Microsoft® ADO.NET

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Agenda

- **ADO versus ADO.NET**
- ADO.NET Architecture
- Connection Object
- Command Object
- DataReader Object
- DataAdapter Object
- DataSet Object
- DataView Object
- Use ADO.NET to access data in an application

ADO versus ADO.NET

Feature	ADO	ADO.NET
Primary Aim	Client/server coupled	Disconnected collection of data from data server
Form of data in memory	Uses RECORDSET object (contains one table)	Uses DATASET object (contains one or more DATATABLE objects)
Disconnected access	Uses CONNECTION object and RECORDSET object with OLEDB	Uses DATASETCOMMAND object with OLEDB
Disconnected access across multi-tiers	Uses COM to marshal RECORDSET	Transfers DATASET object via XML. No data conversions required

ADO versus ADO.NET (continued)

Feature	ADO	ADO.NET
XML capabilities	XML aware	XML is the native transfer medium for the objects
Firewalls	Firewalls block system-level COM marshalling	XML flows through the firewall via HTTP
Code	Coupled to the language used, various implementation	Managed code library – Uses Common Language Runtime, therefore, language agnostic

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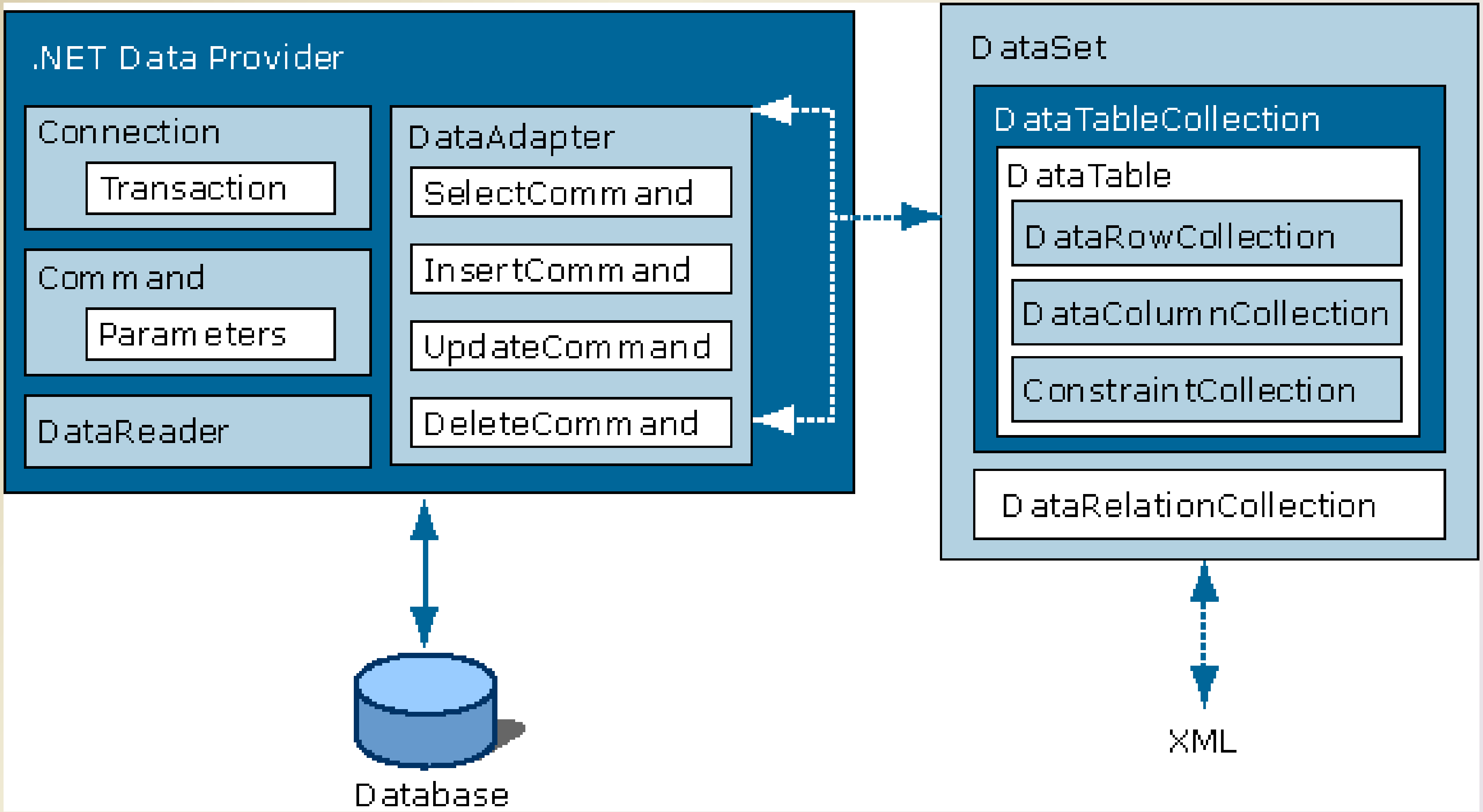
ADO.NET Architecture Diagram



ADO.NET Namespaces

System.data	Core namespace, defines types that represent data
System.Data.Common	Types shared between managed providers
System.Data.OleDb	Types that allow connection to OLE DB compliant data sources
System.Data.SqlClient	Types that are optimized to connect to Microsoft® SQL Server
System.Data.SqlTypes	Native data types in Microsoft® SQL Server

Importing the ADO.NET Namespaces

Needed to build a data access application

- **For OLE DB:**

```
Imports System.Data
Imports System.Data.OleDB
```

- **For SQL Server:**

```
Imports System.Data
Imports System.Data.SQLClient
```

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Connection object

- Connects to databases.
- Two provider-specific classes
  - SqlConnection
  - OleDbConnection.
- Connections can be opened in two ways:
  - Explicitly by calling the Open method on the connection
  - Implicitly when using a DataAdapter.
- Connections handle transactions

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Command Object

- Information submitted to a database as a query via a Connection object
- Two provider-specific classes
  - SqlCommand
  - OleDbCommand
- Input and output parameters are supported, along with return values as part of the command syntax
- Results are returned in the form of streams. Accessed by:
  - DataReader object
  - DataSet object via a DataAdapter

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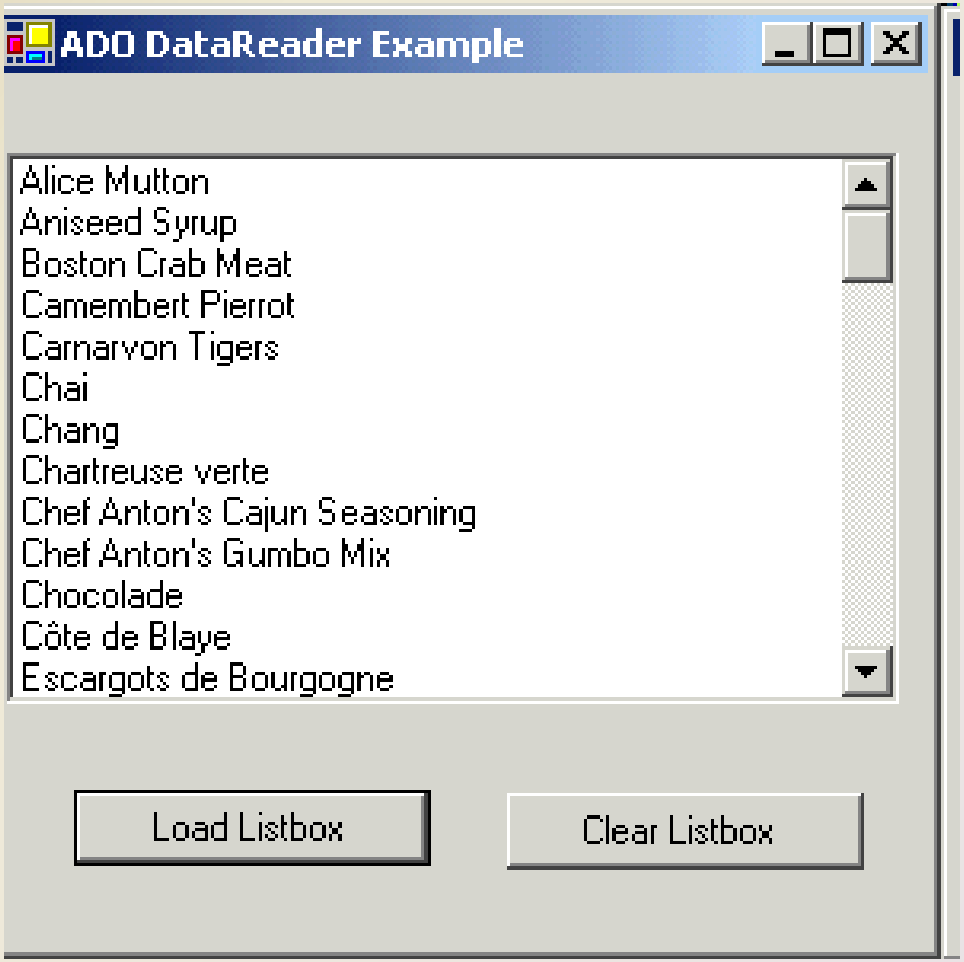
DataReader Object

- Provides methods and properties that deliver a forward-only stream of data rows from a data source
- When a DataReader is used, parts of the ADO.NET model are cut out, providing faster and more efficient data access

Create DataReader Example



Alice Mutton
Aniseed Syrup
Boston Crab Meat
Camembert Pierrot
Carnarvon Tigers
Chai
Chang
Chartreuse verte
Chef Anton's Cajun Seasoning
Chef Anton's Gumbo Mix
Chocolade
Côte de Blaye
Escargots de Bourgogne

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DataAdapter Object

- Provides a set of methods and properties to retrieve and save data between a DataSet and its source data store
- Allows the use of stored procedures
- Connects to the database to fill the DataSet and also update the database

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DataSet Object

- Replaces the ADO Recordset
- Represents a cache of data that contains tables, columns, relationships, and constraints, just like a database
- Regardless of where the source data comes from, data can all be placed into DataSet objects
- Tracks changes that are made to the data it holds before updating the source data
- DataSet are also fully XML-featured
- Works with all current models of data storage: flat, relational, and hierarchical

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DataView Object

- Provides methods and properties that enable UI objects such as a DataGrid to bind to a DataSet
- A view of the data contained in the DataSet
- Only used in conjunction with a DataSet

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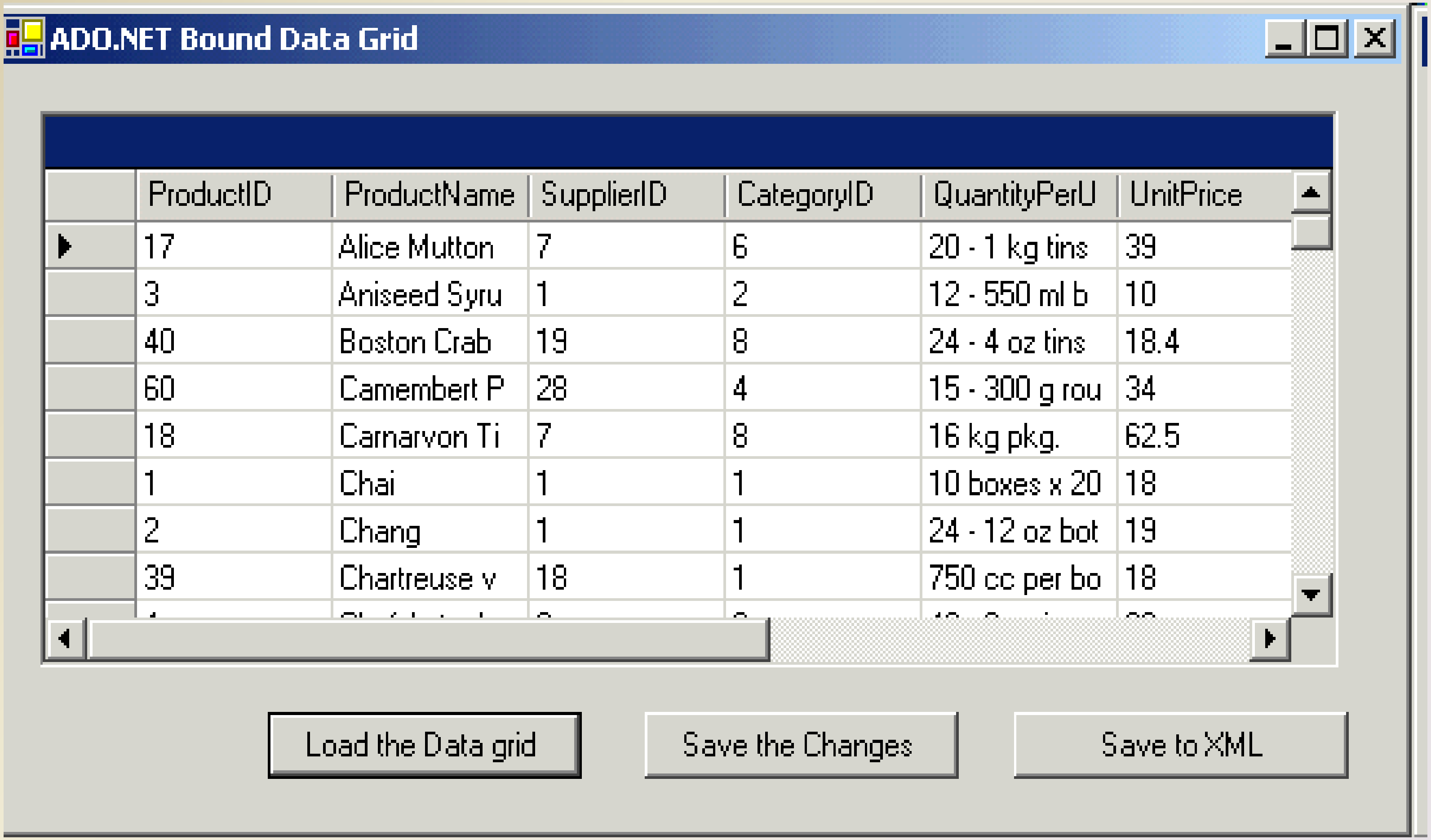
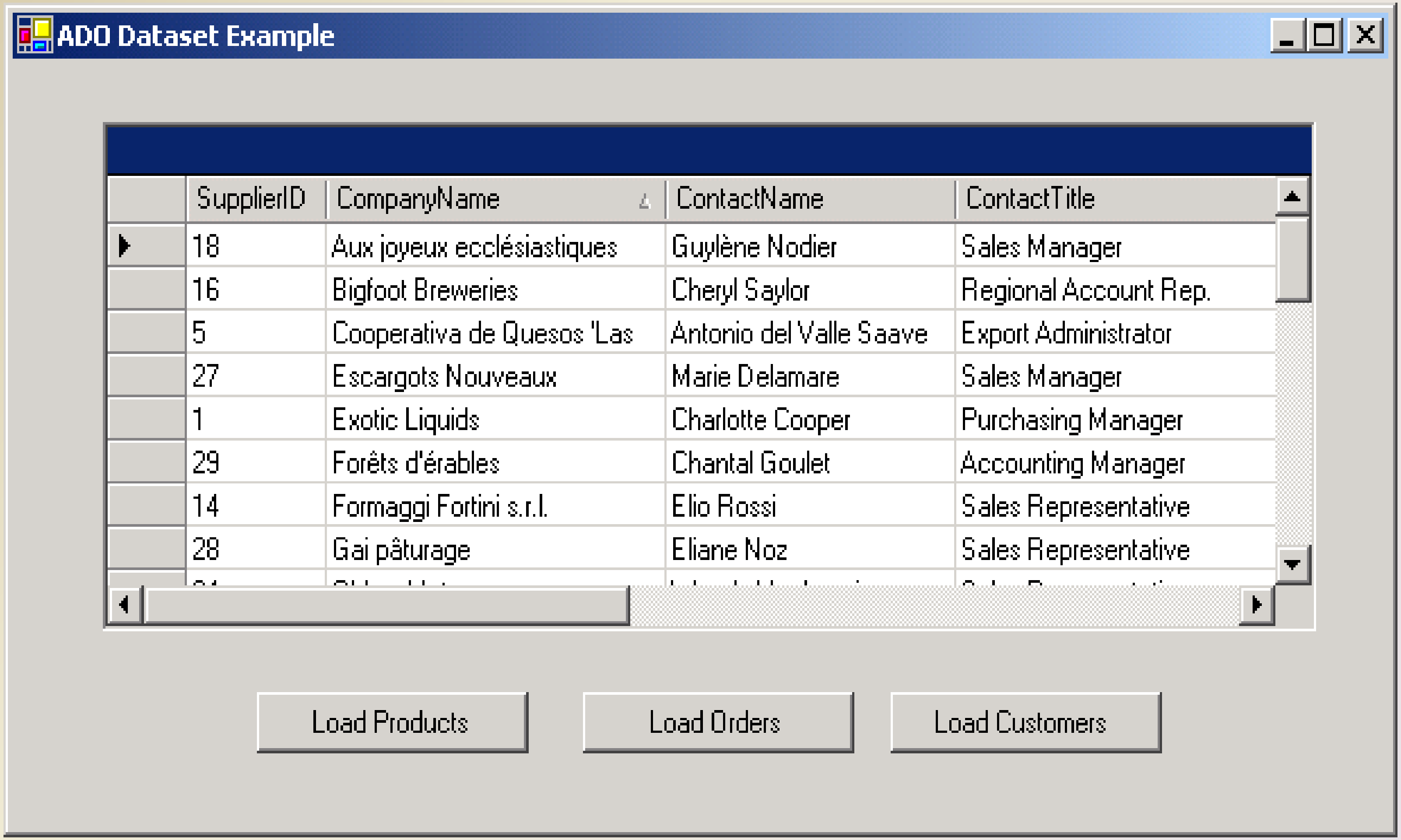
Create Data Access Windows Form



	ProductID	ProductName	SupplierID	CategoryID	QuantityPerU	UnitPrice
▶	17	Alice Mutton	7	6	20 - 1 kg tins	39
	3	Aniseed Syru	1	2	12 - 550 ml b	10
	40	Boston Crab	19	8	24 - 4 oz tins	18.4
	60	Camembert P	28	4	15 - 300 g rou	34
	18	Carnarvon Ti	7	8	16 kg pkg.	62.5
	1	Chai	1	1	10 boxes x 20	18
	2	Chang	1	1	24 - 12 oz bot	19
	39	Chartreuse v	18	1	750 cc per bo	18

Create Multiple Table DataSet Example



SupplierID	CompanyName	ContactName	ContactTitle
18	Aux joyeux ecclésiastiques	Guylène Nodier	Sales Manager
16	Bigfoot Breweries	Cheryl Saylor	Regional Account Rep.
5	Cooperativa de Quesos 'Las	Antonio del Valle Saave	Export Administrator
27	Escargots Nouveaux	Marie Delamare	Sales Manager
1	Exotic Liquids	Charlotte Cooper	Purchasing Manager
29	Forêts d'érables	Chantal Goulet	Accounting Manager
14	Formaggi Fortini s.r.l.	Elio Rossi	Sales Representative
28	Gai pâturage	Eliane Noz	Sales Representative

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