Firebird today: Goals and Perspectives

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Firebird Project
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Firebird 3.0 development

- Technical advantages
  - Revised architecture, plugin support
  - Advanced configuration
  - More powerful security
  - and so on

Firebird 3.0 development

- Technical advantages
  - Revised architecture, plugin support
  - Advanced configuration
  - More powerful security
  - and so on
- Timing disaster
  - Five years of development
  - Snowball effect
  - Constantly shifting schedule

Years 2010-2016

- Competitors
  - PostgreSQL 9.1 - … - 9.5
  - MySQL 5.5 - 5.6 - 5.7
  - MariaDB 5.3 - 5.5 - 10.0 - 10.1
  - SQLite 3.8 - … - 3.14
- Recognition
  - 5th position at db-engines.com among open-source RDBMS

Getting back to the game

- Release schedule
  - Time-based, shorter-than-before (targeting at 18 months)
  - Clear planning rules
  - Mandatory (primary) features
  - Optional (secondary) features
  - Planning board available

Getting back to the game

- Maintenance
  - Only v3.0 and v2.5 series are supported
  - Top priority: v3.0 bugfixes and performance fixes
  - Two point releases per year
  - Automated QA, Continuous Integration

Maintenance: Firebird 3.0.1

- What is new
  - Implicit conversion between boolean and string
  - Enforce IPv4 or IPv6 in URL-like connection strings
  - Nested keys in plugin configuration
  - Other misc improvements
  - Performance improved (oltp-emul score: 4500 → 5200)
  - 58 bugs fixed

Next release: Firebird 4.0

- Timeframes
  - Initially available: Q1-2016
  - Alpha expected: Q4-2016
  - Beta expected: Q2-2017
  - Release expected: Q3/Q4-2017

Firebird 4.0: mandatory features

- Mostly implemented
  - Metadata names longer than 31 characters (completed)
  - Incremental restore via nbackup
  - Predefined system roles, sysop permissions
  - Timeout for statements and connections
  - Built-in logical (row level) replication

Firebird 4.0: mandatory features

- Still in progress
  - Batch API operations
  - Numerics with precision longer than 18 digits
  - More optimizer statistics, auto-update

Firebird 4.0: optional features

- Mostly implemented
  - Granting roles to other roles (completed)
  - User groups / accumulative permissions (completed)
  - Support for page size 32KB (completed)
  - PSQL execution security context (completed)
  - Extended window functions
  - TRUNCATE TABLE command

Firebird 4.0: optional features

- Pending in the queue
  - GBAK's multi-threaded restore
  - Support for time zones
  - New data access algorithms
  - Timing statistics
  - Monitoring toolset hooks
  - MVCC improvements

Firebird at GitHub

- Statistics
  - 27 forks
  - 4 new contributors (via pull requests)
  - 45 pull requests processed, 3 pending

RedSoft contributions

- Via GitHub
  - 4 contributors
  - 10 pull requests merged

RedSoft contributions

- Built-in logical replication
  - Cooperated development
  - Open-source under IDPL
  - Almost two years of testing and bugfixing
  - Running in production
  - In the way into Firebird codebase

Future development

- User expectations
  - Reliability
  - Keep it simple to use
  - Administration / monitoring features
  - SQL features
  - Performance / scalability

Future development

- Top-voted features in the tracker
  - Built-in task scheduler
  - Local temporary tables
  - Database links and cross-database queries
  - Spatial data (GIS) support
  - SQL schemas
  - Full-text search / indexing

Future development

- Other considerations
  - Tablespaces
  - Partitioning
  - Multi-master replication
  - Index-only scans
  - Bi-directional index navigation

Firebird usage cases

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  - Typical customer
  - Nice fit: simple, feature complete
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Firebird usage cases

- SMB
  - Typical customer
  - Nice fit: simple, feature complete
  - Proved by time
- Enterprise
  - Can perform well
  - Some features are missing

Firebird storage limits

		Firebird 2.1	Firebird 2.5	Firebird 3.0
Database size	4KB	8TB	8TB	16TB
	8KB	16TB	16TB	32TB
	16KB	32TB	32TB	64TB
Table size	4KB	256GB	256GB - 18TB	18TB
	8KB	1TB	1TB - 18TB	18TB
	16KB	4TB	4TB - 18TB	18TB
Index key size	4KB	1KB	1KB	1KB
	8KB	2KB	2KB	2KB
	16KB	4KB	4KB	4KB
Blob size	4KB	4GB	4GB	4GB
	8KB	32GB	32GB	32GB
	16KB	256GB	256GB	256GB

Firebird usage cases

- Web in the past
  - Mostly about hosting
  - MySQL is an absolute winner
  - PostgreSQL lags far behind
  - Firebird: scalability and security limitations

Firebird usage cases

- Web now
  - High loads, complex stacks
  - PostgreSQL takes an advantage
  - MySQL eats dust… but strikes back with v5.7
  - Lots of geographics information
  - NoSQL buzz, key/value, JSON

Firebird usage cases

- Embedded applications
  - Mobile market is 99% occupied by SQLite
  - Standalone version of client-server solutions
  - LibreOffice case
  - Mobile local server and offline replication
  - Embedded into enterprise stack (SAS for example)

Firebird usage cases

- Uber case
  - https://eng.uber.com/mysql-migration/
  - MySQL → PostgreSQL → MySQL
  - Write amplification
  - Hot standby issues
  - Maybe bad engineering, corner usage cases, but…

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  - Maybe bad engineering, corner usage cases, but…
  - Firebird is not affected by these issues!

Questions?