

# Firebird 2.x and 3.0: the Foreseeable Future

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# Development Priorities

- **Reliability and Security**
  - Quick bugfixing
  - Guaranteed recovery
  - More robust security
- **Performance and Scalability**
  - Effective very large database support
  - Full SMP support
  - Optimized caching and data access paths
  - Clustering



# Development Priorities (continued)

- **Flexible Administration**
  - System monitoring and management
  - Activity logging
  - Powerful server utilities
- **SQL Features**
  - New language enhancements and functions
  - Strict compliance with the SQL specification
  - SQL interface to the administration tools



# Current Releases

- **Firebird V1.5.4**
  - **(Backport of Bugfixes for 1.5.x branch)**
- **Firebird V2.0.1**
  - **(Bugfix Release for V2.0)**
- **Firebird V2.1 Beta 1**
  - **(Latest Release)**



# Firebird 2.0 Review

- **Released November 2006**
  - **No 36 gigabyte table size limit**
  - **Larger page cache size available**
  - **64-bit platforms support**
  - **Incremental online backup**
  - **Improved optimizer**
  - **Faster index operations**
  - **More powerful garbage collection**
  - **Flexible database shutdown modes**



# Firebird 2.0 Review (continued)

## ▪ SQL Features

- Derived tables, PSQL cursors, new built-in functions
- User-defined context variables
- DDL: COMMENT, SET/DROP DEFAULT
- DML: EXECUTE BLOCK, INSERT ... RETURNING

## ▪ Security

- More secure password hashing
- Protected access to the security database
- Fixed a number of external vulnerabilities



# Firebird 2.0 Review (continued)

- **International Language Support**
  - **ICU (IBM's International Components for Unicode)**
  - **New UTF-8 implementation and UNICODE collate**
  - **Multi-byte character set fixes and improvements**
  - **UPPER/LOWER do not require a COLLATE clause**
  - **Collations for text blobs, length functions**
  - **New character sets and collations**



# Experimental Code Branches

- **Vulcan**
  - **Unified architecture**  
(superserver, classic and embedded as a single package on all platforms)
  - **Fine-grained multi-threading with a shared cache**
  - **Customizable authentication**  
(server level or database level)
  - **SQL-based user management**
  - **Flexible server configuration**

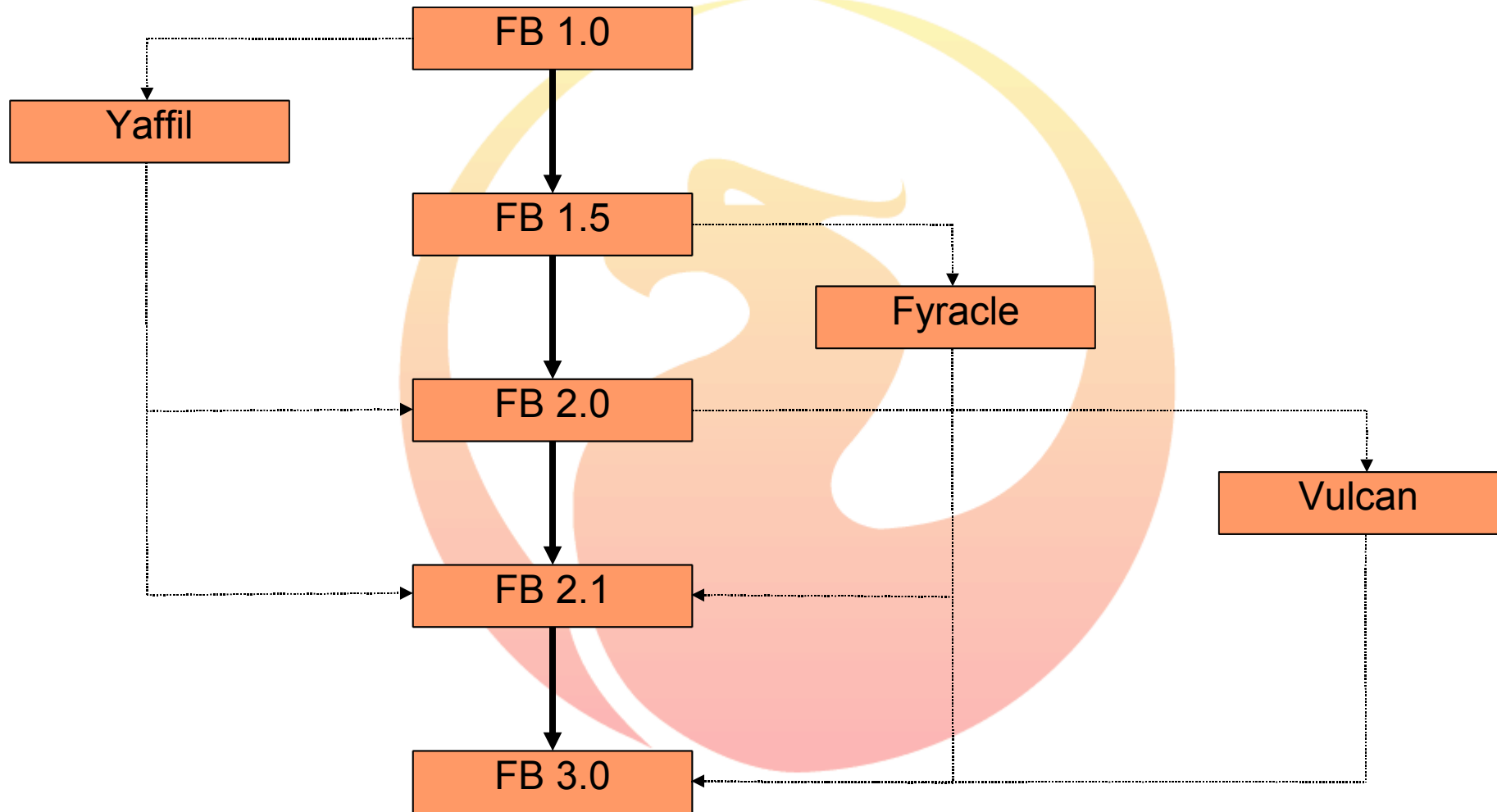


# Experimental Code Branches (continued)

- **Fyracle**
  - **Global temporary tables**
  - **Common table expressions and hierarchical queries**
  - **External procedures and functions (Java and others)**
- **Other**
  - **Trusted authentication in Windows domains**
  - **Database encryption**
  - **Optimized network protocol**



# Experimental Code Branches (continued)



# Firebird 2.1

- **What's in it (Minor release or Major?)**
  - **Global temporary tables**
    - Using data that persists for the lifetime of the connection in which the specified Global Temporary Table was referenced
    - Using data that persists only for the lifetime of the referencing transaction.
  - **Common table expressions and hierarchical queries**
    - Allows you to specify dynamic queries that are recursive
    - The engine begins execution from a non-recursive member
    - For each row evaluated, it starts executing each recursive member one by-one, using the current values from the outer row as parameters.
    - If the currently executing instance of a recursive member produces no rows, execution loops back one level and gets the next row from the outer result set.
    - More efficient than a recursive stored procedure



# Firebird 2.1 (continued)

- **INTL improvements & Text Blobs as strings**
  - Usage of ICU charsets through fbintl
  - UNICODE collation (charset\_UNICODE) available for all fbintl charsets
  - Using collation attributes
  - CREATE/DROP COLLATION statements
  - SHOW COLLATION and collation extraction in ISQL
  - Verifying that text blobs are well-formed
  - Transliterating text blobs automatically
- **Domains in PSQL**
  - It is now possible to use a domain when declaring the data types of arguments and variables in PSQL modules.
- **MERGE and REPLACE statements**
  - You can write a statement that is capable of performing either an update to an existing record or an insert, depending on whether the targeted record exists.



# Firebird 2.1 (continued)

- **Database triggers**
- Newly implemented “database triggers” are user-defined PSQL modules that can be designed to fire in various connection-level and transaction-level events. E.g Connect, Disconnect, Start Transaction, Commit, Rollback
- **Win64**
- 64-bit Windows platform (AMD64 and Intel EM64T) ports of Classic, Superserver and Embedded models.
- **Large number of “New” built in Functions**
- **List function**
- A new aggregate function LIST(<SOMETHING>) retrieves all of the SOMETHINGs in a group and aggregates them into a comma-separated list.



# Firebird 2.1 (continued)

- **Server activity monitoring & query cancellation**
- Firebird 2.1 introduces the ability to monitor server-side activity happening inside a particular database. The engine offers a set of so-called “virtual” tables that provides the user with a snapshot of the current activity within the given database.
- **Optimized network protocol**
- The remote protocol has been improved to perform better in slow networks. In order to achieve this more advanced packet batching is now performed, along with some buffer transmission optimizations. In a real world test scenario, these changes showed about 50% fewer API round trips, thus incurring about 40% fewer TCP roundtrips.
- **Read the Release Notes for more details**
- **Schedule**
- **Q2 2007: Beta version**
- **Q4 2007: Final Release**



# Firebird 3.0

## ▪ Tasks

- **Effective multi-threaded server**
- **Compiled query caching**
- **Continue to improve Optimization for very large databases**

## ▪ Features

- **Clustering abilities**
- **External procedures and functions, SQL functions**
- **External data sources and cross-database queries**
- **Enhanced metadata security**



# Firebird 3.0 (continued)

- **Features (continued)**
  - **New data access paths and optimizer improvements**
  - **Bi-directional index navigation**
  - **Customizable authentication**
  - **Optional activity logging**
  - **Optional database encryption**
- **Schedule**
  - **Q3 2007: Beta version**
  - **Q2 2008: Final Release**



# What's Might Be Next?

- **Performance**

- Table partitioning
- WAL (write-ahead logging)
- Further network protocol improvements

- **Security**

- PAM (pluggable authentication modules)
- Optional network protocol encryption



# What Might Be Next? (continued)

## ▪ Features

- Better support of SQL:2003
- Schemas and long identifiers
- User groups (aggregated privileges)
- PITR (point-in-time recovery)
- Bulk load abilities
- SQL debugging and tracing



Questions?



