SYBASE®

An **SAP** Company

Contents

Enterprise Connect Data Access

Enterprise Connect™ Data Access (ECDA) is an integrated set of software applications and connectivity tools that allows you to access data within a heterogeneous database environment.

ECDA gives you the ability to access a variety of LAN-based, non-Sybase® datasources, as well as mainframe datasources. It consists of components that provide transparent data access within an enterprise, including access to servers housed on zSeries, iSeries, UNIX, Linux, and Microsoft Windows platforms.

Note: Mainframe Connect™, a suite of products you can purchase separately, allows you to access and integrate mainframe data and applications. See the *Mainframe Connect Overview Guide*.

With ECDA, you can maintain a corporate view of distributed operations, even when distributed business units run on a variety of hardware and database management system (DBMS) platforms. Because ECDA is database-independent middleware, it allows LAN-based clients to see a consistent picture of enterprise data, no matter what the datasource.

ECDA components allow applications to interact with non-Sybase DBMSs, such as DB2 UDB, Microsoft SQL Server, and Oracle, as well as Sybase DBMSs, including Adaptive Server® , SQL Anywhere®, and Sybase® IQ.

Specifically, DirectConnect™ server component of ECDA works as a gateway to support Adaptive Server and Replication Server® interoperability with various non-Sybase databases.

Sybase Central Plug-Ins

Sybase Central™ provides a common interface for managing Sybase products. Each server product is managed by a service provider "plug-in" that operates in parallel with other service providers in the Sybase Central framework.

Sybase Central displays a visual representation of servers and provides a point-and-click interface for choosing options.

ECDA provides DirectConnect server plug-in (DirectConnect Manager), a Sybase Central plug-in that allows you to manage DirectConnect servers locally or remotely throughout your business environment.

Enterprise Connect Data Access Capabilities

ECDA provides transparent access to a variety of datasources for Adaptive Server.

The DirectConnect server and other components of ECDA are also included with Replication Server Options, in each case providing Replication Server the capability to replicate to heterogeneous databases including DB2 UDB and Microsoft SQL Server.

Transparent Access
With ECDA, you can:

- Create interfaces that let developers, applications, and users work with familiar tools—no matter how your business enterprise changes or what new technologies are added.
- Access information on remote, heterogeneous data servers as if it were from a single source.
- Connect to DB2 UDB, Microsoft SQL Server, and Oracle using the appropriate ECDA Option, either directly or with Adaptive Server/Component Integration Services (CIS) or Replication Server.
- Connect to other ODBC-compliant databases using ECDA Option for ODBC and an appropriate ODBC driver, either directly or with Adaptive Server/CIS or Replication Server.

Interoperability
ECDA interoperates with other Sybase products and product suites, such as Adaptive Server, Replication Server, and Sybase® IQ. With ECDA, these products can access non-Sybase data.

ECDA also supports a variety of client interfaces, including:

- Client applications written either in Java using jConnect™ for JDBC™, or in C/C++ using Open Client™ libraries
- Open Server™ applications
- JDBC applications

Data Management
Because ECDA helps you manage your enterprise data, you can:

- Share data efficiently throughout your organization by moving it in bulk form between datasources using the ECDA Option for ODBC transfer feature or the Adaptive Server **select into** statement.
- Manage ECDA services and Sybase components using Sybase Central.

ECDA Components

ECDA components are Sybase and non-Sybase supported.

ECDA includes:

- ECDA Options, which contain DirectConnect servers that work with Adaptive Server and Replication Server to provide access to DB2 UDB, Microsoft SQL Server, and Oracle databases, as well as to other ODBC-compliant databases
- Adaptive Server, with a restricted license for Component Integration Services (CIS) for a single view of distributed and heterogeneous datasources
- Software Developer's Kit (SDK), with which you can create custom client applications and use drivers to connect your existing applications to ECDA

ECDA Options

The ECDA Options provide basic connectivity to non-Sybase datasources through DirectConnect servers.

There are two options in ECDA:

- ECDA Option for ODBC
- ECDA Option for Oracle

Each option provides data access, transaction management, and remote systems management through DirectConnect Manager.

DirectConnect servers provide connectivity between clients located throughout the enterprise and enterprise data servers. You can combine DirectConnect servers with Adaptive Server or Replication Server to can access, move, and replicate data in a heterogeneous environment.

See also

Client and Target ODBC Drivers

ECDA Option for ODBC requires ODBC drivers to provide connectivity to the target database.

Target Database
You must obtain the necessary ODBC drivers for DB2 UDB and Microsoft SQL Server, as well as the instant client libraries required for Oracle OCI connectivity.

Adaptive Server Enterprise with Component Integration Services

Adaptive Server is provided with ECDA for the Component Integration Services (CIS) functionality. With Adaptive Server/Component Integration Services (CIS), your client

applications can view and change data on multiple, heterogeneous data servers as if it were single-source data.

Adaptive Server/CIS performs datatype transformations and enables heterogeneous joins.

Note: When included in ECDA, the Adaptive Server/CIS license does not include support for local data storage within Adaptive Server. If you have purchased a full Adaptive Server license with the CIS option, you are licensed for local data storage within Adaptive Server.

Adaptive Server/CIS allows users to access both Sybase and non-Sybase databases on different servers. These external datasources include host data files and tables, views, and remote procedure calls (RPCs) in database systems such as Adaptive Server, Oracle, Microsoft SQL Server, and DB2 UDB.

Using Adaptive Server/CIS, you can:

- Access tables and views that reside on remote servers as if they were local objects.
- Perform joins between tables in multiple remote, heterogeneous servers. For example, you can join tables between an Oracle DBMS and DB2 UDB, and between tables in multiple DB2 UDB database servers.
- Create stored procedures that work with distributed heterogeneous data.
- Transfer the contents of one table into a new table on any supported remote server using a **select into** statement.
- Provide applications, such as PowerBuilder®, Microsoft Access, and DataEase, with transparent access to heterogeneous data.
- Maintain referential integrity across heterogeneous datasources.
- Access native remote server capabilities using the Component Integration Services passthrough mode.
- Map RPCs into proxy table structures and perform operations on them as though they were local tables.

Software Developer's Kit

Software Developer's Kit (SDK) is a set of libraries and utilities for developing client applications.

Open Client

Open Client provides the interfaces that client applications, third-party products, and other Sybase products need to communicate with Adaptive Server and Open Server applications. Open Client provides runtime libraries and additional tools for developing custom client applications. Open Client network services support specific protocols such as TCP/IP.

Open Client Embedded SQL/C

With Open Client Embedded SQL™/C precompiler, you can embed Adaptive Server Transact-SQL® statements into C-language applications.

Open Client Embedded SQL/COBOL

With this precompiler, you can embed Adaptive Server Transact-SQL statements into COBOL-language applications.

jConnect for JDBC

The jConnect for JDBC driver from Sybase provides native access to all Sybase database products and servers based on Open Server.

Language Modules

You can provide system messages and datetime formats to help you localize your applications. The default installation includes:

- US English language module
- Unicode UTF-8 encoding (utf8)
- IBM code page 850 (cp850)
- IBM code page 437 (cp437)
- ISO 8859-1 (iso_1)
- Hewlett-Packard Roman 8 (roman8) character sets

Note: SDK licenses are included as part of Adaptive Server.

Related Products and Options

There are several related Sybase data integration products and options you can purchase separately that extend the capabilities of your system.

Sybase Replication Server

Replication Server is an Open Server application that maintains replicated data in multiple databases while ensuring the integrity and consistency of the data.

It provides client applications with local data access, thereby reducing the load on the network and centralized computer systems.

Replication Server supports heterogeneous data servers. You can build a replication system from existing databases and applications and, as your enterprise grows and changes, you can add data servers and Replication Servers to accommodate your evolving business needs.

See the Sybase Replication Server documentation set.

Sybase Replication Server Options

Sybase Replication Server Options are sets of products packaged together to give you unidirectional or bidirectional replication between Adaptive Server and non-Adaptive Server databases using Sybase Replication Agents and ECDA.

If you already own Sybase Replication Server, you can purchase one or more Sybase Replication Server Options.

Three options are available on Microsoft Windows or UNIX platforms:

- Replication Server Option for Oracle, which provides replication to and from Oracle databases
- Replication Server Option for Microsoft SQL Server, which provides replication to and from Microsoft SQL Server databases
- Replication Server Option for IBM DB2 UDB, which provides replication to and from IBM DB2 UDB

See the *Replication Server Options Overview Guide*.

Mainframe Connect

Mainframe Connect provides a product suite that provides access to and integration of mainframe data and applications. Mainframe Connect allows you to write applications that access mainframe data and allow the mainframe to act as a client to other Sybase servers.

See the *Mainframe Connect Overview Guide*.

Replication Agent for DB2 UDB

Replication Agent™ for DB2 UDB allows you to replicate transactions from a DB2 UDB primary database on the mainframe (zSeries).

See the Replication Agent for DB2 UDB documentation set.

Open Server

Open Server provides the libraries, tools, and interfaces to create a custom server application.

Open Server consists of a programming interfaces component and a network services component. See the Open Server documentation.

With Open Server, you can:

- Create an application for any type of server
- Create applications that perform calculations, provide access to real-time data, or interface with e-mail applications
- Communicate directly with Sybase and non-Sybase protocols

ECDA and Replication Server are Open Server applications.

ECDA Option for ODBC

ECDA Option for ODBC is Open Server-based software that supports Client-Library and Open Database Connectivity (ODBC) application programming interfaces (APIs).

A local area network (LAN)-based middleware server, ECDA Option for ODBC provides access to non-Sybase data and applications and basic connectivity to ODBC-accessible datasources.

ECDA Option for ODBC serves as a fundamental building block for highly scalable database middleware applications. In addition, you can use ECDA Option for ODBC with other Sybase products, such as Adaptive Server/Component Integration Services (CIS), Replication Server, and Replication Server Options.

Note: For access to additional databases, such as Microsoft SQL Server, DB2 UDB, and others, you must obtain and install the necessary ODBC driver separately, on the same server as ECDA Option for ODBC, and configure ECDA Option for ODBC to use that ODBC driver for access to the database.Carefully integrate and thoroughly test with non-Sybase provided, third-party ODBC drivers.

ECDA Option for ODBC is a symmetric multiprocessing (SMP) that uses an Open Server thread for each incoming client connection. It communicates with Adaptive Server using the server class `direct_connect`.

These rules define the relationship between an access service library and an access service:

- A single access service library can support multiple access services.
- Each access service has one configuration set and is always associated with a specific access service library.
- All access services within a given access service library share the same configuration properties.
- You can assign different configuration property values to different access services within an access service library.

When a client connects, the access service logs in to the target database, using the client user ID and password, plus the ODBC-configured datasource name (DSN).

ECDA Option for ODBC Components

ECDA Option for ODBC comprises of multiple components.

ECDA Option for ODBC consists of a server and one or more access service libraries, which have specific sets of configuration properties. The server provides the framework in which the service libraries operate. Each access service library accesses data from a particular target database, such as DB2 UDB, Microsoft SQL Server, and Oracle.

DirectConnect Server

The DirectConnect server provides management and support functions for DirectConnect service libraries.

- Routing client connections to the appropriate access service based on user ID, requesting application, and access service name
- Providing a single log file and a trace file for access services
- Logging server, access service, and client messages
- Tracing server, access service, and client events
- Providing configuration management of all installed services

Service Libraries

There are two types of service libraries that reside on the DirectConnect server.

- Access service library– a set of configuration properties that describes how all of its access services will function.
- Administrative service library– provides specific administrative services for all service libraries, including writing to logs and allowing remote configuration of access services (for example, through DirectConnect Manager).

Access Services

An access service is the client connection point for a DirectConnect server. It contains specific sets of configuration properties relating to the target to be accessed. You must define at least one access service for every service library.

Access services allow clients to access data from a specific target. Each access service is a specific set of configuration properties that:

- Transforms SQL
- Converts datatypes
- Supports remote procedure calls (RPCs)
- Transfers data between the target database and other servers accessible through Open Client
- Supports catalog stored procedures (CSPs) and system stored procedures

An access service is the named pairing of an access service library and a set of specific configuration properties. Clients connect to access services by the access service name. Within each access service library, a collection of configuration properties define how each access service behaves.

DirectConnect Manager

DirectConnect Manager is a Sybase Central plug-in application that allows you to configure and manage Sybase DirectConnect servers interactively from a client machine. It runs on Windows and UNIX platforms.

DirectConnect Manager connects to a DirectConnect server and communicates with it through an application programming interface (API) rather than by manipulating the configuration files directly. It displays a consolidated view of all DirectConnect servers across your enterprise.

Note: DirectConnect Manager is installed separately from ECDA Option for ODBC.

DirectConnect Manager provides the capability to:

*   Perform all of its management functions remotely: you do not need physical access to the DirectConnect server machine or directory.
*   Provide management services to multiple servers at the same time, including the ability to copy access service configurations from one server to another.
*   Manage DirectConnect servers on multiple platforms.
*   Change configuration properties of DirectConnect servers, service libraries, and services.
*   Create and copy services by copying an existing service and giving it a unique name.
*   Designate a new server using DCDirector (ECDA Option for ODBC only).
*   Start and stop existing servers using DCDirector (ECDA Option for ODBC only).
*   Start, stop, and delete services remotely.
*   Test the availability of all your datasources.
*   Retrieve a DirectConnect server log file or a subset of the log, and view log file messages.
*   Update DirectConnect server connection information.
*   View the status of a service and datasource.

The interface provided by DirectConnect Manager allows you to easily configure and manage all of the data access services directly from your Windows or UNIX platform. As a result, you greatly increase your ability to respond and manage a distributed environment.

ECDA Option for ODBC Architecture

In ECDA Option for ODBC, the DirectConnect server provides the framework in which the service libraries operate. Within the service libraries, each access service accesses data from a particular target, such as DB2 UDB, Microsoft SQL Server, and ODBC-accessible databases.

Figure 1: Relationship Between Access Service Library and Components
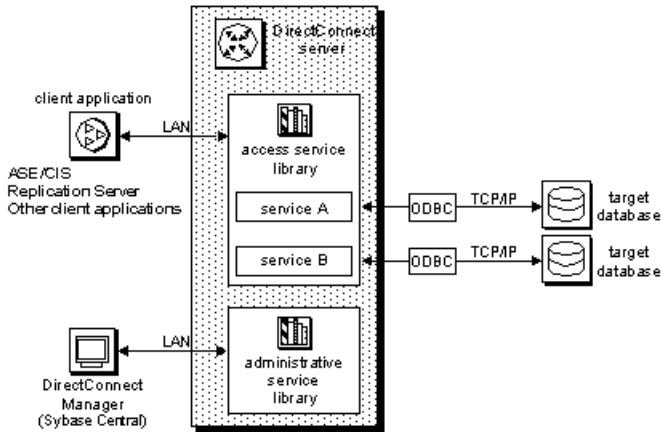
The request from a client application goes over the LAN to the DirectConnect server. The access service routes the request through the ODBC driver to the target and accesses data from the database. DirectConnect Manager accesses the administrative service library to manage the DirectConnect server and provide a view of the servers, service libraries, and services.

ECDA Option for Oracle

ECDA Option for Oracle provides Open Client access to Oracle databases. It works either with the Component Integration Services feature of Adaptive Server called Adaptive Server/ CIS or as a standalone gateway.

When used with Adaptive Server, ECDA Option for Oracle transforms the Transact-SQL generated by Adaptive Server to Oracle's native SQL. ECDA Option for Oracle also handles datatype mapping between Sybase datatypes and Oracle datatypes. ECDA Option for Oracle provides many of the features of a distributed database system when used in combination with Adaptive Server. This combination enables location transparency, distributed query optimization, copy transparency, transaction transparency, and distributed joins.

When used with Adaptive Server, you can join Oracle tables with Adaptive Server, DB2, or other tables. Access to these objects through Adaptive Server is transparent to the application. ECDA Option for Oracle is used with Adaptive Server/Component Integration Services (CIS) to support full, two-phase commit transaction management.

When used with Replication Server, the ECDA Option for Oracle allows you to replicate data into Oracle tables.

ECDA Option for Oracle:

- Is a symmetric multiprocessing (SMP) Sybase Open Server application that uses an Open Server thread for each incoming client connection.
- Uses the DirectConnect server to route the incoming client connection to the correct service based on the service name and has one Oracle process for each DirectConnect server.
- Does not have a service library but can have multiple services and each service is configured to connect to a different Oracle database. In addition, the DirectConnect server performs SQL transformation and some data translation based on the configuration of the service.
- Accesses Oracle databases using the Oracle Call Interface (OCI) application programming interface (API). The OCI allows the ECDA Option for Oracle the ability to manipulate data in an Oracle database.
- Communicates with Adaptive Server using the server class `direct_connect`.

ECDA Option for Oracle Components

ECDA Option for Oracle comprises of multiple components.

DirectConnect Server

The DirectConnect server component of ECDA Option for Oracle is an all-encompassing server; there is only one process and binary, dcoracle.

The DirectConnect server accepts connections, routes them to the appropriately configured service, which ultimately is sent to the appropriate Oracle database for processing.

DirectConnect Manager

DirectConnect Manager is a Sybase Central plug-in application that allows you to configure and manage Sybase DirectConnect servers interactively from a client machine.

It runs on Windows and UNIX platforms. DirectConnect Manager connects to a DirectConnect server and communicates with it through an application programming interface (API) rather than by manipulating the configuration files directly. It displays a consolidated view of all DirectConnect servers across your enterprise.

Note: DirectConnect Manager is installed separately from ECDA Option for Oracle.

DirectConnect Manager provides the capability to:

- Performs all of its management functions remotely: you do not need physical access to the DirectConnect server machine or directory.
- Provide management services to multiple servers at the same time.
- Manage DirectConnect servers on multiple platforms.
- Change configuration properties of DirectConnect servers.
- Test the availability of all your DirectConnect servers datasources.

The interface provided by DirectConnect Manager allows you to easily configure and manage all of the data access services directly from your Windows or UNIX platform. As a result, you greatly increase your ability to respond and manage a distributed environment.

ECDA Option for Oracle Architecture

ECDA Option for Oracle is a Sybase Open Server application that supports multiple concurrent client connections.

Figure 2: ECDA Option for Oracle Architecture
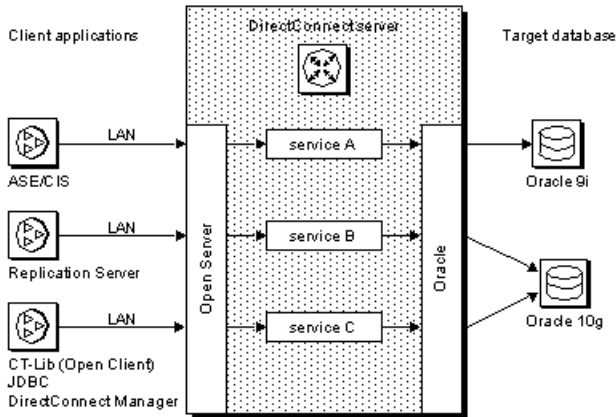
The request from a client uses a TCP/IP LAN connection to the DirectConnect server. Based on the incoming server name, the DirectConnect server routes the connection using OCI to the proper Oracle database depending on the configuration properties.

Sample Solutions

You can use sample solutions as an example to solve business problems using ECDA components and other Sybase products and product suites.

Although there are many ways your site can use ECDA to access data, the scenarios provide some high-level examples of the solutions that ECDA provides.

Transparent Access to Local Heterogeneous Data Stores

An example that illustrates transparent access to local heterogeneous data stores.

Profile
An insurance company has an application that processes claims and requires data from two sources: a DB2 UDB for iSeries database and an Oracle database. The company uses ECDA Option for ODBC to retrieve data from the DB2 UDB for iSeries database and ECDA Option for Oracle to retrieve data from the Oracle database. This eases administration and eliminates the need for changes to the claims application.
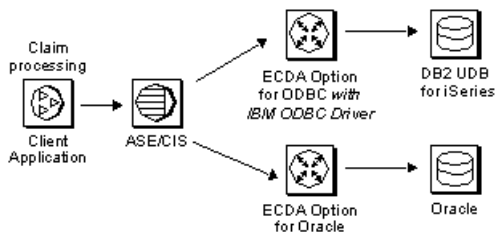
Sybase Components
To retrieve the data without the application (or the user) being aware of the specific data location, the insurance company uses these three components in ECDA:

- Adaptive Server/CIS
- ECDA Option for ODBC (with the IBM DB2 UDB ODBC driver)
- ECDA Option for Oracle

Sample Scenario

Figure 3: Transparent Access to Local Heterogeneous Data Stores

The client application sends a request through Adaptive Server/CIS and ECDA Option for ODBC to a DB2 UDB for iSeries database, which returns data or a message to the client. It also

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sends a request through Adaptive Server/CIS and ECDA Option for Oracle to an Oracle database, which returns data or a message to the client.

For descriptions of specific ECDA components used in the sample scenarios, see ECDA Components.

Access to Distributed Datasources

An example of access to distributed datasources.

Profile
A broker for a securities company receives a call from a customer. The broker client application immediately shows the customer profile based on the telephone number of the caller. This data is stored in the Oracle database at the local work group's office in Memphis and is updated through ECDA Option for Oracle. Real-time feeds from outside the system are stored in DB2 UDB on a zSeries host located in New York and are accessed by ECDA Option for ODBC. Client inquiries regarding other investments and current prices need to be queried off the zSeries host and shown within the broker client application.
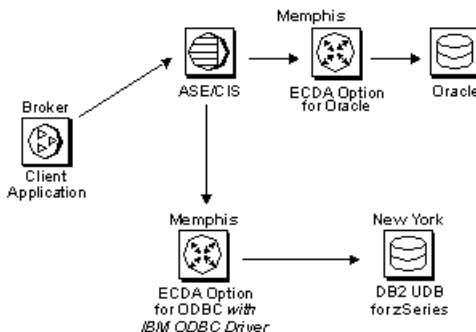
Sybase Components
To set up transparent access to heterogeneous data stores, the securities company uses:

• Sybase ECDA Option for Oracle
• Sybase ECDA Option for ODBC, with an IBM DB2 UDB ODBC driver

This combination of components gives the securities company access to heterogeneous data stores.

Sample Scenario

Figure 4: Access to Distributed Datasources

The client application sends a request through Adaptive Server/Component Integration Services (CIS) and ECDA Option for Oracle to an Oracle database, which returns data or a message to the client. It also sends a request through Adaptive Server/CIS and ECDA Option for ODBC to a DB2 UDB for zSeries database, which returns data or a message to the client.

Integrating Systems of Two Companies

An example that integrates systems from of two separate companies.

Profile
A Paris retail company has acquired company in New York, and must to integrate its Oracle data with the DB2 UDB for UNIX data of the acquired company as quickly as possible to share information such as customer profiles and orders. The company must capture data changes and replicate them to other systems where they can be incorporated without having to re-code existing applications.
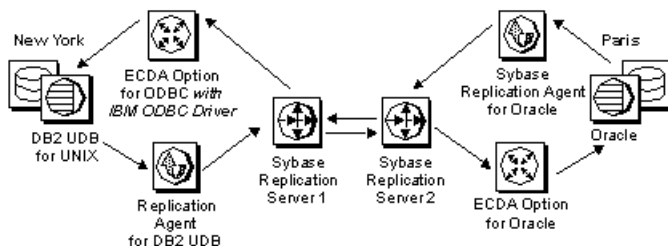
Sybase Components
To set up bidirectional, enterprise-wide replication, the retail company uses these components:

- ECDA Option for ODBC (to be used with an IBM ODBC Driver)
- ECDA Option for Oracle
- Sybase Replication Agent for Oracle
- Replication Agent for DB2 UDB
- Replication Server

Sample Scenario

Figure 5: Bidirectional, Enterprise–Wide Replication

Data stored in a DB2 UDB database for UNIX is sent through Replication Agent for DB2 UDB to Replication Server 1 and Replication Server 2, which replicate the information into Oracle through ECDA Option for Oracle to the Oracle database. Data from the Oracle database is then sent through Replication Agent for Oracle to Replication Server 2 and

Replication Server 1, which replicate the information into DB2 UDB through ECDA Option for Oracle using an IBM ODBC driver to the DB2 UDB for UNIX database.

Obtaining Help and Additional Information

Use the Sybase Getting Started CD, Product Documentation site, and online help to learn more about this product release.

- The Getting Started CD (or download) – contains release bulletins and installation guides in PDF format, and may contain other documents or updated information.
- Product Documentation at *http://sybooks.sybase.com/* – is an online version of Sybase documentation that you can access using a standard Web browser. You can browse documents online, or download them as PDFs. In addition to product documentation, the Web site also has links to EBFs/Maintenance, Technical Documents, Case Management, Solved Cases, Community Forums/Newsgroups, and other resources.
- Online help in the product, if available.

To read or print PDF documents, you need Adobe Acrobat Reader, which is available as a free download from the *Adobe* Web site.

Note: A more recent release bulletin, with critical product or document information added after the product release, may be available from the Product Documentation Web site.

Technical Support

Get support for Sybase products.

If your organization has purchased a support contract for this product, then one or more of your colleagues is designated as an authorized support contact. If you have any questions, or if you need assistance during the installation process, ask a designated person to contact Sybase Technical Support or the Sybase subsidiary in your area.

Downloading Sybase EBFs and Maintenance Reports

Get EBFs and maintenance reports from the Sybase Web site or the SAP® Service Marketplace (SMP). The location you use depends on how you purchased the product.

- If you purchased the product directly from Sybase or from an authorized Sybase reseller:
  a) Point your Web browser to *http://www.sybase.com/support*.
  b) Select **Support > EBFs/Maintenance**.
  c) If prompted, enter your MySybase user name and password.
  d) (Optional) Select a filter, a time frame, or both, and click **Go**.
  e) Select a product.

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

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

- If you ordered your Sybase product under an SAP contract:

 a) Point your browser to *http://service.sap.com/swdc* and log in if prompted.

 b) Select **Search for Software Downloads** and enter the name of your product. Click **Search**.

Sybase Product and Component Certifications

Certification reports verify Sybase product performance on a particular platform.

To find the latest information about certifications:

- For partner product certifications, go to *http://www.sybase.com/detail_list?id=9784*
- For platform certifications, go to *http://certification.sybase.com/ucr/search.do*

Creating a MySybase Profile

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

1. Go to *http://www.sybase.com/mysybase*.
2. Click **Register Now**.

Accessibility Features

Accessibility ensures access to electronic information for all users, including those with disabilities.

Documentation for Sybase products is available in an HTML version that is designed for accessibility.

Vision impaired users can navigate through the online document with an adaptive technology such as a screen reader, or view it with a screen enlarger.

Sybase HTML documentation has been tested for compliance with accessibility requirements of Section 508 of the U.S Rehabilitation Act. 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 may 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 the Sybase Accessibility site: *http://www.sybase.com/products/accessibility*. The site includes links to information about Section 508 and W3C standards.

You may find additional information about accessibility features in the product documentation.

Obtaining Help and Additional Information