Firebird RDBMS

About

- A relational database management system offering many ANSI SQL:2003 features.
- It runs on Linux, Windows, OS X, and a variety of Unix platforms.
- Started as a fork of Borland's open source release of InterBase 6.0
- Codebase is maintained by the Firebird Project at SourceForge.
- The Firebird Project is a commercially independent project of C and C++ programmers, technical advisors and supporters
- A non-profit Firebird Foundation comprised of individuals and companies of various sizes, working together, aims to ensure the continued development of the open source Firebird relational database and related products.

InterBase's History

- In 1984 Jim Starkey ”The Wolf”, founded Groton Database Systems
  - Later became Interbase Software Corporation.
  - Release as InterBase in 1986
  - InterBase is the first RDBs to support multi-versioning, created and offered the blob column type, type event alerts, arrays, and triggers
  - InterBase was sold to Ashton-Tate in 1991, which in turn was sold to Borland.
- In early 2000, Borland announced that InterBase would be released under open source
  - Negotiations to spin off a separate company to manage the product
  - Terms could not be reached
  - InterBase remained Borland product sold to and currently developed by CodeGear as of 2006
- Source code for InterBase version 6 was released under a variant of the Mozilla Public License(IBPL) in mid-2000.

Firebird's History

- 1.0 released
  - Bug-fixed and slightly enhanced variant of InterBase 6.0
  - Minor new features, but all IB docs for 6.0 still mostly apply
- 1.5 was released in 2004
  - First release of 2.x codebase
  - Moved to C++ from C, major code re-write and cleanup
  - Lastest stable version 1.5.5, released on 2007-12-12
- 2.0 was released in 2006.
  - Latest stable version is 2.0.4, released in April 2008.
- 2.1 was released on 2008-4-18
  - Lastest stable version 2.1.1, released on 2008-7-15
- 2.5 is currently in development; an alpha version is expected in the first quarter of 2008, the final by last Quarter of 2008.[2]
- 3.0 will merge code from several codebases, including Firebird 2.1, Vulcan, and Fyracle; an alpha version is scheduled for release in Q4 2008.

Features

- Full support of Stored Procedures and Triggers with fully featured internal language for Stored Procedures and Triggers (PSQL)
- Full ACID compliant transactions
- Referential Integrity
- Multi Generational Architecture (sometimes called MVCC)
- Very small footprint (~60MBs full install, embedded is smaller)
- Support for External Functions (UDFs) in many languages C, C++, Java, etc
- Little or no need for specialized DBAs
- Almost no configuration needed - just install and start using
- Big and very old community and lots of places where you can get good support free or commercial

Features

- Optional single file embedded version - great to create CDROM catalogs, single user or evaluation versions of applications
- Dozens of third party tools, including GUI administrative tools, replication tools, etc.
- Careful writes - fast recovery, no need for transaction logs
- Many ways to access your database: native/API, dbExpress drivers, ODBC, OLEDB, .Net provider, JDBC native type 4 driver, Python module, PHP, Perl, etc
- Native support for all major operating systems, including Windows, Linux, Solaris, Mac OS X
- Incremental Backups
- 64-bit builds available
- Full cursor implementation in PSQL

Architecture

- Classic Server (non-threaded)
  - Allows for programs to directly open the database, instance per connection (legacy ideal for SMP)
  - Allows the same database to be opened by several programs at once
  - Remote connections via xinetd
  - No services API (remote GUI,...)
- Super Server (threaded)
  - Provides a server process, and client process cannot directly open the database. All SQL requests are done via the server using a socket.
  - Makes use of lightweight theads to process the requests
  - Single server process eliminates bottlenecks resulting from arbitration for shared pages and reduces the overhead required for multiple process startups and queries
  - SuperServer improves message interaction performance because a shared library call is always faster than an interprocess communication request to a server process.
  - SuperServer improves integrity because only one server process has write access to the database, rather than one process for each client.
  - Full Services API for statistics, monitoring, remote GUI admin, etc.

Command Line Tools

- isql(fbsql)
  - tool for interactive SQL access to databases. It can also be used to perform administrative tasks in command-line environments (like (metadata) updates via a batch file).
- gbak
  - Tool for online backup and restore of a complete database.
  - Able to perform a backup while the database is running via snapshot taken at start of backup.
  - Visits all pages of the database, so it will also perform a garbage collection on the database.
- gfix
  - Tool for administration issues like data repair, sweeping, etc.
- gsec
  - Tool for user administration.
- fbsvcmgr (new as of v 2.1)
  - Allows use of any service, implemented by firebird.
  - Requires familiarity with firebird services API.
  - It does NOT emulate traditional utilities switches, just a services API frontend.

GUI Tools

- Open Source
  - FlameRobin - http://flamerobin.org
    - Currently and actively developed and maintained
    - Cross platform, light weight, and dependent only on FOSS
  - IBAccess - http://sourceforge.net/projects/ibaccess
    - Old pascal application for InterBase still some what usable
- Commercial
  - Database Workbench (formerly IBWorkbench) - http://www.upscene.com/
  - IBExpert - http://ibexpert.net
- Windows
  - IBConsole
    - Part of InterBase on windows, project on S.F., binaries available from several places
  - IBOConsole
    - Bit more advanced and feature rich version of IBConsole
    - Download location unknown, binaries available from several places

Drivers

- JDBC - JayBird
  - Very stable robust, and rich JDBC driver type 2 and 4
  - Full access to non-JDBC spec Firebird Services API.
- ODBC
  - Open Source one developed by Firebird Project
  - Commercial versions available (mostly legacy and proprietary features)
- .NET
  - Written in C# and provides a high-performance, native implementation of the Firebird API.
- PHP
  - Built in PHP functionality, enable Firebird support at compile time
- Perl
  - DBI driver available in cpan named DBD::InterBase

Foundation

- Legal
  - Firebird Foundation (Inc.) is a non-profit Association incorporated and registered in the state of New South Wales, Australia (certificate INC9878828).
- Objectives
  - Support and advance development
  - Provide the non-commercial infrastructure and mechanisms required to accept and manage funds raised; and disburse such funds to promote and advance the development effort.
  - To encourage cooperation and affiliation with individuals, other non-profit organisations and commercial companies involved in, or planning to become involved in the development, support and promotion of Firebird software projects and associated products and activities.
- Management
  - The affairs of the Foundation are managed by a Management Committee which is elected annually during the Annual General Meeting, by voting members of the Foundation.
- Membership
  - Voting members pay a full subscription of $300 USD per year, which can be paid monthly if you have an Australian bank account or a PayPal account.
  - Those who wish to show their support as Associate members pay an annual subscription of $50 USD.

Community

- Mailing Lists
  - Where most of the community interaction and development takes place
  - Yahoo groups starting with firebird-*, firebird-support, firebird-devel, firebird-java, ...
- IRC
  - Unofficial IRC channel on Freenode.net #firebird
  - Started and moderated by presenter
- Commercial
  - Lots of commercial companies offering paid support for Firebird
  - Best of the best is IBPhoenix
    - Most of the previous Borland InterBase staff works for and owns IBPhoenix
- Free Support from those providing Commercial support
  - It's common to see previous Borland employees, princibles like Jim Starkey, Ann Harrison, Helen Borrie, Paul Beach, Martijn Tonies, ... providing free support via the various mailing lists
  - Same people you can alternatively pay at times for support (sometimes required depending on level required)

Shortcomings

- Replication
  - A few commercial offerings
  - No usable FOSS offerings
  - No native in engine replication support, possibly coming in 3.x
- Clustering
  - No support for clustering
  - No support for clustering file systems
- Network Filesystems
  - No support for nfs, samba, etc
  - Direct block access required by engine
- Visibility and support in FOSS software
  - Most FOSS software supports PostgreSQL or MySQL not Firebird

Fun historic facts

- *Jim got impatient, and began playing with shadowing, which he saw as a way to provide a repeatable read without blocking updates. Then, one morning in the shower, he realized that the shadows could be also prevent update conflicts and undo failed transactions. The multi-generational database revealed itself in that shower.*
- *The multi-generational architecture - Jim's shadowing Eureka - eliminated problems that other databases stumbled over. A reader could create a large, consistent report while others continued to update the same data. Transaction rollback was simple; even crash recovery was automatic.*
- *Crash recovery was essential, because we ran the company on InterBase, from accounting, sales, code management, everything. Electrical failures were common: from overloaded circuits, from August thunderstorms, and from accidentally unplugging a machine by tripping over the power cord. Database recovery was as important to us as to any of our customers.*
- *Before we leave blobs, I would like to make something quite clear. The rendering "BLOb" is an abomination! The fact that "Interbase" was a company and "InterBase" was a product (or was it the other way around? I never could keep them straight.) is bad enough. "BLOb" or "BLoB" or "BlOb" is just too much. Arggggggggggggh!*

Resources

- http://www.firebirdsql.org/
- http://www.ibphoenix.com/
- http://www.firebirdsql.org/index.php?op=files
- http://firebird.sourceforge.net/manual/qsg15-classic-or-super.html
- http://www.ibphoenix.com/main.nfs?a=ibphoenix&page=ibp_ss_vs_classic
- http://www.destructor.de/firebird/
- http://jaybirdwiki.firebirdsql.org
- http://en.wikipedia.org/wiki/Firebird_(database_server)
- http://en.wikipedia.org/wiki/Firebird_Foundation
- http://en.wikipedia.org/wiki/Jim_Starkey
- http://en.wikipedia.org/wiki/Interbase
- http://www.firebirdsql.org/index.php?op=history
- http://www.cvalde.net/misc/blob_true_history.htm