can click **Create** to open the Create Subscription set notebook now, or you can create a subscription set later and associate it with a subscription later. See “Enabling groups to access their data and files” on page 96 for more information on creating a subscription set.

- Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets are displayed in the **Selected subscription sets** list.

Creating an upload subscription

An upload subscription is a type of JDBC subscription that allows you to insert rows directly into a table on a source database. The source table can reside on any database that supports JDBC. Upload subscriptions can improve Sync Server's throughput, simplify administration, and increase system reliability.

Upload subscriptions can be used in scenarios where the client devices are used only for collecting data only and when getting timely updates of tables on the client device is not a primary concern. Such scenarios include:

- Registering gas or water meter readings.
- Issuing traffic tickets.
- Collecting bar codes in supermarkets.

There are few restrictions on the source database except that it must support JDBC and SQL INSERT statements. Because there is no replication for an upload subscription, the burden on the Sync Server is alleviated.

In an upload subscription, when you synchronize with the Sync Server, the DB2 Everyplace database engine on the handheld device communicates directly with the source database to insert the rows that have been added to the DB2 Everyplace database. The flow of the data is one-way; the tables on the device are not refreshed. No mirror database is involved in this process.

If a primary key is used, multiple inserts that cause a primary conflict are rejected. The rejections are logged in both the client and the Mobile Devices Administration Center (MDAC) on the Sync Server. Other operations, like DELETE and UPDATE, are either ignored by the source database or rejected. Table 7 lists client operations and results.

Table 7. Client's possible operations and their consequences

Operation	Results
Client's INSERT operations without conflicts in the primary key	Inserted into the source database
Client's INSERT operations with conflicts in the primary key	Rejected with error messages logged in the client and the MDAC
Client's UPDATE operations	Rejected with error messages logged in the client and the MDAC
Client's DELETE operations	Ignored silently
First-time synchronization	Tables created in the client with no rows

In an upload subscription, the Sync Server never updates the related tables in the device's DB2 Everyplace database.

Use the Create Upload Subscription notebook to create an upload table subscription. See "Creating synchronization objects" on page 62 for information on how to open the notebook. Each table subscription that you create can reference one or more tables.

To create an upload subscription:

1. Open the Create Upload Subscription notebook.
2. Identify the upload subscription.
3. Specify the encryption level.
4. Specify the source database driver and URL.
5. Specify source tables and target tables for the subscription.
6. Assign subscription sets to the upload subscription.
7. Click **OK**.

These steps are explained in more detail in this section.

Identifying the upload subscription

After authenticating a user, the Sync Server determines what group the user belongs to, then queries the administration control database to determine what subscription is involved in the request. For this reason, the Sync Server must be able to uniquely identify each subscription by name.

To identify an upload subscription:

1. Click the **Identification** tab of the Creating upload subscriptions notebook.
2. Fill in these fields:

Name Type a descriptive, unique 1- to 18-character name for the upload subscription.

Description

Optional: Type up to 128 characters of text that describes this subscription.

Specifying the encryption level

Encryption support for Windows CE and Win32 platforms is only available with the Microsoft High Encryption Pack available from Microsoft. The Microsoft High Encryption Pack must be installed to use encryption between Windows CE/Pocket PC clients or Win32 platform clients and the DB2 Everyplace Sync Server. Encryption support on Palm OS requires Palm OS 3.3 or later.

To specify the encryption level:

On the **Identification** page, select the encryption level from the **Encryption level** drop-down list. The following three options are available:

None No encryption will be used during data transfer.

Limited: 56-bit Data Encryption Standard

All data transfers will be encrypted using a 56-bit key. This provides basic security with a small performance penalty.

Strong: 128-bit Data Encryption Standard

All data transfers will be encrypted using a 128-bit key. This provides enhanced security with a larger performance penalty than Limited encryption.

Specify the source database driver and URL

You must specify only the source database for an upload subscription because no mirror database is involved.

To specify the source database driver and URL:

On the **Source** page of the Create Upload Subscription notebook, provide the following information:

Database URL

Type the JDBC Database URL. The correct form for the JDBC driver selected in the Driver field is shown. Replace the variables in braces with the information to connect to the database. For example, the default Database URL for IBM DB2 UDB local is `jdbc:db2:{database}`. Replace `{database}` with the name of the DB2 database you plan to use.

Driver Use this field to select the JDBC database driver to use with this subscription.

User ID

Type a valid source database user ID. Ensure this ID has the SQL INSERT privilege against the source database.

Password

A valid source database password for the user ID.

Verify Password

Type again the password exactly as you typed it in the **Password** field.

Specifying source tables and target tables

You must define at least one table for every upload subscription.

To add a table to the subscription:

1. On the **Identification** page of the Create Upload Subscription notebook, click **Define subscription**. The Define Replication Subscription window opens.
2. In the Define Replication Subscription window, click **Add**. The Add Table window opens.
3. In the Add Table window, use the **Table** list to select the replication source to add to this subscription.
Click **Filter** to change the source filter used to limit the available tables in the table list. The Filter window opens.
The % symbol is a wildcard. Typing % in the Source schema and Source table fields displays all available tables in the table list.
4. In the **Target schema** field, specify the schema that the table will have on the mobile device. If you do not specify a schema, by default the system uses the schema of the source table.
5. In the **Target table** field, specify the name that the table will have on the mobile device. If you do not specify a name, by default the system uses the name of the source table.
6. Optional: Select the **Use Constraints defined in selected DB2 source** checkbox. This enables the constraints from the selected DB2 source table for the target table.
7. Optional: Select the **Use Indexes defined in selected DB2 source** checkbox. This enables the indexes from the selected DB2 source table for the target table.
8. Click **Add** to add the replication source to the subscription. Click **Close** to close the Add Table window.

Assigning a subscription set to an upload subscription

After you define the subscription, you must specify what subscription sets use it. When you associate a subscription with a subscription set, you can then assign the

subscription set to a group to provide members of the group access to the data and files. The data and files that the group can access are defined in the subscriptions that the subscription set references.

One subscription can be used by an unlimited number of subscription sets.

To specify the subscription sets that use this subscription:

1. Go to the subscription sets page of the Create Upload Subscription notebook.
2. In the **Available subscription sets** list, select the subscription set with which you want to associate the subscription. Hold down the Ctrl key while selecting to select multiple subscription sets serially, or hold down the Shift key to select multiple subscription sets contiguously.

If no subscription sets appear in the **Available subscription sets** list, click **Create** to create a subscription set without closing the current Create Upload Subscription notebook. The Create Subscription Set notebook opens.

3. Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets appear in the **Selected subscription sets** list.

Creating a file subscription

To provide users access to the files that they require, you define one or more file subscriptions. Unlike a DataPropagator subscription, which can contain more than one table, a file subscription can contain only one file. Thus, if your group of users needs access to several files, you must create several file subscriptions (then assign them to a subscription set as explained in “Specifying what information the subscription set accesses” on page 97, and assign the subscription set to the group as explained in “Enabling the group to access data and files” on page 69). A file cannot be referenced in multiple subscriptions.

The file to which you subscribe the group can be any file stored at the source server. You can use file subscriptions as a convenient way to distribute and update data and application files to the users. For example, it could be an application file that you want to install on the mobile devices, or a resource file required for a Palm OS application to function, or it could be a flat file containing the minutes from a morning meeting.

To create a file subscription:

1. Open the Create File Subscription notebook. See “Creating synchronization objects” on page 62 for more information.
2. Identify the subscription.
3. Specify the encryption level.
4. Specify the name of the source file.
5. Specify the subscription sets that will use the subscription.
6. Click **OK**.

These steps are explained further in this section.

Identifying the subscription

After authenticating a user, the Sync Server determines the group that the user belongs to, then queries the administration control database to determine what subscription is involved in the request. For this reason, the Sync Server must be able to uniquely identify each file subscription by name.

To identify a file subscription, provide the following information on the Identification page of the Create File Subscription notebook:

Name

Provide a descriptive, unique name for the subscription from 1 to 18 characters long. Names are case-sensitive.

Description

Type up to 128 characters of text that describes this subscription.

Specify the encryption level

Encryption support for Windows CE and Win32 platforms is only available with the Microsoft High Encryption Pack available from Microsoft. The Microsoft High Encryption Pack must be installed to use encryption between Windows CE/Pocket PC clients or Win32 platform clients and the DB2 Everyplace Sync Server. Encryption support on Palm OS requires Palm OS 3.3 or later.

To specify the encryption level:

On the Identification page, select the encryption level using the **Encryption level** field. The following three options are available:

None No encryption will be used during data transfer.

Limited: 56-bit Data Encryption Standard

All data transfers will be encrypted using a 56-bit key. This provides basic security with a small performance penalty.

Strong: 128-bit Data Encryption Standard

All data transfers will be encrypted using a 128-bit key. This provides enhanced security with a larger performance penalty than Limited encryption.

Specifying the name of the source file

A *source file* is a file residing on a source system that is replicated to a target device.

A *target file* is a file on a target system receiving the contents of a source file during synchronization.

The source file must be available for selection from the mid-tier system where you invoke the Mobile Devices Administration Center. Thus, before you define the subscription, either connect to the source system where the file is stored or copy the file from the source system to the mid-tier system. If your synchronization configuration has only two tiers, the file is probably already on the system where you invoke the Mobile Devices Administration Center.

Specify the name of the source file in the **Source filename** field on the Identification page of the Create File Subscription notebook.

After you create the file subscription, a copy of the file that you specify here is stored to ensure integrity of the subscription in case anything happens to the file. If you update the file, you must flag the source file to be replicated again to each of the subscribed users. See “Flagging a subscription that references a changed file” on page 92 for more information.

Because Palm OS mobile devices store the file name within the file itself, the **Target filename** field is ignored.

Specifying subscription sets that use the subscription

After you define the subscription, you must specify the subscription sets that make use of it. When you associate a subscription with a subscription set, you can then assign the subscription set to a group to provide its members with access to the data and files defined in the subscriptions that the subscription set references.

One subscription can be used by an unlimited number of subscription sets.

To specify the subscription sets that use this subscription:

1. Go to the Subscription sets page of the Create File Subscription notebook.
2. In the **Available subscription sets** list, select the subscription set that you want to associate the subscription with. To select multiple subscription sets serially, hold down the Ctrl key while selecting; To select multiple subscription sets contiguously hold down the Shift key.

If no subscription sets are displayed in the **Available subscription sets** list, you will need to create a subscription set. You can click **Create** to open the Create Subscription set notebook now, or you can create a subscription set later and associate it with a subscription later. See “Enabling groups to access their data and files” on page 96 for more information on creating a subscription set.

3. Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets are displayed in the **Selected subscription sets** list.

You can also associate subscriptions with a subscription set using the Subscription set notebook. For more information, see “Specifying what information the subscription set accesses” on page 97.

Flagging a subscription that references a changed file

When you make changes to a file referenced in a subscription, you need to flag that the source file has changed so that the Sync Server replicates the file to the subscribed users on the next synchronization. It is a convenient way to update or upgrade applications and data files on the mobile devices.

To flag that the source file has changed:

1. Open the **Subscriptions** object folder from the object tree in the Mobile Devices Administration Center.
2. In the contents pane, right-click the file subscription and select **Reset**.

Creating a custom subscription

Use the Create Custom Subscription notebook to create a custom subscription. A Custom subscription can be used to customize the default adapters or use a 3rd party adapter.

To create a custom subscription:

1. Open the Create Custom subscription notebook.
2. Identify the custom subscription.
3. Specify the encryption level.
4. Launch the customizer.
5. Assign subscription sets to the custom subscription.
6. Click **OK**.

These steps are explained further in this section.

Identifying the Custom subscription

After authenticating a user, the Sync Server determines what group the user belongs to, then queries the administration control database to determine what subscription is involved in the request. For this reason, the Sync Server must be able to uniquely identify each subscription by name.

To identify a custom subscription:

On the Identification page, fill in these fields:

Name Type a descriptive, unique 1- to 18-character name for the subscription.

Description

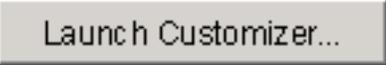
Optional: Type up to 128 characters of text that describes this subscription.

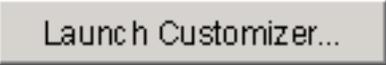
Specify the encryption level

Encryption is not supported with custom subscriptions. Select None in the **Encryption** field.

Launch the customizer

To launch the customizer:

A rectangular button with a light gray background and a thin black border. The text "Launch Customizer..." is centered on the button in a dark gray, sans-serif font.

On the Identification page, Click the  push button to launch the custom Java class file defined in the Customizer class name field of the custom adapter used by the subscription. The Customizer is only available if the adapter requires it. Otherwise, additional parameters for the custom subscription are entered in the **Other** field.

Assigning a subscription set to a Custom subscription

After you define the subscription, you must specify what subscription sets use it. When you associate a subscription with a subscription set, you can then assign the subscription set to a group to provide members of the group access to the data and files defined in the subscriptions the subscription set references.

One subscription can be used by an unlimited number of subscription sets.

To specify the subscription sets that use this subscription:

1. Go to the subscription sets page of the Create Custom Subscription notebook.
2. In the **Available subscription sets** list, select the subscription set that you want to associate the subscription with. Hold down the Ctrl key while selecting to select multiple subscription sets serially, or hold down the Shift key to select multiple subscription sets contiguously.

If no subscription sets appear in the **Available subscription sets** list, click **Create** to create a subscription set without closing the current Custom Subscription notebook. The Create Subscription Set notebook opens.

3. Click > to assign the subscription sets, or click >> to assign all available subscription sets at once. Assigned subscription sets appear in the **Selected subscription sets** list.

Creating a custom adapter

Use the Create Custom Adapter notebook to create a custom adapter. DB2 Everyplace Sync Server includes four default adapters. The default adapters are:

DSYDPROPR	DataPropagator adapter for relational data
DSYJDBC	JDBC adapter for relational data
DSYFILE	File adapter for copying files
Agent Adapter	Remote query and stored procedure adapter for running stored procedures

Custom adapters allow you to expand the capabilities of DB2 Everyplace Sync Server.

To create a custom adapter:

1. Open the Create Custom Adapter notebook.
2. Identify the custom adapter.
3. Specify the Customizer class name and the Signature.
4. Specify the communications attributes.
5. Specify the file attributes.
6. Click **OK**.

These steps are explained further in this section.

Identifying the Custom Adapter

To identify a custom adapter:

On the Identification page, fill in these fields:

Name Type a descriptive, unique 1- to 18-character name for the adapter.

Description

Optional: Type up to 128 characters of text that describes this adapter.

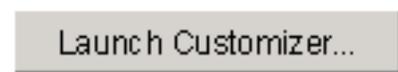
Specify the Customizer class name and the Signature

To specify the Customizer class name and the signature:

On the Identification page, fill in these fields:

Customizer class name

Type the Java class name to be called by the



push button.

Signature

Type the Signature used to identify subscriptions using this adapter.

Signature is used to identify a *class* of adapters. This prevents a relational data subscription being used with a file adapter. For example, if we had many instances of a WIDGET adapter (all using the same signature WidgetSig) and each instance of the WIDGET adapter had a different function, any existing custom subscription that used this WIDGET adapter could use any custom WIDGET adapter of the same signature (WidgetSig).

Specify the Communication Attributes

To specify the communication attributes:

On the Identification page, fill in these fields:

Command

Type the command to run for this adapter.

Server IP address:port

Type the server IP address and port for the adapter to connect to in the following form:

XXX.XXX.XXX.XXX:PPPP

where XXX.XXX.XXX.XXX is the IP address and PPPP is the port number.

Queue manager suffix

Optional: Type a descriptive, unique 1- to 18-character suffix for the queue manager.

Input queue name

Optional: Type up to 128 characters of text that describes this subscription.

Specify the File Attributes**To specify the file attributes:**

On the Identification page, fill in these fields:

Lib name

Type the filename of the library to use for this adapter. The library must be located in the path.

Other parameters

Optional: Type up to 128 characters of other parameters for the file named in lib name.

Replicating on demand

The replication-on-demand feature enables you to request replication at any time. It is an alternative to setting replication to automatically run at regular intervals. You can enable replication on demand when you create a new subscription, or when you edit an existing subscription. If you reconfigure an existing subscription, you must restart the Sync Server servlet to make the changes effective.

To enable replication on demand:

1. On the Create DataPropagator Subscription notebook or Create JDBC Subscription notebook, go to the Identification page and click **Define Subscription**. The Define Replication Subscription window opens.
2. Click **Timing**. The Subscription Timing window opens.
3. In the **Batch window** field, set the timing to 0.
4. Click **OK**.

When the Sync Server servlet starts, the initial replication takes place as usual. No subsequent replications will be performed automatically. Subsequent replications can be requested by using the dsyreplicate command. To request a replication:

1. Open a DB2 command window.
2. Change to SyncServer/Server subdirectory under the directory where DB2 Everyplace has been installed. For example, db2e/SyncServer/Server.
3. Issue the dsyreplicate <mirror_database_name> command to request the replication. For example:
dsyreplicate m_vnurse
4. Close the DB2 command window.

Notes:

- If the dsyreplicate command must be issued from a machine different than the one that the Sync Server servlet runs on, both machines need to be configured to use the same Sync Server control database (DSYCTLDB).
- The dsyreplicate command must be issued for each mirror database.
- For DataPropogator subscriptions, the command must be issued on the same machine where the mirror database resides.

Enabling groups to access their data and files

An *subscription set* is a container for subscriptions. You assign subscription sets to a group so that its members have access to the data and files defined in the subscriptions that are part of the subscription set. The subscriptions that you assign can be JDBC subscriptions, DataPropagator subscriptions, file subscriptions, or custom subscriptions. Each subscription set can contain any number of subscriptions (limited by mobile device storage capacity).

When users start the synchronization user software on the device, they choose which applications to synchronize. This menu of applications is created from the list of subscription sets associated with the user's group. For more information, see "Registering the user's device" on page 73.

To define an subscription set:

1. Open the Create Subscription set notebook. (See "Creating synchronization objects" on page 62.)
2. Identify the subscription set.
3. Evaluate your current groups of mobile users and determine what information they currently need to perform their work. Assign to the subscription set all DataPropagator or file subscriptions that represent this information.
4. Evaluate which groups require access to the subscriptions referenced in the subscription set. Associate these groups with the subscription set.
5. Click **OK**.

Each step is explained further in this section.

Identifying the subscription set

After authenticating a user, the Sync Server determines the group that the user belongs to, then queries the administration control database to determine the subscriptions that belong to the subscription set referenced in the request. For this reason, the Sync Server must be able to uniquely identify each subscription set by name.

To identify the subscription set, provide the following information on the Identification page of the Create Subscription set notebook:

Name

Provide a descriptive, unique name for the subscription set from 1 to 18 characters. You might choose a name that maps to the name of an application already used by a particular group, or you might create a new name here. For example, you might choose VNURSE as the name for the subscription set used by all home health care specialists that work at the hospital.

Subscription set names are case-sensitive.

Description

Type up to 128 characters of text that describes this subscription set. For example, you might describe the VNURSE subscription set as "Data and files used by all home health care specialists".

Specifying what information the subscription set accesses

To enable a group of mobile users to access data and files that its members require, associate the subscription set with replication subscriptions that define tables and files as data sources available for replication.

For example, suppose your group of visiting nurses relies on a Palm OS application called `vnurse.prc` to perform their jobs. The `vnurse.prc` Palm OS application accesses patient and scheduling information in the `PATIENTS` and `SCHEDULES` tables, which reside on a source server. To enable the nurses to use the DB2 Everyplace Sync Server to replicate this data to their user devices, you must define two replication subscriptions:

- One subscription references both of the required tables (`PATIENTS` and `SCHEDULES`).
- The other subscription references the resource file for the Palm OS application (`vnurse.prc`).

After defining the subscriptions, associate the subscriptions with a subscription set and then assign that subscription set to the VNURSE group to enable the visiting nurses to replicate the data that they need. When the visiting nurses synchronize their data, they receive the latest copy of the resource file, as well as updates to the `PATIENTS` and `SCHEDULES` tables.

You can associate an unlimited number of subscriptions with a subscription set.

To associate subscriptions with the subscription set:

1. Go to the Subscriptions page of the Create Subscription set notebook.
2. In the **Available subscriptions** list, select the subscription you want to assign to the subscription set. To select multiple subscriptions serially, hold down the Ctrl key while selecting; To select multiple subscriptions contiguously hold down the Shift key.
3. Click > to assign the selected subscriptions, or click >> to assign all available subscriptions at once. Assigned subscriptions are displayed in the **Selected subscriptions** list.

If no subscriptions are displayed in the **Available subscriptions** list, you will need to create a subscription. You can click **Create** to open the Create JDBC subscription, Create DataPropagator subscription notebook, Create File subscription notebook, or Create Custom subscription notebook now, or you can create a subscription later and associate a subscription set with it later.

Making the subscription set available to a group

To allow a group to access the DataPropagator and file subscriptions referenced in a subscription set, you must associate the group with the subscription set.

To assign an subscription set to a group:

1. Go to the Groups page of the Create Subscription set notebook.
2. In the **Available groups** list, select the group to which you want to assign the subscription set. To select multiple groups serially, hold down the Ctrl key while selecting; To select multiple groups contiguously hold down the Shift key.

If no groups are displayed in the **Available groups** list, you will need to create a group. You can click **Create** to open the Create Group notebook now, or you can create a group later and associate it with a subscription set later. See “Creating a data synchronization group” on page 68 for details on creating a group.

3. Click > to assign the selected groups, or click >> to assign all available groups at once. Assigned groups are displayed in the **Selected groups** list.

Enabling and disabling synchronization

Before synchronization can happen, both the user and group must be enabled in the Mobile Devices Administration Center. If you delete required information from an object at a later time, the object is automatically disabled.

When a user or group is enabled for synchronization

You can enable a group for synchronization after you assign to the group:

- A unique name
- At least one user
- At least one subscription set

A user is automatically enabled for synchronization after you:

1. Provide a unique name for the user.
2. Assign the user to an enabled group.
3. Register the user’s device.

You must create the user first in the Mobile Devices Administration Center before that user registers his or her device during the first synchronization. See “Registering the user’s device” on page 73 for information on registering a device.

Enabling synchronization

You can enable a group or user in one of the following ways:

- By opening the object:
 1. From the object tree, select the object folder. Existing objects are displayed in the contents pane of the Mobile Devices Administration Center.
 2. Right-click the object that you want to enable.
 3. Select **Edit**. The Edit notebook for the object opens.
 4. From any page of the Edit notebook, select the **Enable synchronization** check box. If the check box appears inactive, you did not provide all the required information for the object to be enabled. See “When a user or group is enabled for synchronization” for more information.
 5. Click **OK**. The **Enabled** field in the contents pane changes from No to Yes.
- From the contents pane (if you want to enable multiple objects at the same time):
 1. In the object tree, open the object folder. Existing objects are displayed in the contents pane of the Mobile Devices Administration Center.
 2. Right-click the object and select **Enable**. If the **Enable** option is not present on the menu, you did not provide all the required information for the object to be enabled. See “When a user or group is enabled for synchronization” for more information.

Disabling synchronization

You might choose to disable an object temporarily if you are making administration changes to either the group or the user.

Disable a group or user in one of the following ways:

- By opening the object:
 1. From the object tree, select the object folder. Existing objects are displayed in the contents pane of the Mobile Devices Administration Center.
 2. Right-click the object that you want to disable.
 3. Select **Edit**. The Edit notebook for the object opens.
 4. From any page of the Edit notebook, clear the **Enable synchronization** check box.
 5. Click **OK**. The **Enabled** field in the contents pane changes from Yes to No.
- From the contents pane (if you want to disable multiple objects at the same time):
 1. From the object tree, select the appropriate object folder.
 2. In the contents pane, right-click the object that you want to disable.
 3. Select **Disable**.

Chapter 11. Handling synchronization problems

When synchronization is interrupted, the Sync Server writes messages to the log in the administration control database. This chapter explains how to:

- Understand the order of synchronization and reception of error messages.
- View the log through the Mobile Devices Administration Center to determine the cause of the problem.
- Add error-handling logic to automatically perform actions in response to an error message.
- View the log on the client device.

Understanding the order of synchronization and reception of error messages

Order of synchronization:

For a given subscription set, the subscriptions are synchronized in the order you added them when you created this subscription set in the Mobile Devices Administration Center. Similarly, for each of the subscriptions, the tables are synchronized in the order that you added them when you created the subscription. Understanding these orders may help you to interpret the logs and resolve a synchronization problem.

You can always review this order in the Mobile Devices Administration Center by editing the subscription set or subscription. The subscriptions listed in the Editing subscription set notebook or the tables displayed in the Editing subscription notebook are in the order that you added them, with the earliest at the top.

Error messages about rejected records:

If a record was rejected by the Sync Server for JDBC and DataPropagator subscriptions, the client receives error messages about the rejection during the next synchronization. However, if you have specified only SELECT privilege for the table to be synchronized and a record was rejected for any other SQL operations, the client receives error messages about the rejection immediately.

Viewing the error log to diagnose problems

When you encounter synchronization problems, you can use the Mobile Devices Administration Center to view the error log for troubleshooting purposes. To access the log:

1. Start the Mobile Devices Administration Center.
2. In the object tree, select the **Logs** folder to open the log.

When you open the **Logs** folder, the contents pane displays the following information:

Timestamp

This field displays the time the message was written to the log.

Code This field displays the number of the message.

Description

This field displays the text of the message. Message text is truncated to 255 characters.

To determine the actions that you should take for a particular message, see “Appendix A. Error messages” on page 109, which lists messages by code along with an explanation and suggested actions that you can take to resolve the problem.

Additional logs are created in the form of trace files. Trace files are stored in the \SyncServer\Server\ directory. They have a .trace suffix. You can use a text editor to view the trace files.

Managing the error log and the trace files

Purging error log entries automatically

You can specify how many days the entries in the error log in the Mobile Devices Administration Center should be kept. The log entries that are older than the specified days are automatically purged. This feature helps to keep the size of the error log small.

To specify the days that the entries should be kept:

1. Use a text editor to open the DSYGdf1t.properties file in directory \SyncServer\Server\classes\com\ibm\mobileservices\.
2. Modify the Log.KeepDays line in the file. The default value is 7 days. If you set the value to 0, automatic purging will not happen and all entries are kept.

For example, if you want all log entries older than three days to be purged automatically, change the line to look like this:

```
Log.KeepDays=3
```

Defining tracing level

By default, the Sync Server only logs error messages in the trace files. However, for diagnostic purposes, you may want to turn on tracing to include more detailed information. Use **DSYTrace** to turn on or off tracing.

To turn on tracing:

1. Open a command prompt.
2. Change to the \SyncServer\Server\ directory.
3. At the command prompt, type:

```
DSYTrace 1 -console
```

All trace messages are now logged to a .trace file.

To turn off tracing:

1. Open a command prompt.
2. Change to the \SyncServer\Server\ directory.
3. At the command prompt, type:

```
DSYTrace 0 -console
```

Tracing is now turned off. Only error messages are now logged to a .trace file.

The DSYTrace command changes the Trace.Level in file DSYGdf1t.properties in directory \SyncServer\Server\classes\com\ibm\mobileservices\. For additional

tracing options, type DSYTrace with no options at the command line or open the DSYGdflt.properties file in a text editor and modify the Trace.var parameters where var is a specific parameter variable.

Providing your own error-handling logic

Almost all the error messages require you to take action to resolve the problem indicated in the message text. To simplify day-to-day synchronization management, you might choose to add your own logic to automatically perform these actions when a particular error message number is issued.

To define automatic processing of errors:

1. Using a text editor of your choice, open the following file for editing:

DSYUserExits.properties

This file associates a message number with a routine or program that runs when the message number is written to the log. This properties file supports many different parameters.

```
# Formats:
# {DSY message id}={class to execute} {environment parameters}
# {DSY message id}={command to execute} {environment parameters}
#   where
#     {DSY message id}:
#       a DSY* message id that you want to define a user exit for (such as
#       DSYD000E)
#     {class to execute}:
#       the name the Java .class to execute. This class must implement the
#       com.ibm.mobileservices.DSYUserExitsInterface
#     {command to execute}:
#       the name the command to execute (such as pager.exe)
#     {environment parameters}:
#       a series of parameters to pass in to the class or command to execute
#
# Optional command tags:
# <DSYID>           = the message id
# <DSYIDMSG>        = the message id message text
# <DSYIDMSG_>       = the message id message text, but all blanks are
#                   converted to underscores
# <DSYMSG>          = the message text
# <DSYMSG_>         = the message text, but all blanks are converted to
#                   underscores.
# <SERVER_IPADDRESS> = the server ip address (such as 9.112.19.143)
# <SERVER_NAME>     = the server name (such as mpauser.stl.ibm.com)
#
# Refer to the messages section for available DSY message ids.
#
# Example 1:
# If you wanted to have user exists for DSYD000E, you would add a line
# similar to the following:
#
# DSYD000E=pager.exe number=5551234 id=<DSYID> msg=<DSYMSG_>
#
# When a DSYD000E message was issued, the pager.exe command would be executed
# with two environment parameters would be set: number=5551234, id=DSYD000E
# and msg=DSY message text, substituting an underscore (_) for blanks.
#
# Example 2:
# If you wanted to have a class executed when a DSYD020E was encountered,
# you would add a line similar to the following:
#
```

```
# DSYD020E=com.ibm.mobileservices.DSYUserExitsSample.class
#
# When a DSYD020E was issued, the com.ibm.mobileservices.DSYUserExitsSample
# class would be executed.
```

2. At the end of the file, pair a message number and an action to be performed when the message is written to the log. The action can be a command (such as an executable or batch file) or a Java class. Use the following format:

```
message_number=action parameter=value
```

where:

message_number

The number of the message. See “Appendix A. Error messages” on page 109 for message codes and their associated text.

action The file referencing the command or Java class that is called. The Java class must implement the `com.ibm.mobileservices.DSYUserExitsInterface`.

parameter=value

A series of parameter sets (such as `lastname=Doe firstname=John`), with each set separated by a space.

The action to be performed must be a reference to a valid routine or program.

For example, suppose that you want to include a user exit that pages you when message DSYD000E is issued. You could write a program called `pager.exe` that dials your pager, and include the pager number as a parameter. The line in the `DSYUserExits` file might look something like this:

```
DSYD000E=pager.exe number=9980674
```

You can also include the following parameters and variables with the command:

ID Use this parameter to write the code of the message. For the parameter value, specify the variable `DSYID`.

MSG Use this parameter to write the message text. For the parameter value, specify `DSYMSG` to write the actual message text, or `DSYMSG_` to write the message text, but convert all blank spaces in the text to underscore characters.

The following example dials the same pager, but submits both the message number and its text as parameters so they appear in the pager window:

```
DSYD000E=pager.exe number=9980674 id=dsyid msg=dsymsg
```

The Sync Server does not check the validity of your entries in the `DSYUserExits` file, nor does it validate that the action associated with the message is completed.

To test a user exit routine, the `DSYUserExitsTest.bat` file tool is included. To test a user exit routine using the `DSYUserExitsTest` tool, use the following format:

```
DSYUserExitsTest.bat dsy_message_id
```

where *dsy_message_id* is the message number you want to simulate. If you do not provide a message ID, a list of available message id's is displayed.

Example command with message id DSYS001I:

```
DSYUserExitsTest.bat dsys001i
```

The DSYS001I message is generated and the user exit defined for this message number is started.

Example command with an invalid message number:

```
DSYUserExitsTest.bat zzz
```

The DSYUserExitsTest tool output is:

```
DSYUserExitsTest
  DSY message id 'ZZZ' not found. Valid DSY message id's are:
DSYA000E, DSYA001E, DSYD000E, DSYD002E, DSYD006E, DSYD007E, ...
```

Viewing the log on the client

On a Palm OS device or emulator, you can view the synchronization log messages by tapping **Log** in IBM Sync. You can set the Sync Client to register a detailed log. For information about how to set the IBM Sync to register a detailed log, see “Configuring IBM Sync” on page 18.

The contents of the synchronization log are overwritten when a refresh-type synchronization starts. A resume-type synchronization appends new messages to the log.

On a Palm OS device or emulator, the filename of the log is LOGDB-ISYN.pdb. If you want to save its contents for debugging purposes, you can use any utility that can view the contents of a .pdb file to open this file.

Resetting the user ID

Occasionally, you might find it necessary to reset the user ID for a mobile device. For example, you might reset the ID for a mobile device that is having a technical problem. If the user ID is being reset, ensure that you do not attempt to synchronize until the reset is complete. During the reset process all configuration data used for synchronization is cleaned up. No manual clean up is required.

To use the Mobile Device Administration Center (MDAC) to reset the user ID for a mobile device, click **User** → **Reset**.

To reset a user ID without using MDAC, run the *dysreset.bat* tool from a command line, using the following syntax:

```
DSYReset {[user name]} {-device [device id]} {-group [group name]}
```

where

[user name] is the user name to reset

[device id] is the device id to be reset

[group name] is the group name to reset all users belonging to a group

For example:

```
'DSYReset bob' would reset the user named 'bob'.
```

```
'DSYReset -group Sales' would reset all users belonging to the group 'Sales'.
```

Part 5. Appendixes

Appendix A. Error messages

This appendix lists error messages and their meanings, and it provides suggested actions to correct the problem identified in the message. Use this appendix with “Chapter 11. Handling synchronization problems” on page 101 to identify and correct problems.

DSYA000E Invalid or missing JDKpath environment variable encountered in file dsysetenv.bat.

Explanation: The specified file contains an invalid or missing environment variable.

User Response: Modify the specified file and correct the specified environment variable to contain a valid path.

DSYA001E Invalid or missing JSDKpath environment variable encountered in file dsysetenv.bat.

Explanation: The specified file contains an invalid or missing environment variable.

User Response: Modify the specified file and correct the specified environment variable to contain a valid path.

DSYC100E Failed to open Config DB

Explanation: The Sync Client could not open the configuration database. The configuration database may be missing, write-protected, locked by another application, or corrupted.

User Response: Check the access right of the configuration file, have the Sync Server administrator reset the user, and try again. If problems persist, contact IBM software support.

DSYC101E Failed to open Misc DB

Explanation: The Sync Client could not open the configuration database. The configuration database may be missing, write-protected, locked by another application, or corrupted.

User Response: Check the access right of the configuration file, have the Sync Server administrator reset the user, and try again. If problems persist, contact IBM software support.

DSYC102E Failed to open File DB

Explanation: The Sync Client could not open the configuration database. The configuration database may

be missing, write-protected, locked by another application, or corrupted.

User Response: Check the access right of the configuration file, have the Sync Server administrator reset the user, and try again. If problems persist, contact IBM software support.

DSYC103E Unexpected sync mode

Explanation: The Sync Client has encountered unexpected internal information while synchronizing configuration information.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC104E String is too long

Explanation: The Sync Client has encountered unexpected internal information.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC105E Unexpected message format

Explanation: The Sync Client has encountered unexpected internal information during configuration synchronization.

User Response: Have the Sync Server Administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC106W Failed to remove file: 'filename'

Explanation: The Sync Client could not remove the specified file. Note that 'filename' may be truncated.

User Response: Make sure the file is not write-protected, or locked by another application.

DSYC107E Server reported invalid user or password

Explanation: The provided username/password doesn't match any registered user on the Sync Server.

User Response: Make sure that the username and

password are entered correctly, and try again. If problems persist, contact the Sync Server administrator.

DSYC108E Server reported user or device not enabled

Explanation: The user has not been enabled to synchronize by the Sync Server administrator.

User Response: Make sure that the username is entered correctly, and have the Sync Server administrator enable and reset the user, and try again. If problems persist, contact the Sync Server administrator.

DSYC109E Server reported invalid device ID

Explanation: An invalid device ID was sent to the Sync Server.

User Response: Contact the Sync Server administrator.

DSYC110E Server failed to register this client

Explanation: The Sync Server had problems registering the user.

User Response: Contact the Sync Server administrator.

DSYC111E Server failed to register this device

Explanation: The Sync Server had problems registering the device. It could be because that the Sync Client has changed its user information, and thus doesn't match the registered user information at the Sync Server.

User Response: Have the Sync Server Administrator reset the new user, and try again. If problems persist, contact the Sync Server administrator.

DSYC112E Server reported this device is not registered to this client

Explanation: The Sync Server had problems registering the device to this user.

User Response: Contact the Sync Server administrator.

DSYC113E Server reported new client must be enabled first

Explanation: An invalid username was sent by the Sync Client to the Sync Server, or the user has not been enabled by the Sync Server administrator.

User Response: Make sure that the username is entered correctly, and try again. If problems persist, contact the Sync Server administrator.

DSYC114E Server encountered an unexpected error

Explanation: The Sync Server could not synchronize this user.

User Response: Contact the Sync Server administrator.

DSYC115E Failed to allocate work buffer for config synchronization

Explanation: The Sync Client could not allocate sufficient memory as work buffer for configuration synchronization.

User Response: The device could be low on available memory. Quit some unused applications, and try again. If problems persist, consult the DB2 Everyplace database engine documentation or contact IBM software support.

DSYC200E Config Adapter not already loaded

Explanation: The Sync Client could not load the configuration adapter.

User Response: Make sure the config adapter library has been properly loaded onto the device and try again. Check with your Sync Server administrator for the library file name to look for.

DSYC201E Failed to find file entry with given ID

Explanation: The Sync Client detected inconsistent data in its configuration database.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC202E Unexpected empty temp file

Explanation: The Sync Client detected problems with a file subscription.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC203E Failed to create target file

Explanation: The Sync Client detected problems creating a file.

User Response: Check the target filename with the administrator and make sure the Sync Client has permission to create it, or it is not being used by another application. Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC204E Failed to remove target file

Explanation: The Sync Client detected problems removing a file.

User Response: Check the target filename with the administrator and make sure the Sync Client has permission to delete, or it is not being used by another application. Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC205E Failed to create temp file

Explanation: The Sync Client detected problems creating a temporary file.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC206E Failed to empty temp file

Explanation: The Sync Client was unable to empty a temporary file

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC207E Invalid file format

Explanation: The Sync Client received unexpected file subscription data from the Sync Server.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC208E Temp file state inconsistent with current message #

Explanation: The Sync Client received unexpected file subscription data from the Sync Server.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC209E Failed writing to target file

Explanation: The Sync Client detected problems writing to the target file.

User Response: Check the target filename with the administrator and make sure the Sync Client has permission to modify, or it is not being used by another application. Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC210W Failed to remove temp file

Explanation: The Sync Client detected problems removing a temporary file.

User Response: Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC211E Unexpected empty target file

Explanation: The Sync Client received unexpected empty file subscription data from the Sync Server.

User Response: Check the target filename with the administrator and make sure it does exist on the server and is not empty. Have the Sync Server administrator reset the user and try again. If problems persist, contact IBM software support.

DSYC300E Failed to open adapter: <adapter name>

Explanation: The Sync Client could not open the adapter library after use.

User Response: Check that the library for 'adapter name' is present on the device. If the library name is unknown, check with the Sync Server administrator. Otherwise, have the Sync Server administrator reset the user and try again.

DSYC301E Failed to load adapter: <adapter name>

Explanation: The Sync Client could not load the adapter library after use.

User Response: Check that the library for 'adapter name' is present on the device. If the library name is unknown, check with the Sync Server administrator. Otherwise, have the Sync Server administrator reset the user and try again.

DSYC302E Failed to close adapter: <adapter name>

Explanation: The Sync Client could not close the adapter library after use.

User Response: Check that the library for 'adapter name' is present on the device. If the library name is unknown, check with the Sync Server administrator. Otherwise, have the Sync Server administrator reset the user and try again.

DSYC303E Configuration synchronization failed, synchronization aborted

Explanation: The Sync Client did not properly sync the configuration information.

User Response: Have the user reset by the Sync Server Administrator and try again. If problems persist, contact IBM software support.

DSYC304E Authentication failed - synchronization aborted.

Explanation: The provided username/password doesn't pass the authentication on the Sync Server

User Response: Make sure that the password is entered correctly, and try again. If problems persist, contact the Sync Server administrator.

DSYC305E Failed to update the sync mode for application

Explanation: The Sync Client could not update the synchronization mode for applications

User Response: Have the user reset by the Sync Server Administrator and try again. If problems persist, contact IBM software support.

DSYC306E Authentication failed (invalid encryption key) - synchronization aborted.

Explanation: The Sync Server could not successfully encrypt/decrypt the message from the client.

User Response: Make sure that the password is entered correctly, and try again. If problems persist, contact the Sync Server administrator.

DSYC307E Client encryption/decryption failed - synchronization aborted

Explanation: The Sync Client could not successfully encrypt/decrypt the received message.

User Response: Make sure that the password is entered correctly, and try again. If problems persist, contact the Sync Server administrator.

DSYC308E Encryption not available

Explanation: Encryption is not supported for Palm OS V3.2 or earlier versions. The encryption library is not installed, or the path is not set correctly.

User Response: Make sure that the operating system supports the encryption, and the encryption library is properly installed and the path is set correctly. If problem persists, contact the Sync Server administrator.

DSYC309E Failed to open encryption library

Explanation: Encryption is not supported for Palm OS V3.2 or previous versions. The encryption library is not installed, or the path is not set correctly.

User Response: Make sure that the operating system supports the encryption, and the encryption library is installed properly and the path is set correctly. If problem persists, contact the Sync Server administrator.

DSYC310E Incompatible Sync Client version

Explanation: The Sync Client version is incompatible with the Sync Server version.

User Response: Upgrade the Sync Client to the latest version, and try again. If problem persists, contact the Sync Server administrator.

DSYC400E Failed to allocate a SQL environment

Explanation: The Sync Client could not allocate the environment for the DB2 Everyplace database engine.

User Response: The device could be low on available memory. Quit some unused applications, and try again. If problems persist, consult the DB2 Everyplace database engine documentation or contact IBM software support.

DSYC401E Failed to allocate a SQL connection

Explanation: The Sync Client could not allocate a connection to the DB2 Everyplace database engine.

User Response: The device could be low on available memory. Quit some unused applications, and try again. If problems persist, consult the DB2 Everyplace database engine documentation or contact IBM software support.

DSYC402E Failed to connect to the database engine

Explanation: The Sync Client could not make a connection to the DB2 Everyplace database engine.

User Response: Make sure the DB2 Everyplace database engine is operational with other applications (e.g., sample applications that come with the database). If problems persist, consult the DB2 Everyplace database engine documentation or contact IBM software support.

DSYC403E No tables specified

Explanation: No database tables were specified for synchronization.

User Response: There may be missing information in the DB2 Everyplace database subscription. Contact the Sync Server administrator.

DSYC404E Config Adapter not already loaded

Explanation: The Sync Client could not find the configuration adapter.

User Response: Make sure the configuration adapter's library is installed on the device. Check with the Sync Server administrator for details on this library or contact IBM software support.

DSYC405E Failed to allocate a SQL statement

Explanation: The Sync Client could not allocate memory for a statement handle to the DB2 Everyplace database engine.

User Response: The device could be low on available memory. Quit some unused applications, and try again. If problems persist, consult the DB2 Everyplace database engine documentation or contact IBM software support.

DSYC406E Unexpected sync mode

Explanation: The Sync Client has encountered unexpected internal information while synchronizing the DB2 Everyplace database.

User Response: The user must be reset by the Sync Server Administrator. If problems persist, contact IBM software support.

DSYC408E Unexpected suSTATE value

Explanation: The Sync Client has encountered an unexpected internal error.

User Response: Contact IBM software support.

DSYC411E Unexpected SQL data type

Explanation: The Sync Client has encountered an unexpected or invalid data type.

User Response: The data from the Sync Server may be invalid or a DB2 Everyplace database table may have been altered by another application. Check with the Sync Server administrator, have the user reset, and try again. If problems persist, contact IBM software support.

DSYC412E Unexpected message format

Explanation: The Sync Client has encountered unexpected internal information during synchronization of DB2 Everyplace data.

User Response: Have the user reset by the Sync Server Administrator and try again. If problems persist, contact IBM software support.

DSYC413E No matching local table

Explanation: The Sync Client cannot find a DB2 Everyplace database table which is involved in the synchronization process.

User Response: The table may have been deleted by another application. Have the user reset by the Sync Server Administrator and try again. If problems persist, contact IBM software support.

DSYC414E Unexpected end of block data

Explanation: The Sync Client has encountered unexpected end-of-data during synchronization of DB2 Everyplace data.

User Response: Have the user reset by the Sync Server Administrator and try again. If problems persist, contact IBM software support.

DSYC415W Truncating - data too long for database field

Explanation: The Sync Client was forced to truncate data that was too large

User Response: There may be problems with the Sync Server data. Check with the Sync Server administrator.

DSYC416E Server reported invalid user or password

Explanation: The username or password sent to the Sync Server was invalid.

User Response: Check the username and password in the "Settings" menu and try again. If problems persist, check with the Sync Server administrator that the user has permission to sync.

DSYC417E Server reported user or device not enabled

Explanation: The username and the device ID are not associated on the Sync Server.

User Response: Check the username in the "Settings" menu and try again. If problems persist, check with the Sync Server administrator that the user has permission to sync.

DSYC418E Records rejected by server

Explanation: The changes the Sync Client made to the database had conflicts with changes made by the server or other clients.

User Response: Check the Sync Client log, and consult the DB2 Everyplace database engine documentation with the provided SQL state in the error message or contact IBM software support.

DSYC419E Error in executing a SQL statement:

Explanation: The Sync Client encountered an error in executing a SQL statement.

User Response: Check the Sync Client log, and consult the DB2 Everyplace database engine documentation with the provided SQL state in the error message or contact IBM software support.

DSYC420E Attempt to modify read only table

Explanation: The table the Sync engine just synchronized is read-only, thus no changes are allowed on the server. Although the changes to the table are still effective on the client, they are not synchronized to the server.

User Response: Request that the Sync Server administrator allow write permission to the subscribed table.

DSYC421E Invalid operations on tables in a PUT subscription

Explanation: The client attempts to update/delete records of a table belonging to a PUT subscription, which allows insert operations only. Although the updates and deletes to the table are still effective on the client, they are not synchronized to the server.

User Response: Request that the Sync Server administrator allow update/delete permission on the subscription.

DSYC600E Failed to open connection

Explanation: The Sync Client has problem opening connection with the Sync Server. This could be due to:
1) Wrong server IP address (or hostname) or port number
2) Server is not up.

User Response: Check to ensure: 1) Server's IP address (or hostname) and port number are correctly entered
2) The Sync Server is currently operational
3) Click on "Retry". If problems persists, contact IBM software support.

DSYC601E Failed to establish connection

Explanation: The Sync Client has problem opening connection with the Sync Server. This could be due to:
1) Wrong server IP address (or hostname) or port number
2) Server is not up
3) Network is busy
4) PPP program is not operational.

User Response: Check to ensure: 1) Server's IP address (or hostname) and port number are correctly entered.
2) The Sync Client has access to the Sync Server through either a serial cable (for example, Windows RAS), a modem, or a network connection.
3) The Sync Server is currently operational.
4) If using Mocha (freeware version), stop and restart the program
5) Click "Retry". If you are using a Palm device, select **Drop connection after sync** in the advanced settings, and retry several times. If the problem persists, contact IBM software support.

DSYC602E Failed to send request

Explanation: The Sync Client has successfully connected to the Sync Server, but has problem sending a request to the server. This could be due to: 1) Server is not up 2) Connection is lost.

User Response: Check to ensure: 1) The Sync Client has access to the Sync Server through either a serial cable (e.g., through Windows RAS), a modem, or a network connection.
2) The Sync Server is currently operational.
3) Click on "Retry". If problems persists, contact IBM software support.

DSYC603E Failed to receive reply

Explanation: The Sync Client has successfully connected to, and sent a request to the Sync Server, but has problem receiving the reply from the server, or the received message is corrupted or in an unexpected format. This could be due to: 1) Unregistered user
2) Server is not up
3) Connection is lost.

User Response: Check to ensure: 1) The user name and password are correctly entered, and the user is registered with the Sync Server administrator.
2) The Sync Client has access to the Sync Server through either a serial cable (e.g., through Windows RAS), a modem, or a network connection.
3) The Sync Server is currently operational.
4) Click on "Retry". If problems persists, contact IBM software support.

DSYC604E Timeout while receiving reply

Explanation: The Sync Client has successfully connected to, and sent a request to the Sync Server, but has not received the reply from the server before timeout. This could be due to: 1) Server needs more time preparing the inquired information
2) Network is busy
3) Server is not up
4) Connection is lost

User Response: Check to ensure: 1) The Sync Client has access to the Sync Server through either a serial cable (e.g., through Windows RAS), a modem, or a network connection.
2) The Sync Server is currently operational.
3) Click on "Retry". If problems persists, contact IBM software support.

DSYC605E Failed to receive acknowledge

Explanation: The Sync Client has successfully connected to, sent a request to the server, and received the reply from the Sync Server, but does not receive the acknowledge from the server. This could be due to: 1) Server needs more time preparing the inquired information
2) Network is busy
3) Server is not up
4) Connection is lost

User Response: Check to ensure: 1) The Sync Client has access to the Sync Server through either a serial cable (e.g., through Windows RAS), a modem, or a network connection.
2) The Sync Server is currently operational.
3) Click on "Retry". If problems persists,

contact IBM software support.

DSYC606E Failed to open the Net library

Explanation: The Sync Client has problem opening the Network library. This could be due to the "Redirect Net.Lib calls to host TCP/IP" box is not checked.

User Response: Make sure the check box under Settings->Properties is set (checked).

DSYC607E Failed to load the Net library

Explanation: The Sync Client has problem loading the Network library. This could be due to the "Redirect Net.Lib calls to host TCP/IP" box is not checked.

User Response: Make sure the check box under Settings->Properties is set (checked).

DSYC608E Failed to close the Net library

Explanation: The Sync Client has problem closing the Network library. This could be due to the "Redirect Net.Lib calls to host TCP/IP" box is not checked.

User Response: Make sure the check box under Settings->Properties is set (checked).

DSYC609E Failed to resolve hostname

Explanation: The Sync Client cannot resolve the IP for the provided hostname.

User Response: Make sure the server hostname is correctly specified.

DSYC610E Failed to allocate working buffer for transport

Explanation: The Sync Client could not allocate sufficient memory as transport buffer.

User Response: Close the applications that you are not using and try again. If the problem persists, install more memory on the machine.

DSYC699E (ISYNCFINFO_ErrNetUnknown) Unknown network error

Explanation: The Sync Client has encounter an unknown error while communicating with the Sync Server.

User Response: Contact IBM technical support

DSYD000E A DB2 database adapter set wait was interrupted for database <database name>, synchronization window <sync window name>, flag <flag name>.

Explanation: The adapter for the named database was waiting for the specified flag, but was interrupted.

Because synchronization is a multi-threaded process, several messages may be issued for an interruption.

User Response: To find the source of the problem, access the log in the Mobile Devices Administration Center and review the error with the timestamp preceding the timestamp of this message. Follow the recommended actions for that message. If no previous message exists in this message sequence, contact IBM Software Support.

DSYD002E The DataPropagator manager wait for database <database name> was interrupted.

Explanation: This error is a secondary effect of another error. Because synchronization is a multi-threaded process, several messages may be issued for an interruption.

User Response: To find the source of the problem, access the log in the Mobile Devices Administration Center and review the error with the timestamp preceding the timestamp of this message. Follow the recommended actions for that message. If no previous message exists in this message sequence, contact IBM Software Support.

DSYD006E The MDSS session monitor encountered an exception from the SQL statement: <SQL statement>.

Explanation: The DB2 Everyplace Sync Server records information about the state of each synchronization session in session monitoring tables in the administration control database, DSYCTLDB. The Sync Server issues an SQL statement to add an entry for each new session so that session state information is persistent. The SQL statement failed because the session monitor tables could not be accessed.

User Response: Ensure that the DSYCTLDB database is functional and that storage is not exhausted. If no problems are found, contact IBM Software Support.

DSYD007E The MDSS connection pool encountered the exception: <exception details>.

Explanation: The DB2 Everyplace Sync Server creates a pool of database connections for each database accessed. In this case, the Sync Server attempt to use a connection from this pool for the named database failed, probably because the named database is not functional.

User Response: Ensure that the named database is functional. If no problems are found, contact IBM Software Support.

DSYD010E The DB2 adapter failed to generate a DataPropagator password file for Apply qualifier <apply qualifier>.

Explanation: A password file is generated for each Apply qualifier each time you start the DB2 Everyplace Sync Server. DB2 Data Propagator uses the user ID and password in this file to access the source database. Synchronization fails for all subscriptions whose Apply qualifier does not have a corresponding password file. File creation might have failed because of inadequate storage in the directory where the Sync Server is running.

User Response: Ensure that adequate storage is available in the directory where the DB2 Everyplace Sync Server is running. Then stop and restart the Sync Server to attempt to generate the password file. If problems persist, contact IBM Software Support.

DSYD011E The DB2 adapter was unable to create the tables required for synchronizing table <schema name>.<table name> in database <database name>.

Explanation: The DB2 Everyplace Sync Server creates staging tables for each mirror table involved in synchronization. These tables are created when you create a subscription against the database that corresponds to the mirror referenced in the message. Creation of these tables could fail because of inadequate storage or a non-functional database.

User Response: Ensure that the database referenced in the message is functional and that adequate storage is available. Open the Mobile Devices Administration Center and remove and recreate the subscriptions for the referenced database to attempt to create the staging tables again. If you continue to receive this message, contact IBM Software Support.

DSYD012E The DB2 adapter was unable to drop the tables required for synchronizing table <schema name>.<table name> in database <database name>.

Explanation: To manage synchronization, the DB2 Everyplace Sync Server creates multiple tables in association with a given mirror database. When you delete subscription sets associated with the mirror in the named database, the Sync Server drops the tables associated with the deleted subscription set. This drop operation might fail if the database is not functional.

User Response: Ensure that the database named in the message is functional.

DSYD014E The DB2 adapter was unable to access the synchronization mirror table <schema name>.<table name> in database <database name>.

Explanation: An error occurred while attempting to access the mirror table.

User Response: Ensure that you are connected to the mirror database named in the message and that the database has adequate storage capacity. If problems persist, contact IBM Software Support.

DSYD015E The DB2 adapter was unable to access the synchronization tables peripheral to mirror table <schema name>.<table name> in database <database name>.

Explanation: To manage synchronization, the DB2 Everyplace Sync Server creates multiple tables in association with a given mirror table. An error occurred when the Sync Server attempted to access these tables for the mirror table referenced in the message.

User Response: Ensure that the database named in the message is functional. If problems persist, contact IBM Software Support.

DSYD016E The DB2 adapter was unable to initialize the session-monitoring tables in database <database name>.

Explanation: The session-monitoring tables are part of the control database (DSYCTLDB) and are initialized at the start of a synchronization session. Initialization might fail because the control database is not functional or storage is exhausted.

User Response: Ensure that the control database is functional and that storage is adequate. If problems persist, contact IBM Software Support.

DSYD017E The DB2 adapter was unable to add database <database name> to the session monitoring tables.

Explanation: An error occurred while attempting to add a database for synchronization to the session-monitoring tables.

User Response: Ensure that the control database (DSYCTLDB) is functional. If problems persist, contact IBM Software Support.

DSYD018E The DB2 adapter was unable to access the ASN.IBMSNAP_APPLYTRAIL table in database <database name>.

Explanation: An error occurred while attempting to access the DataPropagator apply trail table.

User Response: Ensure that the database named in the message is functional, and that the DB2 Data

Propagator subscription was properly set up. Additionally, see the DB2 UDB Replication Guide and Reference for reasons the Apply Trail table could not be accessed. If problems persist, contact IBM Software Support.

DSYD019E The DB2 adapter was unable to access the ASN.IBMSNAP_UOW table in database *<database name>*.

Explanation: An error occurred while attempting to access the DataPropagator unit-of-work table.

User Response: Ensure that the database named in the message is functional, and that the Data Propagator subscription was properly set up. Additionally, see the DB2 UDB Replication Guide and Reference for reasons the unit-of-work table could not be accessed. If problems persist, contact IBM Software Support.

DSYD020E The DB2 adapter was unable to access the *<database name>* database.

Explanation: An error occurred while attempting to access the administration control database (DSYCTLDB). The DB2 Everyplace Sync Server accesses this database to authenticate each user at the start of a session, obtain information on the data and files to which the user is subscribed, and to monitor the synchronization session.

User Response: Ensure that DSYCTLDB is functional. If problems persist, contact IBM Software Support.

DSYD021E The DB2 adapter was unable to perform successful recovery on database *<database name>*.

Explanation: An error occurred while attempting to recover this database from a previous disruption. The DB2 Everyplace Sync Server continues, at intervals, to try to recover synchronization for the database.

User Response: Ensure that the database named in the message is functional. If problems persist, contact IBM Software Support.

DSYD022E The DB2 adapter was unable to access the change data table *<schema.table name>* in database *<database name>*.

Explanation: An error occurred while attempting to access the Data Propagator change data table.

User Response: Ensure that the database named in the message is functional, and that the subscription was properly set up in the Mobile Devices Administration Center. If problems persist, contact IBM Software Support.

DSYD023E The DB2 adapter is creating a cumulative error *<error>*.

Explanation: After the DB2 Everyplace Sync Server authenticates the client, it attempts to read the synchronization request. If several rows of data in the request are unreadable, the Sync Server returns a single cumulative error indicating that the message appears to be unreadable, rather than returning an individual message for each row of the request that cannot be read. A cumulative error can result if the metadata for the source table differs from that of the target table (for example, if the client added a column that was not in the source table and tried to synchronize).

User Response: Stop the DB2 Everyplace Sync Server and use the UDB Control Center to compare the metadata for the synchronizing tables. Then restart the Sync Server and instruct the client to refresh the target table on the device (which replaces the local copy of the data with the data in the source table).

DSYD024E The DB2 adapter is aborting a session running on database *<database name>*.

Explanation: An error occurred which caused the DB2 adapter to abort all sessions currently running against the database named in the message. The DB2 Everyplace Sync Server might be having trouble communicating with the database because the database is not functional.

User Response: Check whether the specified database is functional. If problems persist, contact IBM Software Support.

DSYD025E The DB2 adapter is encountering excessive numbers of errors across clients on database *<database name>*.

Explanation: Cumulative errors are being reported to several clients issuing synchronization requests for this database. If several rows of data in a client's synchronization request are unreadable, the DB2 Everyplace Sync Server returns a single cumulative error indicating that the message appears to be unreadable, rather than returning an individual message for each row of the request that cannot be read. A cumulative error can result if the metadata for the source table differs from that of the target table (for example, if the client added a column that was not in the source table and tried to synchronize).

User Response: Stop the DB2 Everyplace Sync Server and use the Control Center to compare the metadata for the synchronizing tables. Then restart the Sync Server and instruct the client to refresh the target table on the device (which replaces the local copy of the data with the data in the source table).

DSYD026E The DataPropagator Capture process failed for database *<database name>*.

Explanation: Synchronization of this database is not possible until the Data Propagator Capture error is addressed.

User Response: See the DB2 UDB Replication Guide and Reference for information about why the Capture program failed. If problems persist, contact IBM Software Support.

DSYD027E The DataPropagator Apply process failed for database *<database name>*,
Apply qualifier *<apply qualifier>*.

Explanation: Synchronization of this database is not possible until the DataPropagator Apply error is addressed.

User Response: See the DB2 UDB Replication Guide and Reference for information about why the Apply program failed. If problems persist, contact IBM Software Support.

DSYD028I A synchronization element for database *<database name>*, table *<schema name>*.*<table name>*, primary key *<primary key value>*, from device *<device id>* was rejected due to *<reject code>*.

Explanation: The synchronization element for the relational database row specified was not accepted for synchronization for the reason given.

User Response: No action required.

DSYD029W The DB2 Everyplace Sync Server detected a syntax error in the user WHERE clause of the mirror table *<full table name>* in database *<database name>*.
<Message from parser> *<WHERE clause>*

Explanation: The DB2 Everyplace Sync Server parses the WHERE clause to obtain the information to handle WHERE clauses that involve multiple tables. If the WHERE clause refers to only one table, this warning can be safely ignored.

User Response: Correct the WHERE clause in Mobile Devices Administration Center. If problems persist, contact IBM Software Support.

DSYD032E Look-up table *<table_name>* is not found in mirror database, but is mentioned in the user filter of *<mirror_table_name>* in *<subscription_name>*.

Explanation: The filter makes reference to a table that does not exist in the mirror database.

User Response: Correct the filter in Mobile Device Administration Center to make it refer to only those

tables that are replicated to the mirror database.

DSYF000E MDSS encountered an exception
<exception details>.

Explanation: MDSSServlet encountered an exception.

User Response: Gather trace and log files, and contact IBM Software Support for the specific adapter.

DSYF001E MDSS servlet failed to initialize.

Explanation: The Mobile Devices Synchronization Server servlet failed to initialize.

User Response: Contact IBM Software Support

DSYF002E MDSS adapter servlet initialization failed

Explanation: The MDSS adapter servlet initialization failed.

User Response: Gather trace and log files, and contact IBM Software Support for the specific adapter.

DSYG000E Invalid password specified for user
<user name>.

Explanation: The named user failed authentication due to an invalid password.

User Response: Specify the valid password for the user and try again.

DSYG001E An unexpected exception occurred:
<exception>.

Explanation: DB2 Everyplace Sync Server encountered the specified unexpected exception.

User Response: Report the error to your administrator.

DSYG002E Unable to locate file *<filename>*.

Explanation: The specified file could not be located and therefore could not be read.

User Response: Verify the file path and file name and try again.

DSYG003E Unable to connect to database *<database name>*.

Explanation: A connection to the specified database could not be established.

User Response: Verify that the database name, driver, userid and password is valid and that it is operational. Verify that the placeholder brackets "{" and "}" are not used when specifying the file name.

DSYG004I Connection to database *<database name>* successful.

Explanation: A connection to the specified database was successfully established.

User Response: No action required.

DSYG005E The Evaluation License for this product installation has expired.

Explanation: This product installation has been licensed for evaluation purposes only, and the evaluation period has expired.

User Response: Please contact IBM for information on purchasing this product.

DSYG006I The Evaluation License for this product installation expires in *<remaining days>* days.

Explanation: This product installation has been licensed for evaluation purposes only, and will cease to operate in the number of days reported.

User Response: Please contact IBM for information on purchasing this product to avoid interruption in service.

DSYJ000E The database adaptor detected a non-insertion operation in a Put subscription: *<operation>*.

Explanation: In a upload subscription, only insertion is allowed. Deletion and update are rejected.

User Response: No action is required.

DSYJ001E A database error occurred. *<the error message from database>*

Explanation: A database error occurred. The error message is obtained from the database.

User Response: Refer to the documentation of your database to diagnose the problem. If the problem persists, contact your database administrator.

DSYJ002E Invalid JDBC driver name *<driver name>*.

Explanation: The MDSS is unable to determine which database the specified JDBC driver name is used.

User Response: Verify that the JDBC driver name is correct. If it is correct, add the JDBC driver to the file `com\ibm\mobileservices\DSYJdbcDriverList.properties`.

DSYM000E Unable to start the DB2 Everyplace Mobile Devices Administration Center because the required control database 'DSYCTLDB' does not exist or is invalid.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not be started because the required control database 'DSYCTLDB' does not exist or is invalid.

User Response: Verify the existence of the control database 'DSYCTLDB' and possibly rerun the script to create the control database (such as `dsyctldb.bat`).

DSYM001E Unable to locate ID for subscription set *<subscription set name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified subscription set.

User Response: Correct the error and try again.

DSYM002E Unable to associate group with subscription set *<subscription set name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a group with the specified subscription set. Possible reason: the group is invalid or does not exist.

User Response: Verify that the group is valid and try again.

DSYM003E Unable to disassociate group from subscription set *<subscription set name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not disassociate a group from the specified subscription set. Possible reason: the group is invalid or does not exist.

User Response: Verify that the group is valid and try again.

DSYM004E Unable to associate subscription with subscription set *<subscription set name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription with the specified subscription set. Possible reason: the subscription is invalid or does not exist.

User Response: Verify that the subscription is valid and try again.

DSYM005E Unable to disassociate subscription from subscription set <subscription set name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not disassociate a subscription from the specified subscription set. Possible reason: the subscription is invalid or does not exist.

User Response: Verify that the subscription is valid and try again.

DSYM006E Invalid or duplicate subscription set name <subscription set name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set because the name is invalid or another subscription set with the same name exists.

User Response: Specify a unique, valid subscription set name and try again.

DSYM007E Update subscription set <subscription set name> **name failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set because the name is invalid or it already exists.

User Response: Specify a unique, valid subscription set name and try again.

DSYM008E Update subscription set <subscription set name> **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set description because the description is invalid.

User Response: Specify a valid subscription set description and try again.

DSYM009E Update subscription set <subscription set name> **signature failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set signature because the signature is invalid.

User Response: Specify a valid subscription set signature and try again.

DSYM010E Update subscription set <subscription set name> **subscriptions failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set subscriptions. Possible reason: the subscription is invalid or does not exist.

User Response: Verify that the subscription is valid and try again.

DSYM011E Update subscription set <subscription set name> **groups failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription set groups. Possible reason: the group is invalid or does not exist.

User Response: Verify that the group is valid and try again.

DSYM012E Unable to locate ID for user <user name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified user.

User Response: Correct the error and try again.

DSYM013E Invalid or duplicate user name <user name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user because the name is invalid or another user with the same name exists.

User Response: Specify a unique, valid user name and try again.

DSYM014E Update user <user name> **name failed. Action canceled.**

Explanation: The DB2 Everywhere Mobile Devices Administration Center could not update the specified user because the name is invalid or it already exists.

User Response: Specify a unique, valid user name and try again.

DSYM015E Update user <user name> **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user description because the description is invalid.

User Response: Specify a valid user description and try again.

DSYM016E Unable to associate group with user *<user name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a group with the specified user. Possible reason: the group is invalid or does not exist.

User Response: Verify that the group is valid and try again.

DSYM017E Update user *<user name>* **password failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user password because the password is invalid.

User Response: Specify a valid user password and try again.

DSYM018E Update user *<user name>* **enable state failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user enable state because the enable state is invalid.

User Response: Specify a valid user enable state and try again.

DSYM019E Update user *<user name>* **data filters failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user data filters. Possible reasons: 1) the group level data filter is invalid or does not exist; 2) the user data filter value is invalid.

User Response: Correct the error and try again.

DSYM020E Unable to remove data filter *<data filter name>* **from the user. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not remove the specified data filter from the user. Possible reasons: the data filter is invalid or is no longer defined at the group level.

User Response: Correct the error and try again.

DSYM021E Unable to remove data filter *<data filter name>* **from the group. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not remove the specified data filter from the group. Possible reason: the data filter is invalid or no longer exists.

User Response: Correct the error and try again.

DSYM022E Unable to disassociate subscription set from group *<group name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not disassociate a subscription set from the specified group. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM023E Unable to locate id for group *<group name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified group.

User Response: Correct the error and try again.

DSYM024E Invalid or duplicate group name *<group name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group because the name is invalid or another group with the same name exists.

User Response: Specify a unique, valid group name and try again.

DSYM025E Update group *<group name>* **name failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group because the name is invalid or it already exists.

User Response: Specify a unique, valid group name and try again.

DSYM026E Update group *<group name>* **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group description because the description is invalid.

User Response: Specify a valid group description and try again.

DSYM027E Update group *<group name>* **password failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group password because the password is invalid.

User Response: Specify a valid group password and try again.

DSYM028E Update group <group name> enable state failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group enable state because the enable state is invalid.

User Response: Specify a valid group enable state and try again.

DSYM029E Unable to associate user with group <group name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a user with the specified group. Possible reason: the user is invalid or does not exist.

User Response: Verify that the user is valid and try again.

DSYM030E Unable to associate subscription set with group <group name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription set with the specified group. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM031E Update group <group name> data filters failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group data filters. Possible reason: the group data filter value is invalid.

User Response: Correct the error and try again.

DSYM032E Unable to locate ID for subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified subscription.

User Response: Correct the error and try again.

DSYM033E Unable to associate subscription set with subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription set with the specified subscription. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM034E Unable to disassociate subscription set from subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not disassociate a subscription set from the specified subscription. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM035E Unable to locate ID for file subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified file subscription.

User Response: Correct the error and try again.

DSYM036E Invalid or duplicate file subscription name <file subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription because the name is invalid or another file subscription with the same name exists.

User Response: Specify a unique, valid file subscription name and try again.

DSYM037E Unable to create file subscription <file subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not create the specified file subscription.

User Response: Correct the error and try again.

DSYM038E Update file subscription <file subscription name> name failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription because the name is invalid or it already exists.

User Response: Specify a unique, valid file subscription name and try again.

DSYM039E Update file subscription <file subscription name> dirty bit failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified

file subscription dirty bit because the dirty bit is invalid.

User Response: Correct the error and try again.

DSYM040E Update file subscription *<file subscription name>* **timestamp failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription timestamp because the timestamp is invalid.

User Response: Correct the error and try again.

DSYM041E Update file subscription *<file subscription name>* **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription description because the description is invalid.

User Response: Specify a valid file subscription description and try again.

DSYM042E Update file subscription *<file subscription name>* **source failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription source because the source is invalid.

User Response: Specify a valid file subscription source and try again.

DSYM043E Update file subscription *<file subscription name>* **target failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription target because the target is invalid.

User Response: Specify a valid file subscription target and try again.

DSYM044E Unable to associate subscription set with file subscription *<file subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription set with the specified file subscription. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM045E Invalid source database for table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected an invalid source database for the specified table subscription.

User Response: Verify that the source database is correct and in the {SYSTEM},{INSTANCE},{DATABASE} format.

DSYM046E Invalid or duplicate table subscription name *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription because the name is invalid or another table subscription with the same name exists.

User Response: Specify a unique, valid table subscription name and try again.

DSYM047E Invalid or missing DataPropagator subscription. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the associated DataPropagator subscription.

User Response: Correct the error and try again.

DSYM048E Unable to create source replication properties for table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not create the source replication properties for the specified table subscription.

User Response: Correct the error and try again.

DSYM049E Unable to create mirror replication properties for table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not create the specified table subscription mirror replication properties.

User Response: Correct the error and try again.

DSYM050E Unable to create table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not create the specified table subscription.

User Response: Correct the error and try again.

DSYM051E Unable to locate ID for table subscription <table subscription name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified table subscription.

User Response: Correct the error and try again.

DSYM052E Unable to locate source replication properties id for table subscription <table subscription name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified table subscription source replication properties.

User Response: Correct the error and try again.

DSYM053E Unable to locate mirror replication properties id for table subscription <table subscription name>. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified table subscription mirror replication properties.

User Response: Correct the error and try again.

DSYM054E Update table subscription <table subscription name> **name failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription because the name is invalid or it already exists.

User Response: Specify a unique, valid table subscription name and try again.

DSYM055E Update table subscription <table subscription name> **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription description because the description is invalid.

User Response: Specify a valid table subscription description and try again.

DSYM056E Update table subscription <table subscription name> **source system failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified

table subscription source system because the source system is invalid.

User Response: Specify a valid table subscription source system and try again.

DSYM057E Update table subscription <table subscription name> **source instance failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source instance because the source instance is invalid.

User Response: Specify a valid table subscription source instance and try again.

DSYM058E Update table subscription <table subscription name> **source database failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source database because the source database is invalid.

User Response: Specify a valid table subscription source database and try again.

DSYM059E Update table subscription <table subscription name> **source user ID failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source user ID because the source user ID is invalid.

User Response: Specify a valid table subscription source user ID and try again.

DSYM060E Update table subscription <table subscription name> **source password failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source password because the source password is invalid.

User Response: Specify a valid table subscription source password and try again.

DSYM061E Update table subscription <table subscription name> **mirror database failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror database because the mirror database is invalid.

User Response: Specify a valid table subscription mirror database and try again.

DSYM062E Update table subscription *<table subscription name>* **mirror user ID failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror user ID because the mirror user ID is invalid.

User Response: Specify a valid table subscription mirror user ID and try again.

DSYM063E Update table subscription *<table subscription name>* **mirror password failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror password because the mirror password is invalid.

User Response: Specify a valid table subscription mirror password and try again.

DSYM064E Update table subscription *<table subscription name>* **mirror sync window failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror sync window because the mirror sync window is invalid.

User Response: Specify a valid table subscription mirror sync window and try again.

DSYM065E Update table subscription *<table subscription name>* **mirror sync maximum users failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror sync maximum users because the mirror sync maximum users is invalid.

User Response: Specify a valid table subscription mirror sync maximum users and try again.

DSYM066E Update table subscription *<table subscription name>* **target database failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription target database because the target database is invalid.

User Response: Specify a valid table subscription target database and try again.

DSYM067E Update table subscription *<table subscription name>* **Apply qualifier failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription Apply qualifier because the Apply qualifier is invalid.

User Response: Specify a valid table subscription Apply qualifier and try again.

DSYM068E Update table subscription *<table subscription name>* **mirror only failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror only because the mirror only is invalid.

User Response: Specify a valid table subscription mirror only and try again.

DSYM069E Update table subscription *<table subscription name>* **user WHERE clause failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription user WHERE clause because the user WHERE clause is invalid.

User Response: Specify a valid table subscription user WHERE clause and try again.

DSYM070E Update table subscription *<table subscription name>* **subtables failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription subtables because a subtable is invalid.

User Response: Specify a valid table subscription subtable and try again.

DSYM071E Unable to associate subscription set with table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription set with the specified table subscription. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM072E Unable to create DataPropagator table manager control tables for table subscription <table subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes to the specified subscription as an exception was encountered during processing.

User Response: Correct the error and try again.

DSYM073I Unable to update DataPropagator table manager control tables for table subscription <table subscription name>.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes to the specified subscription as an exception was encountered during processing.

User Response: No action required.

DSYM074E The replication subscription using source table <source table name> and target table <target table name> does not contain a target column with a primary key. Action canceled.

Explanation: The specified replication subscription table is invalid because it does not contain a target column defined as a primary key.

User Response: Use the advanced subscription definition, dialog, target columns tab to select one or more target columns to be a primary key.

DSYM075E The DB2 Everyplace Mobile Devices Administration Center encountered an unexpected exception: <exception>. Close the DB2 Everyplace Mobile Devices Administration Center and try again.

Explanation: The DB2 Everyplace Mobile Devices Administration Center encountered the specified exception.

User Response: Close the DB2 Everyplace Mobile Devices Administration Center and try again. If the error persists, verify that two subscriptions in the same subscription set do not have the same name and are trying to subscribe to the same table. If two subscriptions have the same name, assign them to two different subscription sets.

DSYM076E Unable to create DataPropagator table manager control tables for table subscription <table subscription name> as no tables were found at the mirror. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes

to the specified subscription because no tables were found at the mirror.

User Response: Verify that the specific subscription mirror authentication is correct and has the proper authorizations to access the mirror

DSYM077E User <user name> password and verify password are not the same. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user password because the password and verify password are not the same.

User Response: Specify a valid, matching password and verify password and try again.

DSYM078E Group <group name> password and verify password are not the same. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified group password because the password and verify password are not the same.

User Response: Specify a valid, matching password and verify password and try again.

DSYM079E Table subscription <table subscription name> source database password and verify password are not the same. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source database password because the source database password and source database verify password are not the same.

User Response: Specify a valid, matching source database password and verify password and try again.

DSYM080E Table subscription <table subscription name> mirror database password and verify password are not the same. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror database password because the mirror database password and mirror database verify password are not the same.

User Response: Specify a valid, matching mirror database password and verify password and try again.

DSYM082E Duplicate target table names for table subscription <table subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected duplicate target table names for the specified table subscription. The target table names within a single table subscription must be unique.

User Response: Specify unique target table names and try again.

DSYM083E Duplicate target table names for table subscriptions assigned to subscription set <subscription set name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected duplicate target table names for two or more table subscriptions assigned to the specified subscription set. The target table names of table subscriptions assigned to a subscription set must be unique.

User Response: Ensure that the table subscriptions assigned to the specified subscription set use unique target table names and try again.

DSYM084E Duplicate target table names for table subscriptions assigned to subscription sets of the group <group name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected duplicate target table names for two or more table subscriptions in subscription sets assigned to the specified group. The target table names of table subscriptions assigned to subscription sets of a group must be unique.

User Response: Ensure that the table subscriptions assigned to the specified group use unique target table names and try again.

DSYM085E Assignment of subscription set <subscription set name> to one or more selected groups would result in duplicate table subscription target table names. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected that the assignment of the specified subscription set to the group(s) would result in duplicate target table names. The target table names of table subscriptions used by a group must be unique.

User Response: Ensure that the groups using the table subscriptions assigned in the specified subscription set use unique target table names and try again.

DSYM086E Assignment of the the table subscription <table subscription name> to one or more selected subscription sets would result in duplicate table subscription target table names. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected that the assignment of the specified subscription to the subscription set(s) would result in duplicate target table name names. The target table names of table subscriptions used by a subscription set must be unique.

User Response: Ensure that the subscription sets using the specified table subscription use unique target table names and try again.

DSYM087E Assignment of one or more subscription sets to group <group name> would result in duplicate table subscription target table names. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected that the assignment of subscription set(s) to the specified group would result in duplicate target table names. The target table names of table subscriptions assigned to subscription sets of a group must be unique.

User Response: Ensure table subscriptions assigned to subscription sets for the specified group contain unique target table names and try again.

DSYM088E Unable to delete the instance of a DSY default adapter <adapter name>. Action ignored.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected an attempt to delete the specified DSY default adapter. The specified adapter can not be deleted as it is required by the DB2 Everyplace Mobile Devices Administration Center.

User Response: Do not remove any DSY default adapter.

DSYM089E Invalid or duplicate adapter name <adapter name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter because the name is invalid or another adapter with the same name exists.

User Response: Specify a unique, valid adapter name and try again.

DSYM090E Unable to locate ID for adapter <adapter name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified adapter.

User Response: Correct the error and try again.

DSYM091E Update adapter <adapter name> name failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter because the name is invalid or it already exists.

User Response: Specify a unique, valid adapter name and try again.

DSYM092E Update adapter <adapter name> description failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter description because the description is invalid.

User Response: Specify a valid adapter description and try again.

DSYM093E Update adapter <adapter name> signature failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter signature because the signature is invalid.

User Response: Specify a valid adapter signature and try again.

DSYM094E Update adapter <adapter name> subscriptions failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter subscriptions. Possible reason: the subscription is invalid or does not exist.

User Response: Verify that the subscription is valid and try again.

DSYM095E Update adapter <adapter name> communication attributes failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter communication attributes because one or more communication attributes are invalid.

User Response: Specify valid communication attributes and try again.

DSYM096E Update adapter <adapter name> file attributes failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter file attributes because one or more file attributes are invalid.

User Response: Specify valid file attributes and try again.

DSYM097E Update adapter <adapter name> subscriptions failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter subscriptions. Possible reason: the subscription is invalid or does not exist.

User Response: Verify that the subscription is valid and try again.

DSYM098E Unable to associate adapter with subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate an adapter with the specified subscription. Possible reason: the adapter is invalid or does not exist.

User Response: Verify that the adapter is valid and try again.

DSYM099E Unable to disassociate adapter from subscription <subscription name>. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not disassociate an adapter from the specified subscription. Possible reason: the adapter is invalid or does not exist.

User Response: Verify that the adapter is valid and try again.

DSYM100I DataPropagator table subscription <table subscription name> created successfully. Additional steps may be required before the table subscription can be used for synchronization. Refer to the DB2 Everyplace Sync Server Administration Guide for more information.

Explanation: The DB2 Everyplace Mobile Devices Administration Center successfully created the specified table subscription. However, additional steps may be required before the specified subscription can be used for synchronization.

User Response: Refer to the DB2 Everyplace Sync Server Administration Guide for further information.

DSYM101E Update table subscription <table subscription adapter> adapter failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription because the adapter is invalid.

User Response: Specify a valid table subscription adapter and try again.

DSYM102E Unable to delete adapter <adapter name> as one or more subscriptions are currently using it. Action ignored.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected an attempt to delete the specified adapter. The specified adapter can not be deleted as it is still used by one or more subscriptions.

User Response: Reassign all subscriptions using the specified adapter to use different adapters and try again or refresh the adapter object and try again.

DSYM103E Update file subscription <file subscription adapter> adapter failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified file subscription because the adapter is invalid.

User Response: Specify a valid file subscription adapter and try again.

DSYM104E Unable to connect to database <database name> using driver <driver name>, userid <userid> and password <password>.

Explanation: A connection to the specified database could not be established.

User Response: Verify that the database name, driver, userid and or password is valid and that it is operational.

DSYM105E Update table subscription <table subscription name> source database failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source database because the source database is invalid.

User Response: Specify a valid table subscription source database and try again.

DSYM106E Update table subscription <table subscription name> mirror database failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror database because the mirror database is invalid.

User Response: Specify a valid table subscription mirror database and try again.

DSYM107E Update table subscription <table subscription name> source driver failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source driver because the source driver is invalid.

User Response: Specify a valid table subscription source driver and try again.

DSYM108E Update table subscription <table subscription name> mirror driver failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror driver because the mirror driver is invalid.

User Response: Specify a valid table subscription mirror driver and try again.

DSYM109E Update table subscription <table subscription name> source userid failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source userid because the source userid is invalid.

User Response: Specify a valid table subscription source userid and try again.

DSYM110E Update table subscription <table subscription name> mirror userid failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror userid because the mirror userid is invalid.

User Response: Specify a valid table subscription mirror userid and try again.

DSYM111E Update table subscription <table subscription name> source password failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription source password because the source password is invalid.

User Response: Specify a valid table subscription source password and try again.

DSYM112E Update table subscription *<table subscription name>* **mirror password failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription mirror password because the mirror password is invalid.

User Response: Specify a valid table subscription mirror password and try again.

DSYM113E Update table subscription *<table subscription name>* **subtable columns failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription subtable columns because a column is invalid.

User Response: Specify a valid table subscription subtable column and try again.

DSYM114W Table subscription *<table subscription name>* **subtable column** *<subtable column name>* **no longer defined in the source database. If you continue, your subscription may be modified.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected that the specified column was no longer defined on the specified database.

User Response: Verify that the source table and columns are correct and try again.

DSYM115W More than *<maximum tables>* **available tables were found in the master database** *<master database name>*. **Only the first** *<maximum tables>* **tables will be displayed. Use the Filter button to limit the available tables result set.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected that more than specified maximum available tables at the specified master.

User Response: If the desired table is not listed, use the Filter button to limit the result set.

DSYM116E Invalid or duplicate custom subscription name *<custom subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified custom subscription because the name is invalid or another custom subscription with the same name exists.

User Response: Specify a unique, valid custom

subscription name and try again.

DSYM117E Unable to create custom subscription *<custom subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not create the specified custom subscription.

User Response: Correct the error and try again.

DSYM118E Unable to locate ID for custom subscription *<subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate the specified custom subscription.

User Response: Correct the error and try again.

DSYM119E Update custom subscription *<custom subscription name>* **name failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified custom subscription because the name is invalid or it already exists.

User Response: Specify a unique, valid custom subscription name and try again.

DSYM120E Update custom subscription *<custom subscription name>* **description failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified custom subscription description because the description is invalid.

User Response: Specify a valid custom subscription description and try again.

DSYM121E Update custom subscription *<custom subscription adapter>* **adapter failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified custom subscription because the adapter is invalid.

User Response: Specify a valid custom subscription adapter and try again.

DSYM122E Update custom subscription *<custom subscription name>* **other failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified

custom subscription other because the other is invalid.

User Response: Specify a valid custom subscription other and try again.

DSYM123E Unable to associate subscription set with custom subscription *<custom subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not associate a subscription set with the specified custom subscription. Possible reason: the subscription set is invalid or does not exist.

User Response: Verify that the subscription set is valid and try again.

DSYM124E Unable to load adapter *<adapter name>* **customizer** *<customizer class name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not load the specified adapter customizer. Possible reason: the adapter Communication attributes Command is invalid, the class is not found or is not specified in the CLASSPATH environment variable.

User Response: Verify that the the adapter Communication attributes Command is valid, the command class is found and that it is specified in the CLASSPATH environment variable.

DSYM125E Unable to load adapter *<adapter name>* **customizer** *<customizer class name>*, **exception** *<exception>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not load the specified adapter customizer. Possible reason: the adapter Communication attributes Command is invalid, the class is not found or is not specified in the CLASSPATH environment variable.

User Response: Verify that the the adapter Communication attributes Command is valid, the command class is found and that it is specified in the CLASSPATH environment variable.

DSYM126E Update user *<user name>* **device dirty state failed. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified user device dirty state.

User Response: Correct the error and try again.

DSYM127E No valid custom adapters found. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not allow the custom subscription action because no custom (non-DSY) adapters were found.

User Response: Define at least one custom adapter and try again.

DSYM128E Unable to locate a local database which could be used as a mirror database.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not locate any local database(s) which could be used as a mirror database. At least one local database must be defined for use as a mirror database.

User Response: Ensure at least one local database is defined and try again.

DSYM129E Unable to create table manager control tables for table subscription *<table subscription name>*. **Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes to the specified subscription as an exception was encountered during processing.

User Response: Correct the error and try again.

DSYM130I Unable to update table manager control tables for table subscription *<table subscription name>*.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes to the specified subscription as an exception was encountered during processing.

User Response: No action required.

DSYM131E Unable to create table manager control tables for table subscription *<table subscription name>* **as no tables were found at the mirror. Action canceled.**

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not complete the changes to the specified subscription because no tables were found at the mirror.

User Response: Verify that the specific subscription mirror authentication is correct and has the proper authorizations to access the mirror

DSYM132E The AS/400 source database *<database name>* is not supported for JDBC table subscriptions.

Explanation: The specified database name is not supported by the DB2 Everyplace Sync Server for synchronization using a JDBC table subscription. DB2/400 V5R1 or later is required for Sync Server support for a AS/400 source database.

User Response: Use DB2/400 V5R1 or later for JDBC table subscription support. If using an earlier version of DB2/400, refer to the subscription type DataPropagator table subscription.

DSYM133E Unable to complete custom subscription *<subscription name>* as the custom adapter reported a failure while processing the save request. Action canceled.

Explanation: The custom adapter failed reported that the request to save failed.

User Response: Refer to the documentation for the custom adapter.

DSYM134E Update adapter *<adapter name>* class name failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified adapter class name because the class name is invalid.

User Response: Specify a valid adapter class name and try again.

DSYM135E Duplicate source and mirror database *<database name>* found.

Explanation: The table subscription is attempting to use the specified database as both the source and the mirror. The source and mirror database must be different.

User Response: Specify a different source and mirror database name and try again.

DSYM136E Update subscription *<subscription name>* encryption level failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription because the encryption level is invalid.

User Response: Specify a valid encryption level and try again.

DSYM137E Table *<table name>* does not contain at least one primary key. Action canceled.

Explanation: No primary key was found the specified table. A table must have at least one primary key defined in order to be used as a table subscription.

User Response: Select a table with at least one primary key and try again.

DSYM138E Update table subscription *<table subscription name>* subcolumns failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified table subscription subcolumns because a subcolumn is invalid.

User Response: Specify a valid table subscription subcolumn and try again.

DSYM139E Duplicate target table index names for table subscriptions assigned to subscription set *<subscription set name>*. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center detected duplicate target table index names for two or more table subscriptions assigned to the specified subscription set. The target table index names of table subscriptions assigned to a subscription set must be unique.

User Response: Ensure that the table subscriptions assigned to the specified subscription set use unique target table index names and try again.

DSYM140E Update subscription *<subscription name>* table index name *<table index name>* failed. Action canceled.

Explanation: The DB2 Everyplace Mobile Devices Administration Center could not update the specified subscription table index name as the specified table index name is invalid. Table index names must be unique across a Sync Server instance.

User Response: Specify unique table index name and try again.

DSYP003E Could not access the Lotus Notes database *<database>*.

Explanation: The Notes database *<database>* may be locked by another application.

User Response: Try again later and make sure that your Notes client is closed. If the problem persists, consult the DB2 PIM replication documentation or contact IBM software support.

DSYS000I Complete synchronization request received; synchronization started for user *<user name>*, session *<session number>*.

Explanation: A complete synchronization request has been received from the specified user as the last message has been received. The DB2 Everyplace Sync Server will now begin the synchronization process.

User Response: No action required.

DSYS001I Synchronization ended for user *<user name>*, session *<session number>*.

Explanation: The synchronization process for the specified user has ended.

User Response: No action required.

DSYS002E Synchronization failed for user *<user name>*, session *<session number>*: *<reason>*.

Explanation: The synchronization process for the specified user has failed.

User Response: Contact your administrator.

DSYS003I Replication started for database *<source database name>*.

Explanation: The replication process as begun for the specified database.

User Response: No action required.

DSYS004I Replication ended for database *<source database name>*.

Explanation: The replication process as ended for the specified database.

User Response: No action required.

DSYS005E Replication failed for database *<source database name>*: *<reason>*.

Explanation: The replication process for the specified database failed.

User Response: Contact your administrator.

DSYS006I Receiving synchronization request from user *<user name>*, session *<session number>*.

Explanation: The specified user initiated the synchronization process as the first message has been received by the DB2 Everyplace Sync Server.

User Response: No action required.

DSYT000E Invalid group name *<group name>*.

Explanation: The specified group name is invalid or does not exist.

User Response: Specify a valid group name and try again.

DSYT001W Line: *<line number>* - invalid user name.

Explanation: The ImportUsers tool did not process the specified line as the user name was invalid.

User Response: Correct the error and try again.

DSYT002I Line: *<line number>* - insert user *<user name>* successful.

Explanation: The ImportUsers tool successfully inserted the specified user.

User Response: No action required.

DSYT003W Line: *<line number>* - insert user *<user name>* failed.

Explanation: The ImportUsers tool failed to insert the specified user.

User Response: Correct the error and try again.

DSYT004W Line: *<line number>* - insert user *<user name>* failed, exception *<exception text>*.

Explanation: The ImportUsers tool failed to insert the specified user due to the specified exception.

User Response: Correct the error and try again.

DSYT005E Errors occurred - performing rollback.

Explanation: The ImportUsers tool encountered one or more errors and is performing a rollback.

User Response: Correct the error and try again.

DSYT006I com.ibm.mobileservices.admin.tools.ImportUsers *<filename>*

Explanation: The ImportUsers tool has been invoked against the specified filename.

User Response: No action required.

DSYT007I **com.ibm.mobileservices.admin.tools.ImportUsers**
{-commit}{-exception}{-fail}{-group
[name]} filename\n where\n {-commit}:
commit each successful insert and do
not rollback if an error occurs\n
{-exception}: display exceptions\n {-fail}:
display failed only\n {-group [name]}:
group {name} to assign users to\n
filename: the comma-delimited file
containing the user(s) to import. File
format is: user name,{user
password},{user description}

Explanation: Displays parameters for invoking the ImportUsers tool.

User Response: No action required.

DSYT008I **Users inserted: <insert count>; failed:**
<failed count>.

Explanation: The ImportUsers tool is complete and reported the specified successful user insert count and failed count.

User Response: No action required.

DSYT009I **DSYCTLDBMigration process started.**

Explanation: The DSYCTLDBMigration tool process to migrate older versions of the DB2 Everyplace Sync Server control database DSYCTLDB to the latest version has started.

User Response: No action required.

DSYT010I **DSYCTLDBMigration is migrating to**
version <version.release.modification>.

Explanation: The DSYCTLDBMigration tool is migrating the DB2 Everyplace Sync Server control database DSYCTLDB to the specified version.

User Response: No action required.

DSYT011I **DSYCTLDBMigration process complete.**

Explanation: The DSYCTLDBMigration tool process to migrating older versions of the DB2 Everyplace Sync Server control database DSYCTLDB to the latest version is complete.

User Response: No action required.

Appendix B. Using the DB2 Everyplace library

The DB2 Everyplace library consists of online help in HTML and books in PDF and HTML format. This section describes the information that is provided, and how you can access it.

All product information is also available online at
www.ibm.com/software/data/db2/everyplace/library.html

DB2 Everyplace PDF and HTML files

DB2 Everyplace information

The installation manuals, release notes, and tutorials are viewable in HTML directly from the product CD-ROM. Most books are available in HTML and Adobe Acrobat (PDF) format on the product CD-ROM for viewing and printing. The following table lists the available books. DB2 Everyplace information is translated into different languages; however, all the information is not translated into every language. Whenever information is not available in a specific language, the English information is provided.

Table 8. Books available for DB2 Everyplace

Book Title	Description	Form Number	HTML Directory
		PDF File Name	
DB2 Everyplace Installation and User's Guide	<ul style="list-style-type: none">• Installing DB2 Everyplace components to a workstation.• Installing the DB2 Everyplace database and sample applications to a mobile or embedded device.• Using the DB2 Everyplace sample applications.	SC27-0764-03	dsyiug
		dsyiug.pdf	
DB2 Everyplace Application Development Guide	<ul style="list-style-type: none">• Building DB2 Everyplace applications on the available platforms.• Understanding the DB2 Everyplace sample applications and source code.• Supported SQL statements, SQLStates, DB2 CLI/ODBC, JDBC Methods, and National Language Support.	SC27-0765-03	dsyadg
		dsyadg.pdf	

Table 8. Books available for DB2 Everyplace (continued)

Book Title	Description	Form Number	HTML Directory
		PDF File Name	
DB2 Everyplace Sync Server Administration Guide	<ul style="list-style-type: none">• Configuring and maintaining Sync Server.• Connecting Sync Server to data sources.• Configuring communications between the Sync Server and mobile and embedded devices.• Managing users and data.	SC27-0845-04 dsysag.pdf	dsysag

DB2 Everyplace online documentation

Accessing online help

Online help is available with the DB2 Everyplace Sync Server Mobile Devices Administration Center and the DB2 Everyplace Mobile Application Builder.

Notices

IBM may not offer the products, services, or features discussed in this document in all countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Canada Limited
Office of the Lab Director
1150 Eglinton Ave. East
North York, Ontario
M3C 1H7
CANADA

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information may contain examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information may contain sample application programs in source language, which illustrates programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

This product includes software developed by 3Com and its contributors.:

Copyright (c) 1998 3Com/Palm Computing Division. All rights reserved. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by 3Com and its contributors.
4. Neither 3Com nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE 3COM AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL 3COM OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Trademarks

The following terms, which may be denoted by an asterisk(*), are trademarks of International Business Machines Corporation in the United States, other countries, or both.

ACF/VTAM	IBM
AISPO	IMS
AIX	IMS/ESA
AIX/6000	LAN DistanceMVS
AIXwindows	MVS/ESA
AnyNet	MVS/XA
APPN	Net.Data
AS/400	OS/2
BookManager	OS/390
CICS	OS/400
C Set++	PowerPC
C/370	QBIC
DATABASE 2	QMF
DataHub	RACF
DataJoiner	RISC System/6000
DataPropagator	RS/6000
DataRefresher	S/370
DB2	SP
DB2 Connect	SQL/DS
DB2 Extenders	SQL/400
DB2 OLAP Server	System/370
DB2 Universal Database	System/390
Distributed Relational Database Architecture	SystemView
DRDA	VisualAge
eNetwork	VM/ESA
Extended Services	VSE/ESA
FFST	VTAM
First Failure Support Technology	WebExplorer
	WIN-OS/2

The following terms are trademarks or registered trademarks of other companies:

Microsoft, Windows, Windows NT, and Windows 2000 are trademarks or registered trademarks of Microsoft Corporation.

Java or all Java-based trademarks and logos, and Solaris are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Tivoli and NetView are trademarks of Tivoli Systems Inc. in the United States, other countries, or both.

UNIX is a registered trademark in the United States, other countries or both and is licensed exclusively through X/Open Company Limited.

Other company, product, or service names, which may be denoted by a double asterisk(**) may be trademarks or service marks of others.

Glossary

A

application. A Mobile Devices Administration Center object containing replication subscriptions. To provide group members with access to the data and files defined in replication subscriptions, you create an application and assign subscriptions to it, then assign the application to a group.

Apply qualifier. A character string that identifies subscription definitions that are unique to each instance of the DataPropagator Apply program.

authentication. The process of validating a user's ID and password against entries in the administration control database to ensure that the user is authorized to use the Sync Server to synchronize data.

authorization. In computer security, the right granted to a user to communicate with or make use of a computer system.

B

binary large object (BLOB). A sequence of bytes, where the size of the sequence ranges from 0 to 2 gigabytes. This string does not have an associated code page and character set. Image, audio, and video objects are stored in BLOBs.

bind. In SQL, the process by which the output from the SQL precompiler is converted to a usable structure called an access plan. During this process, access paths to the data are selected and some authorization checking is performed.

BLOB. See *binary large object*.

C

client. A program or user that communicates with and accesses a database server. You define clients using the Mobile Devices Administration Center.

conflict detection. The process of detecting an out-of-date row in a target table that was updated by a user application. When a conflict is detected, the transaction that caused the conflict is rejected.

Control Center. A graphical interface that shows database objects (such as databases and tables) and their relationship to each other. From the Control Center you can perform the tasks provided by the DBA Utility, Visual Explain, and Performance Monitor tools.

D

data filter. See *filter*.

data synchronization. See *mobile data synchronization*.

database management system (DBMS). A computer program that manages data by providing the services of centralized control, data independence, and complex physical structures for efficient access, integrity, recovery, concurrency control, privacy, and security.

database server. A functional unit that provides database services for databases.

DB2 Control Center. See *Control Center*.

DB2 DataPropagator (DPROP). A replication product that provides an automated method of replicating data from sources to targets. During mobile data synchronization, the mirror and remote databases serve as both source and target. DataPropagator replicates clients' changes from the mirror to the remote database, and also replicates changes from the remote database to the mirror database.

DBCS. See *double-byte character set*.

DHCP. See *Dynamic Host Configuration Protocol*.

DPROP. See *DB2 DataPropagator*.

double-byte character set (DBCS). A set of characters in which each character is represented by two bytes.

Dynamic Host Configuration Protocol (DHCP). An Internet protocol for automating the configuration of computers that use TCP/IP.

E

enterprise database. See *source database*.

enterprise server. See *source server*.

F

filter. A device or program that separates data, signals, or material in accordance with specified criteria.

G

group. A collection of clients that have similar mobile data synchronization needs. You define synchronization characteristics for each group, such as which

applications the users in the group need to access to perform their jobs and what subsets of enterprise data they need to access.

H

handheld device. Any computing device that can be held in the hand. Handheld devices include palm-sized PCs and personal digital assistants (PDAs).

I

IBM Sync. The name for the icon representing the client component of the DB2 Everyplace Sync Server software.

J

JDBC subscription. A JDBC subscription uses the JDBC adapter to synchronize data between DB2 Everyplace and supported JDBC data sources.

join. A relational operation that allows for retrieval of data from two or more tables based on matching column values.

K

key. A column or an ordered collection of columns that are identified in the description of a table, index, or referential constraint.

L

large object (LOB). A sequence of bytes, where the length can be up to 2 gigabytes. It can be any of three types: BLOB (binary), CLOB (single-byte character or mixed) or DBCLOB (double-byte character).

LOB. See *large object*.

local database. A database that is physically located on the computer in use. Contrast with *remote database*.

log. A Mobile Devices Administration Center object containing synchronization error messages and their descriptions.

M

master database. See *source database*.

MDAC. See *Mobile Devices Administration Center*.

mid-tier system. The machine where the DB2 Everyplace Sync Server is installed. In a two-tier synchronization configuration, the mid-tier and source systems refer to the same machine.

mobile. Pertaining to computing that is performed on a portable computer or a handheld device by a user who is frequently moving among various locations and using different types of network connections (for example, dial-up, LAN, or wireless).

mobile data synchronization. A two-step process whereby mobile users, or *clients*, submit changes they have made to local copies of source data and receive any changes that have been made to source data (in a remote database) since the last time they synchronized.

Mobile Devices Administration Center (MDAC). A graphical interface that allows you to create, edit, and view synchronization objects and their relationships to each other. The Mobile Devices Administration Center also allows you to view synchronization status of individual clients and error messages.

O

object.

1. Anything that can be created or manipulated with SQL—for example, tables, view, indexes, or packages.
2. In object-oriented design or programming, an abstraction consisting of data and operations associated with that data.

ODBC. See *Open Database Connectivity*.

Open Database Connectivity (ODBC). An API that allows access to database management systems using callable SQL, which does not require the use of an SQL preprocessor. The ODBC architecture allows users to add modules, called database drivers, that link the application to their choice of database management systems at run time. Applications do not need to be linked directly to the modules of all the supported database management systems.

P

PDA. See *personal digital assistant*.

persistent. Pertaining to data that is maintained across session boundaries, usually in nonvolatile storage such as a database system or a directory.

personal digital assistant (PDA). A handheld device that is used for personal organization tasks (such as managing a calendar and note-taking) and includes telephone, fax, and networking features.

pervasive computing (PVC). The use of a computing infrastructure that includes specialized appliances, known as information appliances, from which users can access a broad range of network-based services (including services that are typically offered through the Internet). These information appliances include televisions, automobiles, telephones, refrigerators, and

microwave ovens. Pervasive computing provides convenient access to relevant information and the ability to take action on that information.

upload subscription. An upload subscription only inserts data to the JDBC source. Upload subscriptions bypass the mirror databases and insert the data directly. No data is synchronized to the device. The rows are left on the client for the application to optionally remove.

primary key. A unique key that is part of the definition of a table. A primary key is the default parent key of a referential constraint definition. With the DB2 Everyplace Sync Server Version 7, each replication source must have one and only one primary key.

privilege. The right to access a specific database object in a specific way. These rights are controlled by users with SYSADM (system administrator) authority or DBADM (database administrator) authority or by creators of objects. Privileges include rights such as creating, deleting, and selecting data from tables.

PVC. See *pervasive computing*.

Q

QBE. See *Query-by-Example*.

query. A request for information from the database based on specific conditions; for example, a request for a list of all customers in a customer table whose balance is greater than \$1000.

Query-by-Example. An application that allows a user to dynamically view and modify the data stored in a DB2 Everyplace table.

R

RAS. See *Remote Access Service*.

refresh. A process in which all of the data of interest in a user table is copied to the target table, replacing existing data.

remote database. A database that is physically located on a computer other than the one in use. Contrast with local database. The remote computing device may be stationary and nonportable, or it may be portable.

Remote Access Service (RAS). A Windows program that manages connections between two systems.

replication. The process of taking changes that are stored in the database log or journal at a source server and applying them to a target server.

replication source. A database table that is defined as a source for replication. After you define a database table as a replication source, the table can accept copy requests.

S

SQL. See *Structured Query Language*.

source database. A database residing on a source server containing data to be copied to a target system.

source server. The database location of the replication source.

source table. A table that contains the data that is to be copied to a target table. The source table must be a replication source table. Contrast with *target table*.

subscription. A specification for how the information in a source database is to be replicated to a target database. A subscription allows you to define which subsets of data and files can be copied from the source database. You can create two types of subscriptions: file subscriptions for files stored at the source server and table subscriptions for tables in the source database.

synchronization. See *mobile data synchronization*.

synchronization object. A manageable item within the Mobile Devices Administration Center that contains information about aspects of the synchronization process in your organization. There are five types of synchronization objects: group, client, application, subscription, and log.

synchronization session. A transaction in which mobile users, or *clients*, submit changes that they made to local copies of source data and receive any changes that were made to source data (residing on the remote server) since the last time they synchronized.

Structured Query Language (SQL). A programming language that is used to define and manipulate data in a relational database.

T

target database. A DB2 Everyplace database residing on a mobile device to which data from a source database is copied.

target table. A table to which data from a source table is copied. Mirror tables on the mid-tier server are targets, as are DB2 Everyplace tables on the mobile device.

tap. To use a stylus to interact with a handheld device.

temporary table. A table created during the processing of an SQL statement to hold intermediate results.

V

view. A logical table that consists of data that is generated by a query.

W

wireless LAN. In wireless uses, a mobile user can connect to a local area network (LAN) through a radio connection. Wireless technologies for LAN connection include speed spectrum, microwave, and infrared light.

Index

Special Characters

\$USERNAME 42

A

access privileges, defining in
 subscription 84
access to data and files, providing 69
adapter, identifying the Custom 94
Add Data Filter window 71
administration
 Capture and Apply programs
 (DataPropagator) 38
 defining replication sources 37
 device registration 73
 enabling objects for
 synchronization 98
 Mobile Devices Administration
 Center. 59
 subscription sets 96
 subscriptions 75
 synchronization objects. *See*
 synchronization object 61
 task road maps 8, 67
 troubleshooting 101
 user groups 59, 68
 users 72
administration control database. *See*
 control database 62
application
 writing 8
application development tools 4
applications for DB2 Everyplace,
 writing 7
Apply program
 role in synchronization 10
Apply qualifier 83
AS/400 system
 Capture program, starting 39
ASNCCP command 38, 39
authentication
 control database verification 62
 user passwords 73
Authentication page
 DataPropagator subscription
 notebook 86
 User notebook 73
authorization, user. *See*
 authentication. 62
autostop parameter, Capture
 program 39

B

batching synchronization requests 80, 85
bindcap command 37, 38, 40

C

cable connection, RAS setup 29
canceling synchronization 11
Capture program
 autostop parameter 39
 bindings 37, 40
 chgonly parameter 39, 40
 cold-starting (*cold* parameter) 39
 cold-starting (cold parameter) 40
 errors on starting 38, 39
 role in synchronization 9, 10
 starting 38
 warm-starting (warm parameter) 38,
 39
case sensitivity 69, 82
change data table (DataPropagator) 84
characteristics of groups 68
chgonly parameter, Capture program 39,
 40
client
 database conflicts 11
 how synchronization happens 8
client synchronization software 9
codes for error messages 101, 109
cold-starting Capture program 39
cold-starting the Capture program 40
commands
 ASNCCP 38, 39
 bindcap 37, 38, 40
 STRDPRCAP 39
configuration
 Mobile Devices Administration Center
 workflow 67
conflict management 11
contents pane
 deleting objects 65
 editing objects 65
 filtering 64
 interpreting information 63
 refreshing 64
 sorting 64
Control Center
 replication sources, defining 37
 starting Mobile Devices
 Administration Center 59
control database
 description 62
 device registration and 73
 importing user definitions 74
creating synchronization objects
 DataPropagator subscription 81
 file subscription 90
 general process 62
 group 68
 subscription set 96
 user 72
custom adapter, creating 93
Custom subscription, assigning a
 subscription set to 93
custom subscription, creating 92
customizer, Launching the 93

customizer class name, specifying 94

D

data
 conflict management 11
 data filter. *See* filtering data. 70
Data filter page
 Group notebook 71
 User notebook 73
data synchronization. *See*
 synchronization. 59
data synchronization group. *See*
 group 61
database
 access privileges for subscription 84
 administration control information.
 See control database 74
 conflict management 11
 mirror. *See* mirror database. 83
database engine for mobile devices 7
DataPropagator
 Apply program 10
 Apply qualifier 83
 Capture, starting 38
 Capture bindings 37, 40
 Capture program 9
 replication source definition 83
 role in synchronization 8
DataPropagator (DPROP)
 Capture program 10
DataPropagator subscription 81
 adding replication sources 83
 assigning to subscription set 86
 data filters 84
 database authentication 86
 naming 82
 synchronization batch parameters 85
DataPropagator subscription, assigning a
 subscription set to 80
DataPropagator subscription
 notebook 81
DB2 Control Center. *See* Control
 Center 59
DB2 Everyplace database engine 7
DB2 Everyplace Mobile Application
 Builder 8
Define Replication Subscription
 window 83
definitions (user), importing 74
DELETE privilege, allowing in
 subscription 84
deleting a synchronization object 65
description, providing for object
 DataPropagator subscription 82
 file subscription 91
 group 69
 subscription set 97
 user 72
Description field
 error messages 102

device. *See* mobile device 73
diagnosis of problems. *See*
troubleshooting 101
disabling synchronization 99
DPROP. *See* DataPropagator. 83
DPRVSN parameter, Capture
program 39
DSYCTLDB database
description 62
DSYID variable (user exits) 104
DSYMSG variable (user exits) 104
DSYUserExits.properties file 103

E

editing a synchronization object 65
enabling synchronization 74, 98
encryption of user ID and passwords 62
error log. *See* log 101
error message
log. *See* log 62
error messages
ASNCCP command 38, 39
codes and explanations 109
rejected records 101
user exit interface for 103
viewing 101, 105

F

file
changing after creating
subscription 92
replicating. *See* file subscription. 90
file subscription
assigning to subscription sets 92
creating 90
file changes 92
naming 90
File Subscription notebook 90
filtering 44
filtering data
contents pane 64
DB2 UDB variables, using 44
for individual users 44
group 41, 70
horizontal 41
subscription 41, 84
user 41, 73
vertical 47

G

graphical user interface (GUI). *See*
interface. 59
group
assigning subscription sets 69, 97
assigning users 71, 72
creating 68
definition 68
disabling synchronization 99
enabling synchronization 98
evaluating user needs 68
filtering source data for 70
naming 69
Group notebook 68

Groups page
Subscription set notebook 97
User notebook 72
GUI (graphical user interface). *See*
interface. 59

H

hardware requirements 3

I

IBM Sync
client component of Sync Server 9
configuring 18
ID parameter in user exits 104
Identification page
DataPropagator subscription
notebook 82
File Subscription notebook 90
Group notebook 69
Subscription set notebook 96
User notebook 72
importing user definitions 74
impromptu device registration 73
inheritance of values (group to user) 73
input queue for synchronization
requests 9, 10
INSERT privilege, allowing in
subscription 84
interface to Sync Server 59

J

JDBC databases
configuring for 34
Configuring for 35
supported 33
using 33
JDBC driver
for Microsoft SQL Server 35
third-party 35
JDBC driver list
updating 34
JDBC driver list file
Updating 35
JDBC driver path
adding 34
Adding 35
JDBC subscription
synchronization batch parameters 80
JDBC subscription, creating 75

L

log, interpreting 101
log and trace file, managing 102
logon verification. *See* authentication. 62
Logs folder 101

M

MDAC. *See* Mobile Devices
Administration Center 59
message, error. *See* error message. 101

mirror database
binding Capture program 40
referencing in subscription 83
role in synchronization 9, 10
staging tables 9
mobile computing solution
component products 7
mobile device
changing user's 74
device unique ID 73
how synchronization happens 8
registering with Sync Server 73
Mobile Devices Administration Center
(MDAC)
interface 59
manipulating synchronization
objects 61
synchronization objects in 61
working with 59
MSG parameter in user exits 104

N

name, providing for object
DataPropagator subscription 82
file subscription 91
group 69
subscription set 96
user 72
names
reserved 62
notebook, Create Custom Adapter 93
notebook, Create Custom
Subscription 92
notebook, Create JDBC subscription 75
notebooks
create mode 62
edit mode 65
group 68

O

object. *See* synchronization object 61
object tree 62
order of synchronization 101
OS/390 system
Capture program, starting 40

P

parameters
ASNCCP command 38, 39, 40
data filtering 71
default value 42
importing user definitions 74
synchronization batches 80, 86
parameters. *See* program parameters. 39
password
device registration and 73
subscription 86
password, setting
user 73
pausing a synchronization session 11
performance
batching synchronization
requests 80, 85

- performance (*continued*)
 - replicating on demand 80, 85, 95
- primary key
 - definition requirements for synchronization 37
- problems with synchronization. *See* troubleshooting. 101
- program parameters
 - DPRVSN(Capture) 39
- purging log entries automatically
 - log and trace file, managing 102

Q

- queues for synchronization requests 9, 10

R

- refresh function (contents pane) 64
- registration of device 73, 74
- renaming a subscription 82
- replicating on demand 80, 85, 95
- replication
 - files. *See* file subscription. 90
- replication source
 - adding to subscription 83
 - defining 37
- replication subscription. *See* DataPropagator subscription *or* file subscription. 75
- reply to synchronization 10
- request for synchronization 8, 95
 - batching 80, 85
- reserved names 62
- reset function for file changes 92
- resetting user IDs
 - using a command line 105
 - using MDAC 105
- resetting user IDs for mobile devices 105
- resolution of conflicts 11
- resuming a synchronization session 11
- rows in source table
 - filtering in subscription 79, 84

S

- scenario 5
- serial connection, RAS setup 29
- setup for synchronization
 - Mobile Devices Administration Center workflow 67
- signature, specifying 94
- sorting objects (contents pane) 64
- source
 - how synchronization happens 10
- source database 82, 83
 - binding Capture program 37
 - file replication. *See* file subscription. 90
 - how synchronization happens 8
 - password for subscriptions against 86
 - staging of updates to 9
 - starting Capture 38

- source database (*continued*)
 - table replication. *See* DataPropagator subscription 90
 - user ID for subscriptions against 86
- source file, specifying 91
- source system
 - Capture program, starting 38
- SQL access privileges
 - defining in subscription 84
 - subscription user ID and 86
- SQL privileges
 - influence on 101
- staging tables 9
- starting the Mobile Devices Administration Center 59
- STRDPRCAP command 39
- subscription
 - adding replication sources 83
 - Apply qualifier 83
 - assigning to a subscription set 97
 - bundling in subscription set 96
 - definition 75
 - file. *See* file subscription. 90
 - filtering data 84
 - password to access source 86
 - role in synchronization 9
 - timing 80, 85, 95
 - user ID to access source 86
- subscription, filtering data in 78
- subscription, identifying the JDBC 75, 93, 94, 95
- subscription, specify the encryption level 76, 82, 91
- subscription, specify the mirror database driver and URL 77
- subscription, specify the source database driver and URL 76
- subscription, specifying privileges 77
- subscription, specifying source tables 77
- subscription, specifying target tables 77
- subscription set
 - assigning subscriptions to 92, 97
 - assigning to group 69
- Subscription set notebook 96
- subscription set object
 - assigning subscriptions to 86
 - assigning to group 97
 - definition 96
 - naming 96
- Subscription sets page
 - DataPropagator subscription notebook 86
 - File Subscription notebook 92
 - Group notebook 69
- Subscriptions page (Subscription set notebook) 97
- Sync Client
 - synchronization log 105
- Sync Server
 - changing devices 74
 - device registration 73
 - overview 7
- synchronization
 - Apply qualifier 83
 - authentication. *See* authentication. 62
 - background processes 38
 - batching requests 80, 85

- synchronization (*continued*)
 - canceling 11
 - customizing for groups 59
 - database conflicts 11
 - disabling groups and users 99
 - enabling groups and users 98
 - explanation of 8
 - order 101
 - subscription set list 96
 - timestamp 11
- synchronization client software 9
- synchronization object
 - creating 62
 - DataPropagator subscription 81
 - deleting 65
 - displaying information about 63
 - editing 65
 - file subscription 90
 - group 68
 - subscription set 96
 - types 61
 - user 72
 - where stored 62
- synchronization queue
 - batching requests 80, 85
- synchronization reply 10
- synchronization request 8
- synchronization session 8
 - batching multiple 80, 85
 - canceling 11
 - replicating on demand 80, 85, 95
- syntax
 - horizontal filtering 44

T

- table
 - conflict management 11
 - defining as replication source 37
 - maximum number for subscription 81
 - name on mobile device, specifying 84
 - version tracking 11
- target database 82, 83
- Target file name field 91
- Target filename field 91
- target table
 - multiple for same source table 84
- timestamp for error messages 101
- timing synchronization requests 80, 85, 95
- toolbar
 - starting Mobile Devices Administration Center 59
- trace files. *See* log and trace file, managing 102
- tracing level, defining
 - log and trace file, managing 102
- troubleshooting
 - error messages and codes 109
- troubleshooting problems
 - error log, viewing 101
 - log on client, viewing 105

U

- update conflicts, how handled 11
- UPDATE privilege, allowing in
 - subscription 84
- updates to source data
 - staging of 9
- upload subscription, assigning a
 - subscription set to 89
- upload subscription, creating 88
- upload subscription, identifying 88
- upload subscription, specify the
 - encryption level 88
- upload subscription, specify the source
 - database driver and URL 88
- upload subscription, specifying
 - privileges 89
- upload subscription, specifying source
 - tables 89
- upload subscription, specifying target
 - tables 89
- user
 - assigning to group 71, 72
 - changing devices 74
 - creating 72
 - data and file access, providing 69
 - definition 72
 - device registration 73
 - disabling synchronization 99
 - enabling synchronization 98
 - evaluating group needs 68
 - filtering data to 73
 - importing 74
 - naming 72
 - password, setting 73
- user. *See* user. 68
- user-exit interface for error handling 103
- user ID
 - device registration and 73
- User notebook 72
- Users page, Group notebook 71

V

- version parameter, Capture program 39
- version tracking for database records 11
- vertical partitioning. *See* filtering data,
 - vertical 47
- view of objects
 - filtering 64
 - interpreting contents pane 63
 - refreshing 64
 - sorting 64

W

- warm parameter, ASNCCP
 - command 38, 39
- WHERE clause. *See* filtering data. 84
- workflow for synchronization setup 67

Contacting IBM

For information or to order any of the DB2 Everyplace products contact an IBM representative at a local branch office or contact any authorized IBM software remarketer.

If you live in the U.S.A., then you can call one of the following numbers:

- 1-800-237-5511 for customer support
- 1-888-426-4343 to learn about available service options

Product Information

If you live in the U.S.A., then you can call one of the following numbers:

- 1-800-IBM-CALL (1-800-426-2255) or 1-800-3IBM-OS2 (1-800-342-6672) to order products or get general information.
- 1-800-879-2755 to order publications.

<http://www.ibm.com/software/data/db2/everyplace/>

The DB2 Everyplace World Wide Web pages provide current DB2 Everyplace information about news, product descriptions, education schedules, and more.

<http://www.ibm.com/software/data/db2/everyplace/library.html>

The DB2 Everyplace Technical Library provides access to frequently asked questions, fixes, books, and up-to-date DB2 Everyplace technical information.

Note: This information may be in English only.

<http://www.ibm.com/software/data/>

The DB2 World Wide Web pages provide current DB2 information about news, product descriptions, education schedules, and more.

<http://www.ibm.com/software/data/db2/library/>

The DB2 Product and Service Technical Library provides access to frequently asked questions, fixes, books, and up-to-date DB2 technical information.

Note: This information may be in English only.

<http://www.elink.ibm.com/pbl/pbl/>

The International Publications ordering Web site provides information on how to order books.

<http://www.ibm.com/education/certify/>

The Professional Certification Program from the IBM Web site provides certification test information for a variety of IBM products, including DB2.

<ftp://software.ibm.com>

Log on as anonymous. In the directory /ps/products/db2, you can find demos, fixes, information, and tools relating to DB2 and many other products.

<comp.databases.ibm-db2>, <bit.listserv.db2-l>

These Internet newsgroups are available for users to discuss their experiences with DB2 products.

On Compuserve: GO IBMDB2

Enter this command to access the IBM DB2 Family forums. All DB2 products are supported through these forums.

For information on how to contact IBM outside of the United States, refer to Appendix A of the *IBM Software Support Handbook*. To access this document, go to the following Web page: <http://www.ibm.com/support/>, and then select the IBM Software Support Handbook link near the bottom of the page.

Note: In some countries, IBM-authorized dealers should contact their dealer support structure instead of the IBM Support Center.

Readers' Comments — We'd Like to Hear from You

IBM® DB2® Everyplace
Sync Server Administration Guide
Version 7 Release 2 Modification 1

Publication No. SC27-0845-04

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>				

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>				
Complete	<input type="checkbox"/>				
Easy to find	<input type="checkbox"/>				
Easy to understand	<input type="checkbox"/>				
Well organized	<input type="checkbox"/>				
Applicable to your tasks	<input type="checkbox"/>				

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? Yes No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

Address

Company or Organization

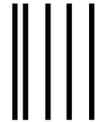
Phone No.



Fold and Tape

Please do not staple

Fold and Tape



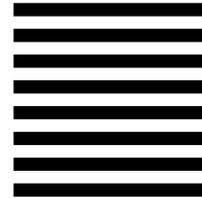
NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Department HHX/H3
555 Bailey Avenue
P.O. Box 49023
San Jose, CA
95161-9023



Fold and Tape

Please do not staple

Fold and Tape



Program Number: 5724-A91



Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

SC27-0845-04

