SYBASE®

Overview Guide

Mainframe Connect™

15.0

Contents

About This Book

Audience

This book is intended for those using components in Mainframe Connect™.

How to use this book

See	For
Chapter 1, "Introducing Mainframe Connect"	An overview of Mainframe Connect, including descriptions of the options and related products.
Chapter 2, "How the Mainframe Connect Options Work Together"	A description of integrated functionality between Mainframe Connect components. An explanation of the advantages and disadvantages of using a DirectConnect™ for z/OS Option gateway.
Chapter 3, "Sample Solutions"	Sample solutions using Mainframe Connect Options and related products

Related documents

See your product documentation for detailed descriptions of how to install and use the Mainframe Connect components.

Other sources of information

Use the Sybase® Getting Started CD, the SyBooks™ CD, and the Sybase Product Manuals Web site to learn more about your product:

- The Getting Started CD contains release bulletins and installation guides in PDF format, and may also contain other documents or updated information not included on the SyBooks CD. It is included with your software. To read or print documents on the Getting Started CD, you need Adobe Acrobat Reader, which you can download at no charge from the Adobe Web site using a link provided on the CD.

- The SyBooks CD contains product manuals and is included with your software. The Eclipse-based SyBooks browser allows you to access the manuals in an easy-to-use, HTML-based format.

  Some documentation may be provided in PDF format, which you can access through the PDF directory on the SyBooks CD. To read or print the PDF files, you need Adobe Acrobat Reader.

  Refer to the *SyBooks Installation Guide* on the Getting Started CD, or the *README.txt* file on the SyBooks CD for instructions on installing and starting SyBooks.

•   The Sybase Product Manuals Web site is an online version of the SyBooks CD that you can access using a standard Web browser. In addition to product manuals, you will find links to EBFs/Maintenance, Technical Documents, Case Management, Solved Cases, newsgroups, and the Sybase Developer Network.

To access the Sybase Product Manuals Web site, go to Product Manuals at http://www.sybase.com/support/manuals/.

Sybase certifications on the Web

Technical documentation at the Sybase Web site is updated frequently.

❖ **Finding the latest information on product certifications**

1   Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.

2   Click Certification Report.

3   In the Certification Report filter select a product, platform, and timeframe and then click Go.

4   Click a Certification Report title to display the report.

❖ **Finding the latest information on component certifications**

1   Point your Web browser to Availability and Certification Reports at http://certification.sybase.com/.

2   Either select the product family and product under Search by Base Product; or select the platform and product under Search by Platform.

3   Select Search to display the availability and certification report for the selection.

❖ **Creating a personalized view of the Sybase Web site (including support pages)**

Set up a MySybase profile. MySybase is a free service that allows you to create a personalized view of Sybase Web pages.

1   Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.

2   Click MySybase and create a MySybase profile.

**Sybase EBFs and
software
maintenance**

❖ **Finding the latest information on EBFs and software maintenance**

1 Point your Web browser to the Sybase Support Page at
http://www.sybase.com/support.

2 Select EBFs/Maintenance. If prompted, enter your MySybase user name
and password.

3 Select a product.

4 Specify a time frame and click Go. A list of EBF/Maintenance releases is
displayed.

Padlock icons indicate that you do not have download authorization for
certain EBF/Maintenance releases because you are not registered as a
Technical Support Contact. If you have not registered, but have valid
information provided by your Sybase representative or through your
support contract, click Edit Roles to add the "Technical Support Contact"
role to your MySybase profile.

5 Click the Info icon to display the EBF/Maintenance report, or click the
product description to download the software.

**Accessibility
features**

This document is available in an HTML version that is specialized for
accessibility. You can navigate the HTML with an adaptive technology such as
a screen reader, or view it with a screen enlarger.

The Mainframe Connect 15.0 DirectConnect for z/OS Option DirectConnect
Manager and the HTML documentation have been tested for compliance with
U.S. government Section 508 Accessibility requirements. Documents that
comply with Section 508 generally also meet non-U.S. accessibility guidelines,
such as the World Wide Web Consortium (W3C) guidelines for Web sites.

Note You might need to configure your accessibility tool for optimal use.
Some screen readers pronounce text based on its case; for example, they
pronounce ALL UPPERCASE TEXT as initials, and MixedCase Text as
words. You might find it helpful to configure your tool to announce syntax
conventions. Consult the documentation for your tool.

For information about how Sybase supports accessibility, see Sybase
Accessibility at http://www.sybase.com/accessibility. The Sybase Accessibility
site includes links to information on Section 508 and W3C standards.

For a Section 508 compliance statement for the Mainframe Connect 15.0 DirectConnect for z/OS Option DirectConnect Manager, navigate to the DirectConnect Manager VPAT at http://www.sybase.com/detail_list?id=52484.

If you need help Each Sybase installation that has purchased a support contract has one or more designated people who are authorized to contact Sybase Technical Support. If you cannot resolve a problem using the manuals or online help, please have the designated person contact Sybase Technical Support or the Sybase subsidiary in your area.

Introducing Mainframe Connect

What is Mainframe Connect?

Mainframe Connect supplies the connectivity tools that allow you to fully integrate your mainframe and LAN-based data sources.

Mainframe Connect allows you to:

- Enable the IBM zSeries mainframe components running under CICS, IMS, or MVS to access data stored on an IBM mainframe as if it were Sybase data.

- Create custom mainframe applications that provide access to data stored on LAN-based servers

- Create Open Server™ gateways to other mainframe database management systems (DBMSs), file systems, and applications

- Create custom applications that access mainframe data sources

Note The DirectConnect for z/OS Option is the only Mainframe Connect option that resides on the LAN (Microsoft Windows or UNIX). All other options reside on the mainframe.

Mainframe Connect options

Mainframe Connect has four options, some of which are available separately for different operating systems and transaction servers:

• Client Option (CICS or IMS and MVS)

• DB2 UDB Option (CICS or IMS)

• DirectConnect for z/OS Option

• Server Option (CICS or IMS and MVS)

For details about new functionality for this release, see the Mainframe Connect *New Features* guide.

Client Option

The Client Option is available for either CICS, or IMS and MVS. It is a programming environment that enables the user to create mainframe applications that access data and applications residing on a LAN. The Client Option allows the user to treat the mainframe as if it were another node on a LAN. The Client Option uses the Open Client™ programming environment API.

The Client Option allows the mainframe to take on the initiating role of a client in a distributed system. The Client Option is a library of routines, programming services, and runtime services that you can use to develop client/server applications. It allows mainframe programs written in assembler, C, COBOL II, or PL/I to communicate with Adaptive Server® Enterprise (ASE) and with Open Server™-developed applications. By using the Client Option, you can extend the capabilities of your existing mainframe transaction-oriented applications to give end-users and mainframe-based applications transparent access to distributed LAN-based applications and data. Also, MVS batch applications can become clients requesting data or services from network- and Internet-based applications.

Note You can use the Client Option only in a two-tier, gateway-less environment (without the DirectConnect for z/OS Option). For more information, see "Gateway and gateway-less environments" on page 12 and the appropriate Mainframe Connect Client Option *Installation and Administration Guide*.

DB2 UDB Option

The DB2 UDB Option is available for either CICS or IMS. It resides on the mainframe and works with the DirectConnect for z/OS Option to provide dynamic access to mainframe DB2 data.

Client applications access the DB2 UDB Option in any of these ways:

- Directly, through the DirectConnect for z/OS Option DB2 access service or Transaction Router Service (TRS), or gateway-less

- Indirectly, through the CIS functionality in ASE (ASE/CIS)

- Through Replication Server® when replicating to DB2 for z/OS

Note You can use DB2 UDB Option with or without the DirectConnect for z/OS Option. For more information, see "Gateway and gateway-less environments" on page 12 and the Mainframe Connect DB2 UDB Option *Installation and Administration Guide*.

DirectConnect for z/OS Option

The DirectConnect for z/OS Option is Open Server-based software that supports DB-Library™, CT-Library, ODBC, and JDBC application programming interfaces (APIs).

As a LAN-based gateway server, the DirectConnect for z/OS Option provides access to non-Sybase data and applications and constitutes a primary structure on which to build scalable database middleware applications.

The DirectConnect for z/OS Option provides these middleware services for decision support and online transaction processing (OLTP) applications:

- *DB2 access services*, which provide access to non-Sybase data sources. The DirectConnect for z/OS Option DB2 access service is the recommended component to use for SQL access to DB2 UDB for z/OS data.

- *Transaction Router Service* (TRS), which provides access from LAN-based client applications to mainframe data and applications. Client applications use TRS to execute mainframe remote procedure calls (RPCs) using Server Option applications.

Note With the Mainframe Connect DirectConnect for z/OS Option, Sybase ships the ASE ODBC Driver by Sybase to provide ODBC applications with connectivity to the mainframe through DirectConnect for z/OS Option or gateway-less. For information about using this client-server (front-end) driver, see the Adaptive Server Enterprise ODBC Driver by Sybase *Users Guide*.

DirectConnect Manager

DirectConnect Manager is a graphical user interface (GUI) systems management tool for configuring and managing a DirectConnect for z/OS Option server. DirectConnect Manager runs within Sybase Central, the Sybase systems management framework.

Server Option

The Server Option is available for either CICS, or IMS and MVS. It uses the Open Server programming environment to allow users to create mainframe applications that LAN-based client applications can access.

LAN-side client applications access Server Option transactions directly through the DirectConnect for z/OS Option or gateway-less, or indirectly through CIS functionality in ASE or through an ASE remote procedure call (RPC). These transactions provide access to virtually any z/OS data source and are used for a variety of functions, including:

- Accessing existing mainframe applications

- Initiating mainframe batch jobs

- Providing source data for data transfer operations

- Providing data mapped to a table within the CIS functionality in ASE, thus allowing results to be accessed or joined with data from other targets

The Server Option allows your mainframe to act as both an application server and a data server in a distributed environment. The Server Option API makes CICS, IMS, and MVS data and application programs available to a Sybase calling program (for example, Sybase Open Client, ODBC, and JDBC applications). These APIs deliver critical CICS, IMS, and MVS data and services to LAN-based and Internet-based clients through a single, open infrastructure.

The heterogeneous solutions made available through the Server Option use traditional mainframe security systems. When used with the DirectConnect for z/OS Option, the Server Option ensures transparent and seamless data transport between the Internet, LAN, and mainframe systems. The DirectConnect for z/OS Option routes requests (SQL statements and RPC calls) between the mainframe and end user, manages all the protocol translation where required, and provides additional security features that deliver the required security necessary for today's Internet and enterprise portal applications.

Note You can also use the Server Option for CICS in a two-tier, gateway-less environment (without the DirectConnect for z/OS Option). For more information, see "Gateway and gateway-less environments" on page 12 and the Mainframe Connect Server Option *Installation and Administration Guide* for CICS.

Related products

These products work with Mainframe Connect to support access to mainframe data, but are not part of the product set:

* Adaptive Server® Enterprise with Component Integration Services (ASE/CIS)

* Replication Server

* Replication Agent for DB2 UDB

* Replication Toolkit for MVS

ASE/CIS

ASE is the relational database server in the Sybase client-server architecture used in mission-critical, transaction-intensive enterprise environments.

CIS is an ASE feature that enables transparent access to a variety of other database management systems, such as DB2, Oracle, and Microsoft SQL Server.

ASE/CIS enables users to access and maintain data throughout an enterprise and across heterogeneous boundaries.

Replication Server

Replication Server is the application that maintains and processes replicate transactions received from a source data server or another Replication Server. Replication Server typically resides on a LAN, but it can also function on the same server as the primary and replicate data sources, and on a WAN.

Replication Agent for DB2 UDB

Replication Agent™ for DB2 UDB is a component of a replication system that moves primary database transactions from DB2 UDB for zSeries through Replication Server to replicate databases.

In a Replication Agent for DB2 UDB environment, the primary database is DB2 UDB, which runs as a subsystem in zSeries. The database logs are DB2 UDB logs. The replication module consists of two components:

- Log Extract
- Log Transfer Manager

Replication Toolkit for MVS

Replication Toolkit™ for MVS is a subset of the components available with Replication Agent for DB2 UDB and consists of the Log Transfer Manager only.

Replication Toolkit for MVS provides the API and tools to enable user development of a zSeries-based log extract application to access non-DB2 mainframe data, such as VSAM or Adabas.

How the Mainframe Connect Options Work Together

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Integrated functionality between the options

The Mainframe Connect options can be used alone or integrated within an environment of Sybase products. Used together, these options provide mainframe data access in distributed, client/server, and Internet environments.

The figures in these sections illustrate *sample* configurations of how the Mainframe Connect options and related products function together to provide access to data on the mainframe:

- The mainframe as a server
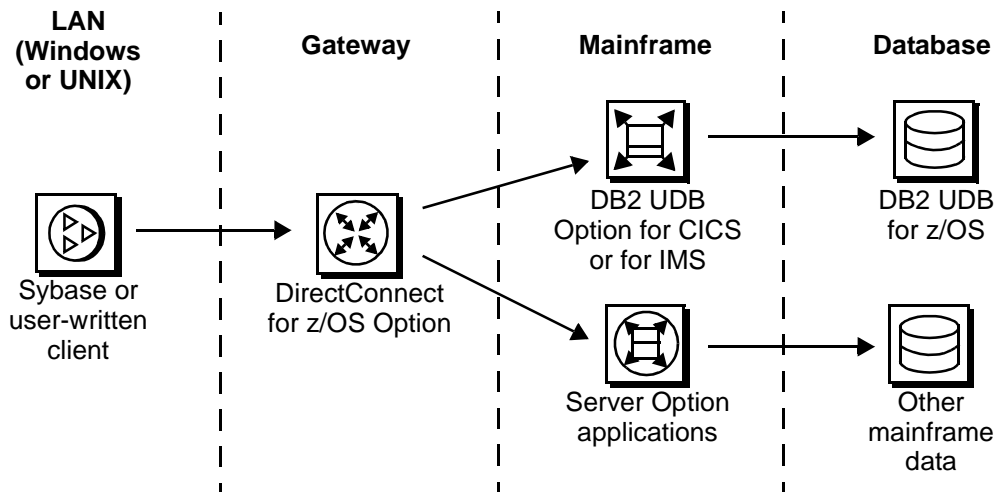- The mainframe as a client

The mainframe as a server

The mainframe components of Mainframe Connect can be accessed with or without a DirectConnect for z/OS Option gateway. For a discussion of the advantages and disadvantages of using the DirectConnect for z/OS Option as a gateway, see "Gateway and gateway-less environments" on page 12.

Gateway environment with the mainframe as a server

The three-tier, gateway-enabled environment uses a DirectConnect for z/OS Option gateway for communication between LAN applications and the mainframe.

Figure 2-1 illustrates the use of the Mainframe Connect options in a three-tier, gateway-enabled environment.

Figure 2-1: Gateway environment (with DirectConnect for z/OS Option)

As shown in Figure 2-1, the Sybase or user-written client on the LAN (Windows or UNIX) sends a request for data from the mainframe to the DirectConnect for z/OS Option in the gateway. The DirectConnect for z/OS Option then sends the request to one of the DB2 UDB Options or a Server Option application on the mainframe. The DB2 UDB Option accesses DB2 UDB for z/OS and the Server Option application accesses other mainframe data and both return the data or a message to the LAN client through the gateway.

LAN
The LAN client can be:

- *User-written* – user-written clients can be any application using ODBC or JDBC and created with or without Sybase tools, such as PowerBuilder®, Open Client, or Open Server.

- *Sybase servers acting as clients* – these include EAServer, ASE/CIS, and Replication Server.

Gateway	The DirectConnect for z/OS Option gateway can be a TRS using RPCs or a DB2 access service using SQL in communication from the LAN to the mainframe. TRS can be used for RPCs and language requests.
Mainframe	The Server Option and the DB2 UDB Option both reside on the mainframe.
Database	The accessed database can be a relational source, such as DB2 UDB. Access to non-relational data (not shown in Figure 2-1), such as IMS, VSAM, IDMS, DATACOM, and ADABAS, requires some user application development.

Gateway-less environment with the mainframe as a server

The two-tier, gateway-less environment does not use a DirectConnect for z/OS Option gateway for communication between LAN applications and the mainframe.

Note Functionality associated with a DirectConnect for z/OS Option gateway is not present in a gateway-less configuration. However, one exception is transaction name mapping, which is available for the Server Option in a two-tier configuration. For a comparison of functionality between the environments, see "Gateway and gateway-less environments" on page 12.

Figure 2-2 illustrates the use of the Mainframe Connect components in a two-tier, gateway-less environment.

Figure 2-2: Gateway-less environment (without DirectConnect for z/OS Option)
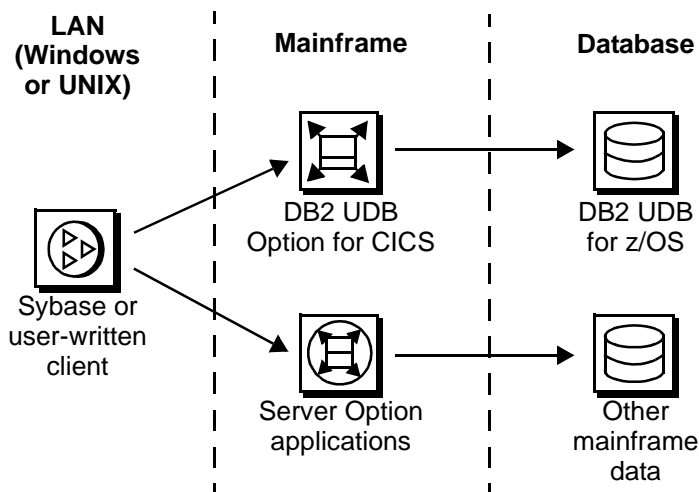
In Figure 2-2, the Sybase or user-written client on the LAN (Windows or UNIX) sends a request for data from the mainframe to either DB2 UDB Option for CICS or Server Option applications on the mainframe. The DB2 UDB Option for CICS accesses DB2 UDB for z/OS and the Server Option application accesses other mainframe data and both return the data or a message to the LAN client.

LAN

The LAN client can be:

- *User-written* – user-written clients can be any application using ODBC or JDBC and created with or without Sybase tools, such as PowerBuilder®, Open Client, or Open Server.

- *Sybase servers acting as clients* – these include EAServer, ASE/CIS, and Replication Server when used with the DB2 UDB Option.

Mainframe

The Server Option, the Client Option, and the DB2 UDB Option for CICS all reside on the mainframe.

Database

The database accessed can be a relational source, such as DB2 UDB. Access to non-relational data (not shown in Figure 2-2), such as IMS or VSAM, requires some user application development.

The mainframe as a client

Figure 2-3 illustrates the use of the Mainframe Connect components in an environment where the mainframe acts as the client to a LAN server.

Figure 2-3: Mainframe as a client
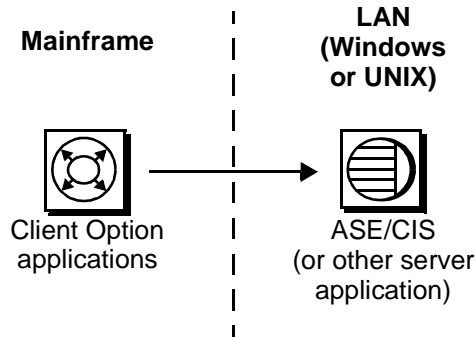
In Figure 2-3, the Client Option applications on the mainframe send a request to ASE/CIS or another server application on the LAN (Windows or UNIX). In response, the LAN application sends the data or a message back to the mainframe client.

Note There is no gateway for use with the Client Option.

Mainframe

The Client Option resides on the mainframe and runs under CICS, IMS, or MVS.

LAN

The LAN server can be any LAN-based Sybase server that supports Open Client connections, including:

- ASE/CIS

- EAServer

- User-written Open Server applications

Gateway and gateway-less environments

The DirectConnect for z/OS Option serves as a gateway in Mainframe Connect. Some options in Mainframe Connect can be used both with and without the DirectConnect for z/OS Option. There are advantages and disadvantages to consider when using the gateway environment.

Advantages of using the DirectConnect for z/OS Option

By using the DirectConnect for z/OS Option, you gain this functionality:

- DirectConnect for z/OS Option DB2 access service features

- DirectConnect for z/OS Option TRS features

- Other DirectConnect for z/OS Option functionality

DirectConnect for z/OS Option DB2 access service features

The DirectConnect for z/OS Option DB2 access services are a primary means of accessing mainframe data through the gateway. These DB2 access service features are:

- *Datatype translation* – datatypes used by LAN client applications match those used on the mainframe.

- *SQL transformation* – SQL used by LAN client applications is matched to the SQL used by mainframe applications.

For more information about DB2 access services, see the Mainframe Connect DirectConnect for z/OS Option *Users Guide for DB2 Access Services*.

DirectConnect for z/OS Option TRS features

The DirectConnect for z/OS Option TRS provides access to mainframe data using RPCs. These TRS features are:

- *IMS and MVS access* – IMS and MVS data are available to LAN clients.

- *Transaction mapping by security definition* – transactions can be mapped from LAN client to mainframe by the security definition.

- *Transaction mapping by user ID* – transactions can be mapped from LAN client to mainframe by the user ID of the client.

- *Security* – TRS security features can be configured to require client identification and restrict access to mainframe connections and transactions.

- *Support for DB2 stored procedures* – using the DB2 UDB Option, client applications can invoke a DB2 stored procedure as a Server Option RPC. Client applications can connect to the DB2 UDB Option for CICS directly or through TRS.

For more information about TRS, see the Mainframe Connect DirectConnect for z/OS Option *Users Guide for Transaction Router Services*.

Other DirectConnect for z/OS Option functionality

These DirectConnect for z/OS Option features are also available in a gateway environment:

- *Logging, tracing, and accounting* – your environment can use DirectConnect for z/OS Option facilities for logging, tracing, and accounting.

- *GUI configuration and multi-user management* – GUI configuration and user-management tools are available using DirectConnect Manager in the DirectConnect for z/OS Option.

- *SNA connectivity* – the SNA connectivity protocol can only be used through the DirectConnect for z/OS Option, which provides TCP/IP-to-SNA protocol conversion. SNA connectivity is supported only in communication from the LAN to the mainframe.

- *Access to multiple CICS regions* – LAN client applications may access multiple CICS regions at one time.

- *Transaction grouping* – transactions may be managed as a group.

- *Security* – additional levels of security may be implemented by the gateway.

Note Transaction name mapping is also provided in the Server Option without a gateway.

Disadvantages of using the DirectConnect for z/OS Option

By using the DirectConnect for z/OS Option, you add another tier to your environment, which can decrease throughput because of the more complicated architecture. Using the DirectConnect for z/OS Option also requires more administrative attention to install and maintain the components in the environment.

From a security standpoint, Secure Sockets Layer (SSL) connectivity to the mainframe is not supported when using the DirectConnect for z/OS Option.
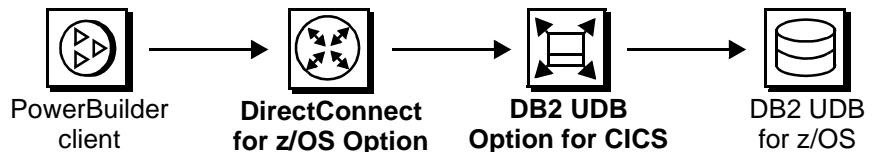
CHAPTER 3 **Sample Solutions**

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Although there are many ways your site can use Mainframe Connect to access mainframe data, the scenarios in this chapter provide high-level examples of Mainframe Connect component solutions.

Accessing and changing data in a DB2 database

Profile   An enterprise using PowerBuilder needs to manage and update users' profiles in a DB2 database on the mainframe.

Sybase products   The enterprise uses the DirectConnect for z/OS Option and the DB2 UDB Option for CICS to access DB2 UDB.

Scenario   Figure 3-1 illustrates this sample scenario.

Figure 3-1: Accessing and changing data in a DB2 database

PowerBuilder client → **DirectConnect for z/OS Option** → **DB2 UDB Option for CICS** → DB2 UDB for z/OS

As shown in Figure 3-1, a request originates at a PowerBuilder client and is sent to the DirectConnect for z/OS Option. The DirectConnect for z/OS Option then sends the request to the DB2 UDB Option for CICS, which accesses the DB2 UDB for z/OS data. The data or a message is returned to the PowerBuilder client.

Transparently accessing and changing data on a mainframe and in other databases

Profile

An enterprise has developed a Visual Basic customer management application that must combine mainframe VSAM data with iSeries data.

Sybase Products

The enterprise uses ASE/CIS, the DirectConnect for z/OS Option, ECDA Option for ODBC, and Server Option applications for VSAM data access.
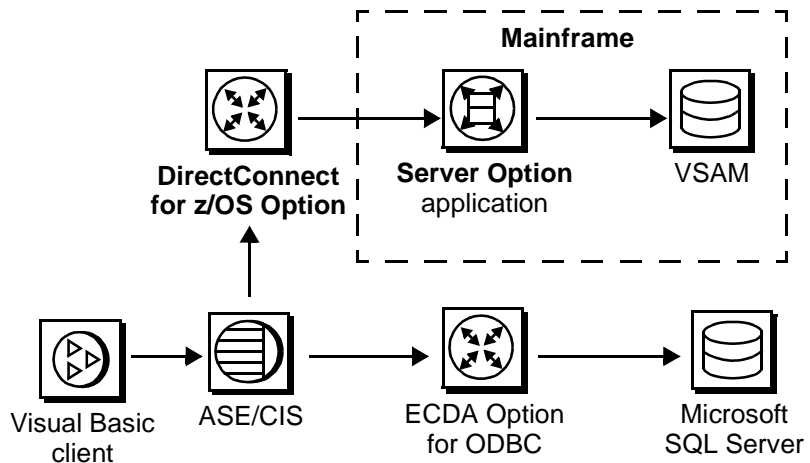

Note ECDA Option for ODBC is a component of Enterprise Connect™ Data Access.

Scenario

Figure 3-2 illustrates this sample scenario.

Figure 3-2: Transparently accessing and changing data on a mainframe and in other databases

As shown in Figure 3-2, a request originating at a Visual Basic Client is sent to ASE/CIS, which routes it to either the DirectConnect for z/OS Option or the ECDA Option for ODBC.

The DirectConnect for z/OS Option sends the request to a Server Option application on the mainframe. The Server Option application accesses the VSAM file. Data or a message is returned to the Visual Basic client.

The ECDA Option for ODBC sends the request to a Microsoft SQL Server database. Data or a message is returned to the Visual Basic client.

Implementing bidirectional replication between DB2 UDB and other databases within the enterprise

Profile

An enterprise is distributing catalog information centrally stored on the mainframe in DB2 UDB to several satellite locations where subsets of the data are stored in Oracle for fast and easy access. Periodic corrections to the catalog information, gathered at the local offices, are replicated back to DB2 UDB.

Sybase products

The example uses Replication Agent for DB2 UDB, Replication Server, Replication Agent for Oracle, and the DirectConnect for z/OS Option to replicate between DB2 and Oracle.

Note ECDA Option for Oracle is a component of Enterprise Connect Data Access.

Scenario

Figure 3-3 illustrates this sample scenario.

Figure 3-3: Processing bidirectional replication between DB2 and other databases within the enterprise
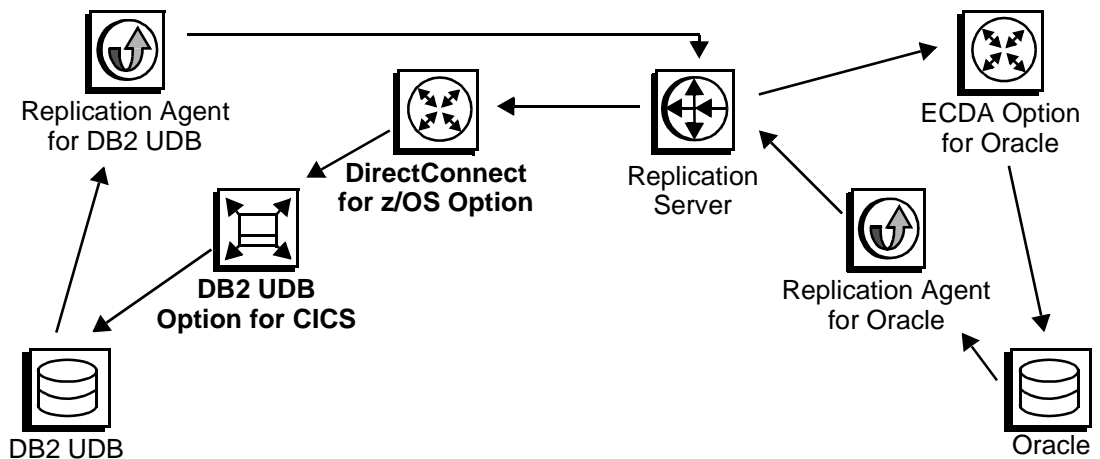
As shown in Figure 3-3, DB2 UDB data is replicated by Replication Agent for DB2 UDB and sent to Replication Server, which passes the data to ECDA Option for Oracle. ECDA Option for Oracle passes the data to the Oracle database for storage. Corrections that have been made to the data on the Oracle database are replicated by Replication Agent for Oracle and sent through Replication Server, DirectConnect for z/OS Option, and DB2 UDB Option for CICS. DB2 UDB Option for CICS then sends the data to the DB2 UDB database for storage.

Accessing and changing data on the mainframe through an enterprise portal on the Web

Profile | A Web-based business—with 20 locations where product orders can be accessed and updated—needs to access orders and customer information stored in VSAM files and in DB2 on the mainframe. The business relies heavily on stored procedures and cannot use dynamic SQL to access mainframe data.

Sybase products | The business uses EAServer, the DirectConnect for z/OS Option, the Server Option, and the DB2 UDB Option for CICS.

Scenario | Figure 3-4 illustrates this sample scenario.

Figure 3-4: Accessing and changing data on the mainframe through an enterprise portal on the Web
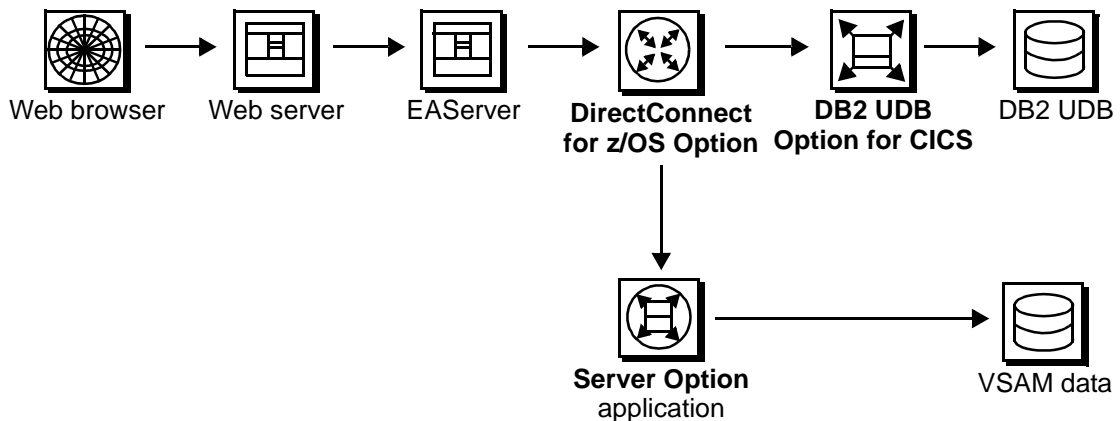
As shown in Figure 3-4, a request originates at a Web browser, is routed through a Web server and EAServer, then to the DirectConnect for z/OS Option in the gateway. The DirectConnect for z/OS Option then sends the request either to the DB2 Option for CICS (for DB2 UDB data) or a Server Option application (for VSAM data) on the mainframe. Data or a message are returned to the Web browser.