

Best Practices in .NET development with Cheetah

Brent Gross — gross@ca.ibm.com
IBM

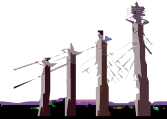
Session B01
Monday, April 28, 2008 • 9:30 a.m. – 10:30 a.m.

2008 IIUG Informix Conference

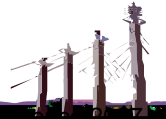


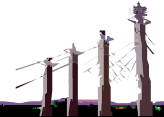
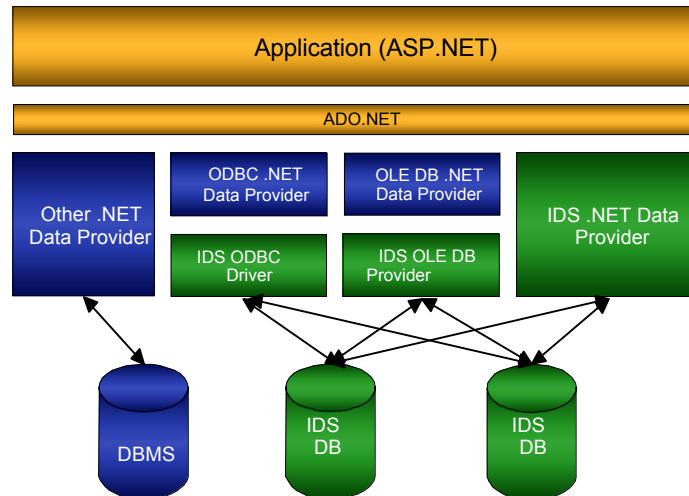
Agenda

- .NET Data Providers
- IDS .NET Data Provider Overview
- What is new for FW 1.1
- What is new for FW 2.0
- Post FW 2.0
- Performance and Productivity Tips



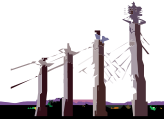
.NET Data Providers



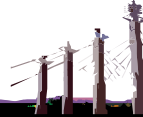
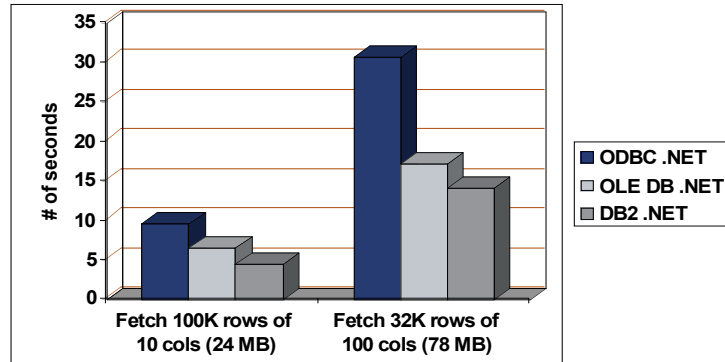


.NET Data Providers

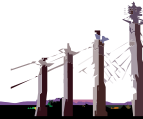
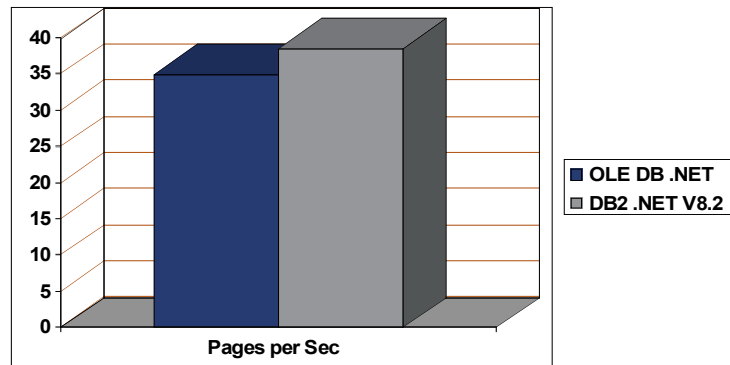
- IDS .NET Data Provider
- OLE DB .NET Data Provider
- ODBC .NET Data Provider
- Customer desire for bridge providers is to enable easy application development against multiple vendor data sources
 - This need will go away as FW 2.0 DbXxx base classes and DbFactory get more use
 - Expect to see much less emphasis on bridge providers in the future
 - MS is following this trend – they are currently NOT planning LINQ support for ODBC .NET or OLE DB .NET



DB2 V8.1.4 .NET Data Provider Comparison

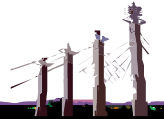


DB2 V8.2 Performance Comparison - Nile



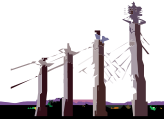
.NET Data Provider Comparison

- Besides better performance for IDS .NET Data Provider, the following are examples of restrictions for OLE DB .NET and ODBC .NET:
 - `DataReader.GetSchemaTable()` does not recognize LOB columns and will generate an exception for it.
 - `DataSet.FillSchema()` does not handle batched SQL statements
 - Newer datatypes are not recognized (e.g. `DecimalFloat`)

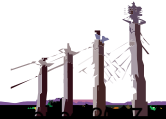


.NET Data Provider Comparison

- Bridge providers do not have newer data types and features
 - IfxBulkCopy, IfxResultSet
 - XML - integration with XmlReader
 - Decimal Float
- Difficulty in diagnosing problems
 - Limitations in MS Bridge providers or ODBC / OLE DB interfaces
 - Connection pooling often an issue
- IBM VS Addins for IDS .NET provider only
- As usage of bridge providers drops off, so does testing

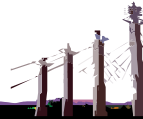


IDS .NET Data Provider



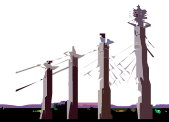
IDS .NET Data Provider

- There are two variants of IDS .NET provider
 - SQLI IDS .NET provider
 - Part of CSDK
 - Supported, but no future enhancements
 - Common (DRDA) IDS .NET provider
 - Common code with DB2 .NET provider
 - Part of IBM Data Server Driver (ds driver)
 - Supports Cheetah (11.10) and later servers
 - New feature stream moving forwards



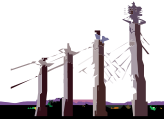
IDS .NET Data Provider

- IBM's .NET support is designed to operate in the .NET environment as .NET programmers expect
- VS Addins fully leverage rapid application development
 - VS Addins also exploit IBM unique features
- Current .NET and Visual Studio skills transportable



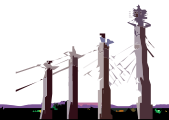
IDS .NET Data Provider

- Advantages of Common IDS .NET provider
 - 64-bit available
 - FW 2.0 Schema metadata APIs
 - Remote database enumeration
 - FW 3.0, 3.5 support



IDS .NET Data Provider - VSAI

- Common IDS .NET provider – VSAI
 - VS 2008 support
 - Web app development
 - Web services (IIS)
 - Schema evolution
 - View / change row data
 - Stored procedures and functions



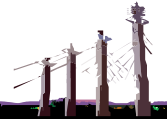
IDS .NET Data Provider

- Common IDS .NET provider – limitations
 - No ODBC escape clauses
 - Direction away from setnet32
 - Env var processing, limited to
 - DB_DATE
 - DBMONEY (money only)
 - DELIMIDENT (default on)
 - FET_BUF_SIZE



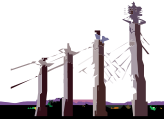
IDS .NET Data Provider

- Common IDS .NET provider – datatype limitations
 - Lobs – as locators only
 - Date time precision – server padding to full time, date or timestamp
 - Boolean – as smallint
 - Money – as Decimal 16,2
 - No current support for collection, interval, multiset, row, set

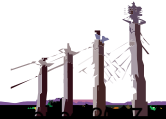


VS Addins Demo – VS 2008

- Server Explorer
 - Enumeration - **filtering**
 - View Data, Script
 - Drag n drop – win app, web app
 - Schema evolution - developers
- Stored Procedures
 - SQL Procedure designer
 - SQL keyword highlighting and Intellisense
- Web Services
 - IIS

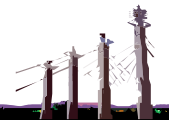


What is new for FW 1.1



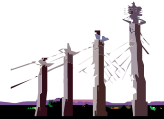
New provider features for FW 1.1

- Accounting information (SQLESETI)
 - Properties on DB2Connection object
- IfxConnection.Enlist
 - Allows delayed enlistment in distributed transaction
- Specify isolation level for distributed transaction
 - Connection string keyword "isolation level"



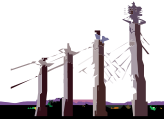
New provider features for FW 1.1

- Named parameters
 - E.g.. SELECT * from table where department = @dept
 - Implemented in IDS .NET
- Chaining
 - IfxConnection.BeginChain, EndChain
 - Allows non-atomic batching of non-query statements
 - Array of IfxError objects indicate individual results
- Multiple Concurrent Data Readers
 - Enables natural processing of parent – child relationship scenarios



New provider features for FW 1.1

- IfxResultSet
 - First .NET scrollable cursor
 - Scrollable, Sensitive, Updateable and SkipDeleted options
 - Specific combinations determined by server
 - LOB columns will force forward only
 - Server side locking semantics
 - Retrieve values just like IfxDataReader
 - Set methods to update values
 - IfxUpdateableRecord to insert a row



New provider features for FW 1.1

- Bulk Copy
 - Easy insert of rows into table from any DataReader
 - Mapping will be performed from source DataReader to destination table
- Testconn
 - .NET diagnostic utility shipped with client
 - Two versions - one for each framework – testconn20, testconn11
 - Performs connection validation with standard .NET connection string
 - Checks items such as package existence and will provide suggestions on resolving common setup problems

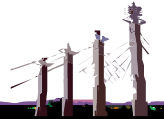


What is New for FW 2.0



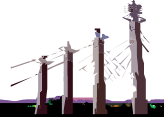
New provider features for FW 2.0

- System.Transaction
 - Much more natural .NET way for using distributed transactions
 - No longer need to inherit from COM based ServicedComponent
 - Always uses global (distributed) transaction
- IfxTypes
 - Alternative to using base framework types
 - Complete set of types matching all supported server column types
 - All types can directly indicate nullability
 - In general, types do not have manipulation operators



New provider features for FW 2.0

- Data Paging
 - E.g.. `IxfCommand.ExecutePageReader( 101, 20 )`
 - Returns a `IxfDataReader` with only row 101 – 120 from the database
 - Easily allows applications to implement paging behavior
 - Implemented with scrollable cursor where possible
 - LOB columns will use skip and discard
 - Use with caution, not a good substitute for SELECT using a primary key range and FETCH FIRST n ROWS
- UpdateBatchSize
 - Allows setting of batch size for DataAdapter
 - Uses chaining under the covers



New provider features for FW 2.0

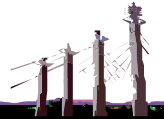
- CacheData property
 - Large types are normally passed from server to application, not held in the provider
 - With streaming, one can not back up within a column value
 - With this enabled, provider will cache value when first Get'ed
 - Can issue multiple Gets on the same row, column value
 - Can also Get as different types (e.g. GetString or GetBytes on XML column)
 - Cached value only valid until next row read
 - Property on IfxConnection and IfxDataReader
 - Caution against using this – large storage cost
 - Allowing for Gets as different types can force internal storage and multiple conversions



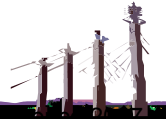
Post FW 2.0 features

- LINQ
 - Language integrated query

```
var query = from cust in dbContext.Customers
             where cust.City == "Seattle"
             select cust;
```
 - LINQ over Entities the extensible model for data providers
 - Only non-MS demo of LINQ over entities at Tech Ed 2007
 - Part of MS Entity Framework Beta 3 announcement
- LINQ Demo
 - Entity Designer
 - LINQ against Entities

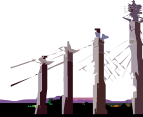


Misc Tips



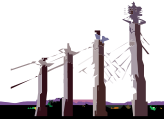
Performance – Reduce Memory Usage

- Managed environment – why do I care about memory
 - Try and make the system work less to cleanup after you
 - None of these are bugs, but they will help prevent out of resource errors on the server
- Select only what you need
 - Applies to rows as well as columns
 - `IfxDataReader.Read` assumes all columns will be Get'd
 - BIG cost in ASP.NET
- Free early to avoid generation 2 allocations
 - The longer an object lives, the harder it is to delete it
 - The more long term objects the system has, the hard it has to work to free memory



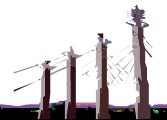
Performance – Reduce Memory Usage

- Connections – open late, close early
 - Maximize the use of connection pooling
- Access columns in order selected
 - This will reduce internal buffering and make the most of streaming
- Other objects – close / dispose, set reference to null
 - `IfxDataReader.Close`, `IfxCommand.Dispose`
 - Allows the server to free locks and clean up locators earlier
 - It will eventually get done in the Finalizer, which is run even less often than the garbage collector



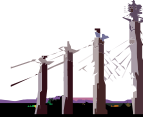
Performance

- Ask once, multiple result sets
 - For example, create a single stored procedure to return two result sets for a connected operation vs. calling two separate stored procedures
 - Single flow to the server will return both results, saving a flow to the server
 - Supported against all servers



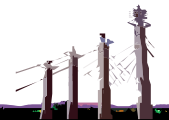
Productivity Tips

- Named parameters
 - Readability
Select * from EMPLOYEE where FNAME = @firstname and
LNAME = @lastname
Parameters.Add("lastname", ...);
Parameters.Add("firstname", ...);
 - Allows binding parameters in any order
- Use Parameter markers vs. building statement from strings
 - Higher hit rate on server side prepared statement cache
 - Avoids SQL injection attacks when parameter values come from user input



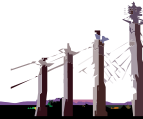
Summary

- Multiple provider options → IDS .NET
- Multiple IDS .NET providers -> Common (DRDA)
- IDS .NET Data Provider and its main classes
- New features for FW 1.1
- New features for FW 2.0
- Ongoing exploitation of .NET features
- Continue to exploit .NET and server strengths



Online references

- Developer Works Visual Studio Zone
 - <http://www.ibm.com/developerworks/db2/zones/vstudio/>
- IDS .NET FAQ
 - <http://www.ibm.com/developerworks/wikis/display/DB2/IDS+and+.NET+FAQ>
- DB2 .NET FAQ
 - <http://www.ibm.com/developerworks/wikis/display/DB2/DB2+and+.NET+FAQ>
- IBM .NET Forum
 - http://www.ibm.com/developerworks/forums/dw_forum.jsp?forum=467&cat=19



More samples and tutorials

- VS Addins Tutorials
 - VS Addins with IDS
 - http://www.ibm.com/developerworks/db2/library/techarticle/dm-0703jayakumar/?S_TACT=105AGX11&S_CMP=LP
 - Good overview of .NET with VS Addins
 - http://www.ibm.com/developerworks/db2/library/techarticle/dm-0710jayakumar/?S_TACT=105AGX11&S_CMP=LP
 - http://www.ibm.com/developerworks/db2/library/techarticle/dm-0711kumar/?S_TACT=105AGX11&S_CMP=LP

