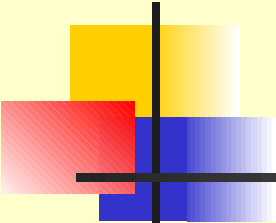




JayBird JCA-JDBC driver

History



Roots

- Original idea was born in discussions between Jim Starkey and David Jencks
- Alejandro Alberola provided initial wire protocol implementation
- Check-ins
 - 9th of May, 2001, project start
 - 24th of May, 2001, wire protocol commit



Active Team

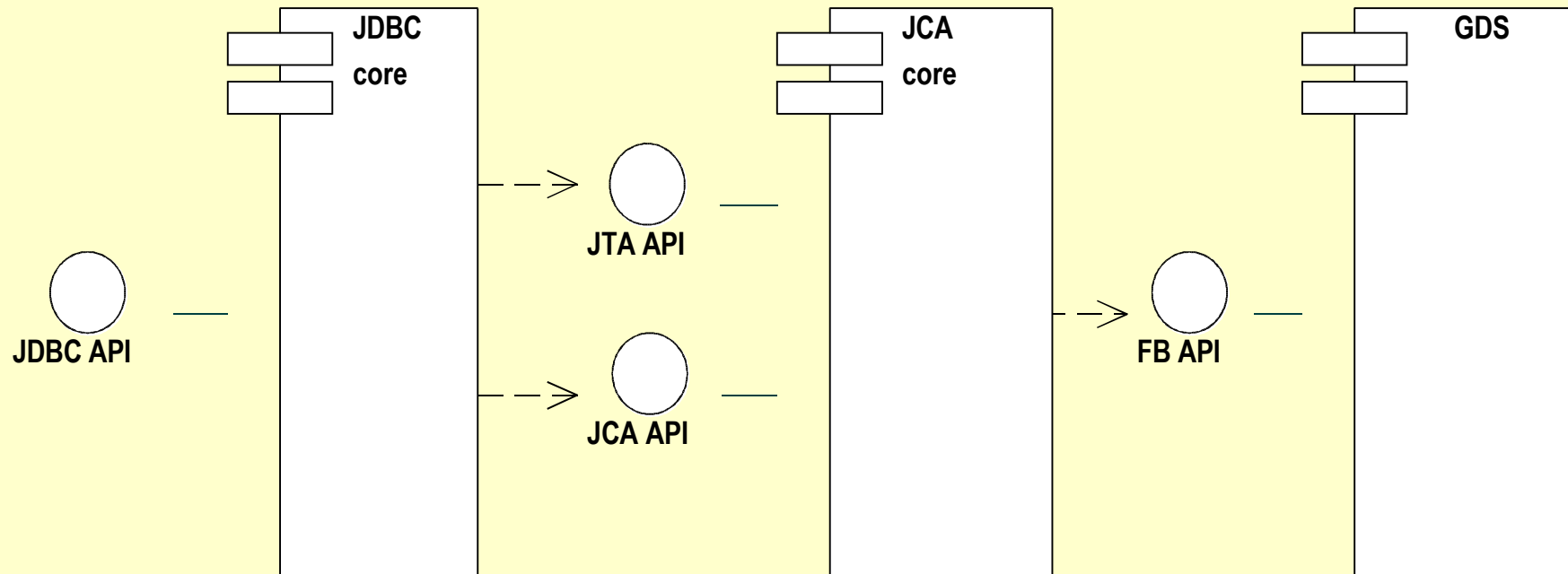
- ▣ Blas Rodriguez Somoza
 - ▣ JDBC conformance, performance optimization
- ▣ David Jencks
 - ▣ project manager, JCA framework
- ▣ Rick Fincher
 - ▣ FAQ, user support
- ▣ Roman Rokytskyy
 - ▣ JDBC implementation, new connection pooling
- ▣ Ryan Baldwin
 - ▣ type 2 driver implementation



Key Features

- ▣ Native wire protocol
- ▣ Native JCA architecture
- ▣ Connection pooling
- ▣ JMX compatible management interface
- ▣ Prepared statements
- ▣ Stored procedures
- ▣ BLOBs
- ▣ Escaped syntax
- ▣ Complete data type conversion support

Architecture





Firebird API

- ▣ `org.firebirdsql.gds.*` package
- ▣ `org.firebirdsql.gds.GDS`
 - ▣ Java translation of C interface `gds.h`
 - ▣ `isc_db_handle`, `isc_tr_handle`,
`isc_stmt_handle`, `isc_blob_handle`
 - ▣ `XSQLDA` and `XSQLVAR`
- ▣ `org.firebirdsql.gds.GDSException`
 - ▣ Java translation of `ISC_STATUS` status vector



Native wire protocol

- ▣ `org.firebirdsql.jgds.*` package
 - ▣ native implementation of protocol v10 (IB 6.0, Firebird 1.0.x, Firebird 1.5)
 - ▣ `isc_attach_database`, `isc_create_database`
 - ▣ `isc_dsql_allocate_statement`, `isc_dsql_prepare2`, `isc_dsql_execute2`, `isc_dsql_exec_immed2`, `isc_dsql_fetch`
 - ▣ `isc_create_blob2`, `isc_open_blob`, `isc_close_blob`, `isc_put_segment`, `isc_get_segment`
 - ▣ `isc_start_transaction`, `isc_commit_transaction`, `isc_rollback_transaction`



JCA 1.0

- ▣ `org.firebirdsql.jca.*` package

- ▣ JCA 1.0 compatible connection management
 - ▣ `FBManagedConnectionFactory`, `FBManagedConnection`
 - ▣ internal connection pooling
- ▣ JTA 1.0 compatible transaction management
 - ▣ `XAResource` and `Xid` support



JDBC 2.0 Core

- `org.firebirdsql.jdbc.*` package

- Common interfaces

- `FBConnection`, `FBStatement`, `FBResultSet`,
`FBPreparedStatement`, `FBCallableStatement`

- Database metadata

- `FBDatabaseMetaData`, `FBResultSetMetaData`

- Access to underlying data

- `FBField` and subclasses, `FBBlob`



JDBC 2.0 Standard Extensions

- ▣ `org.firebirdsql.jdbc.*` package
 - ▣ `javax.sql.DataSource`
 - ▣ `FBDataSource`, `FBSimpleDataSource`,
`FBWrappingDataSource`, `FBDataSourceObjectFactory`
 - ▣ `javax.sql.RowSet`
 - ▣ `FBRowSet`, `FBRowSetInternal`, `FBRowSetReader`,
`FBRowSetWriter`, `FBRowSetListener`



Unsupported JDBC 2.0 Methods

- ▣ Required methods

- ▣ `java.sql.Statement`
 - ▣ `cancel()`
- ▣ `java.sql.CallableStatement`
 - ▣ `registerOutParameter(...)`
- ▣ `java.sql.Blob`
 - ▣ `length()`
 - ▣ `getBytes(long position, int length)`
 - ▣ `position(byte[] pattern, long start)`



Unsupported JDBC 2.0 Methods

- Optional

- ▣ batch updates
- ▣ scrollable cursors
- ▣ updatable cursors
- ▣ `java.sql.Ref`, `java.sql.Clob`, and `java.sql.Array`
- ▣ user defined types/type maps



Unsupported JDBC 2.0 Methods

- ▣ Do not work as expected

- ▣ `java.sql.Statement`

- ▣ `setMaxFieldSize()`

- ▣ `java.sql.PreparedStatement`

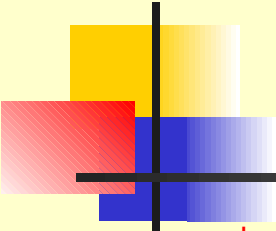
- ▣ `setObject(int, Object, int, int)`

- ▣ `java.sql.ResultSetMetaData`

- ▣ `isReadOnly(), isWritable(), isDefinitelyWritable()`

- ▣ `java.sql.DatabaseMetaData`

- ▣ `getBestRowIdentifier()`



JayBird 1.0 Release

- ▣ Released on 29th of April, 2003
 - ▣ total time of development ~2 years
 - ▣ over 17,000 lines of code
- ▣ Quality assurance
 - ▣ 270 unit test cases
 - ▣ no test case is removed from the system
 - ▣ build system automatically runs all unit test cases
 - ▣ RC1 released on 23rd of September, 2002
 - ▣ great support from community
 - ▣ no bug report without test case



Next Steps

▣ JayBird 1.0.x

▣ fix thread safety issues

- ▣ it is not possible to access methods of JDBC objects from multiple threads

▣ bug fixing

- ▣ `CallableStatement.getResultSet()` returns 1 row with all null records
- ▣ incorrect column size in `DatabaseMetaData.getColumns()` method
- ▣ no default value in `DatabaseMetaData.getColumns()` method



Next Steps

- ▣ JayBird 1.5

- ▣ java.sql.Connection

- ▣ setSavepoint():Savepoint
 - ▣ rollback(Savepoint)

- ▣ java.sql.Blob

- ▣ length()
 - ▣ getBytes(long position, int length)

- ▣ java.sql.Statement

- ▣ setCursorName(String name)
 - ▣ addBatch(String sql)



Next Steps

- ▣ JayBird 1.x

- ▣ `java.sql.ResultSet`
 - ▣ `updateXXX(...)` methods
 - ▣ support of `TYPE_SCROLL_INSENSITIVE`
- ▣ `java.sql.PreparedStatement`
 - ▣ `addBatch()`
- ▣ `java.sql.CallableStatement`
 - ▣ escaped syntax compatibility
 - ▣ `registerOutParameter(...)`



Next steps

- ▣ Type 2 JDBC driver

- ▣ JNI-based implementation of Firebird API
- ▣ can be used together with Embedded Firebird
 - ▣ improves performance ~2 times in local scenario
 - ▣ currently supports only Windows



Next Steps

- ▣ Advanced connection pool

- ▣ `org.firebirdsql.pool.*` package
 - ▣ `ConnectionPoolDataSource` contract support
 - ▣ JDBC object tracking
 - ▣ connection and statement allocation
 - ▣ connection and statement release
 - ▣ prevents access to released objects
 - ▣ helps to debug applications
 - ▣ Prepared statement pooling