Database Extensions

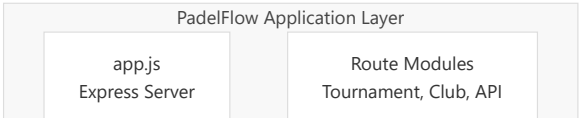
Relevant source files

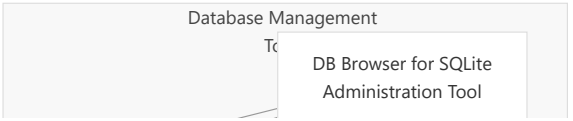
This document covers the SQLite database extensions that enhance PadelFlow's data processing capabilities. These extensions provide mathematical functions, data formatting utilities, and extended SQL functionality beyond the standard SQLite feature set.

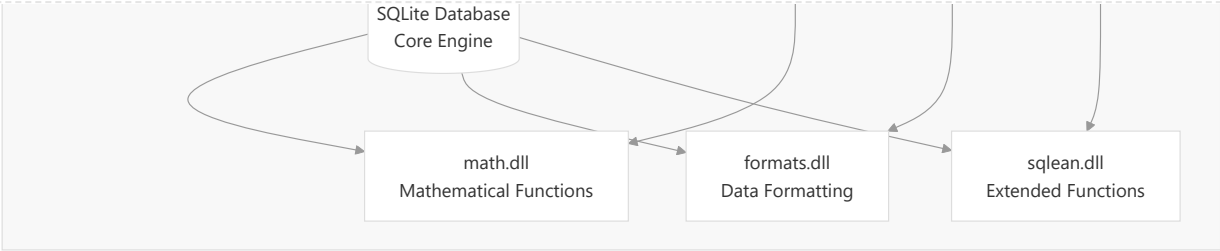
For information about the core SQLite database management and DB Browser tools, see SQLite Database Management. For details about the Qt framework components that support the database tools, see Qt Framework Components.

Purpose and Architecture

The database extensions system provides specialized functionality through dynamically loaded libraries that extend SQLite's built-in capabilities. These extensions enable advanced mathematical calculations, data formatting operations, and additional SQL functions that are essential for tournament management operations.







Sources: System architecture diagrams from the provided overview

Extension Components

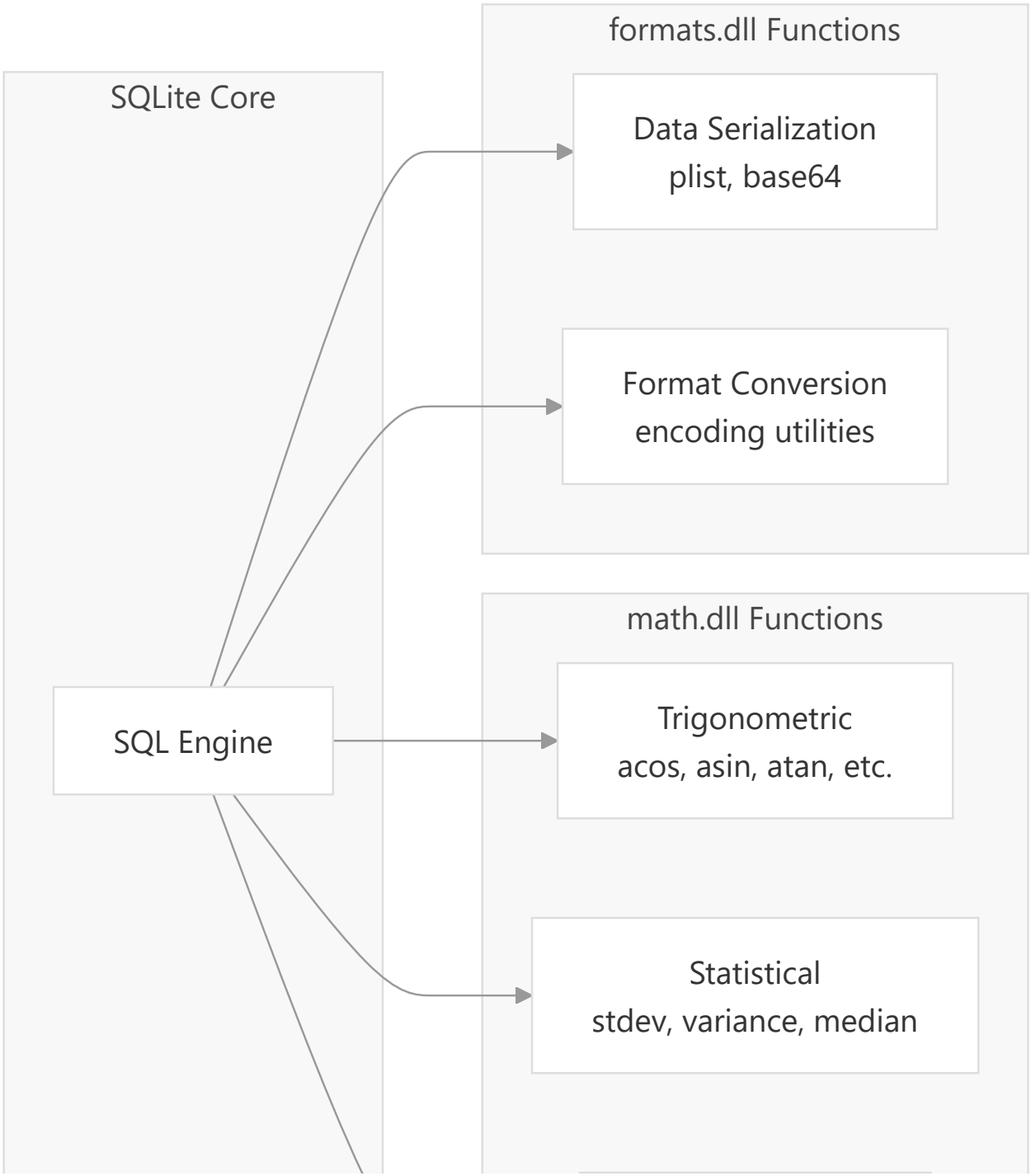
Mathematical Functions Extension

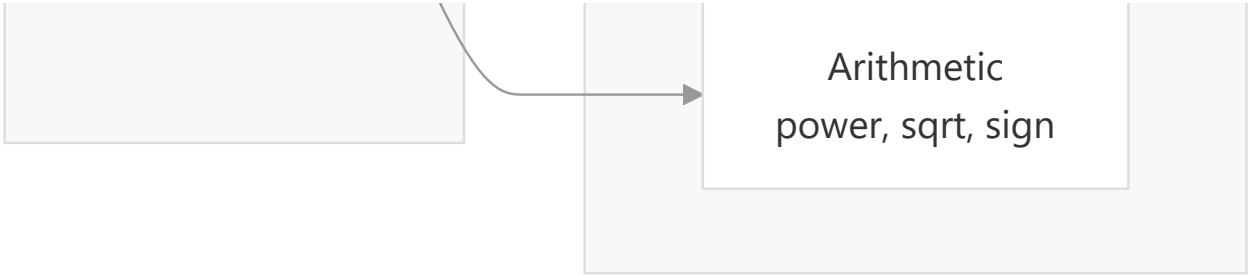
The `math.dll` extension provides advanced mathematical operations for statistical calculations and numerical processing required by tournament scoring systems.

Extension	File	Purpose
Mathematical Functions	`math.dll`	Trigonometric, statistical, and arithmetic operations
Data Formatting	`formats.dll`	Data serialization and format conversion
Extended SQL Functions	`sqlean.dll`	Additional SQL utility functions

Debugging Setup

Project Configuration


formats.dll Functions
SQLite Core
Data Serialization
plist, base64
Format Conversion
encoding utilities
math.dll Functions
SQL Engine
Trigonometric
acos, asin, atan, etc.
Statistical
stdev, variance, median

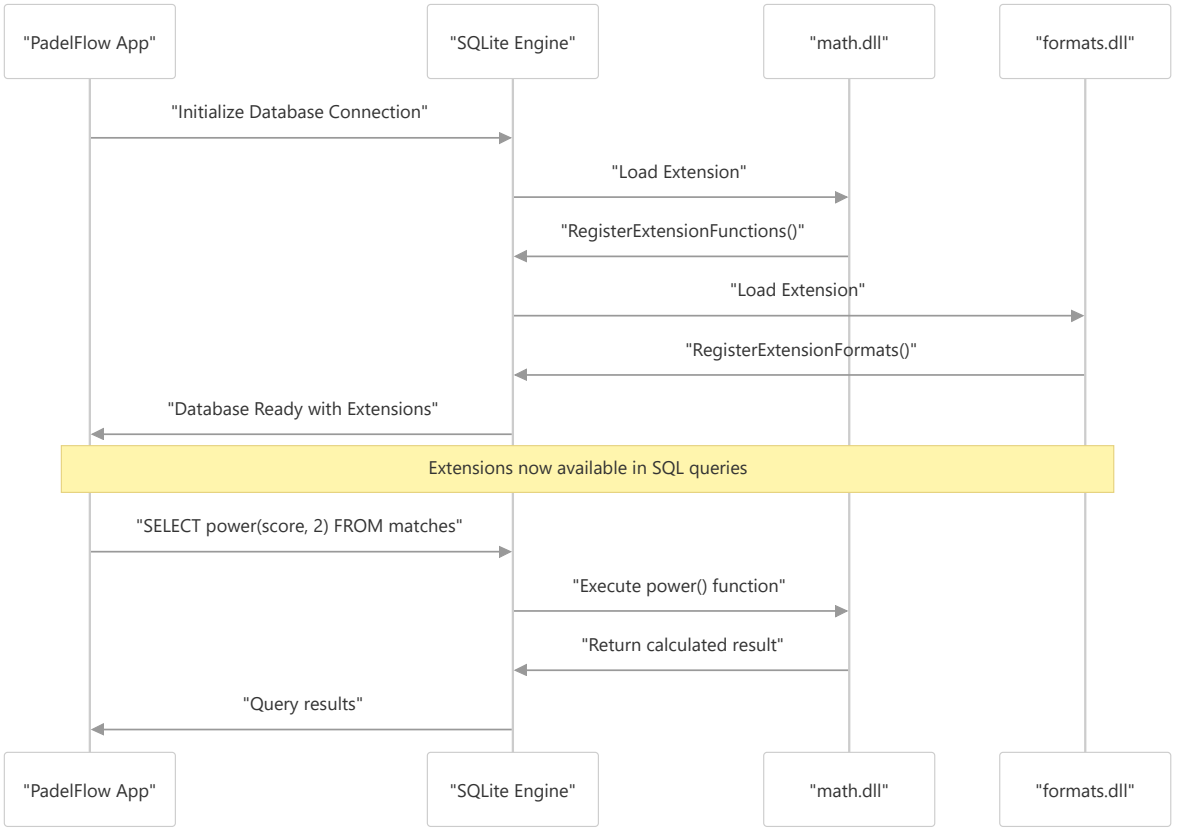


Sources: db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/math.dll

db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/formats.dll

Extension Loading and Integration

The extensions are dynamically loaded by SQLite through the extension loading mechanism. Each extension registers its functions during initialization using the `sqlite3_extension_init` entry point.



Sources: db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/math.dll

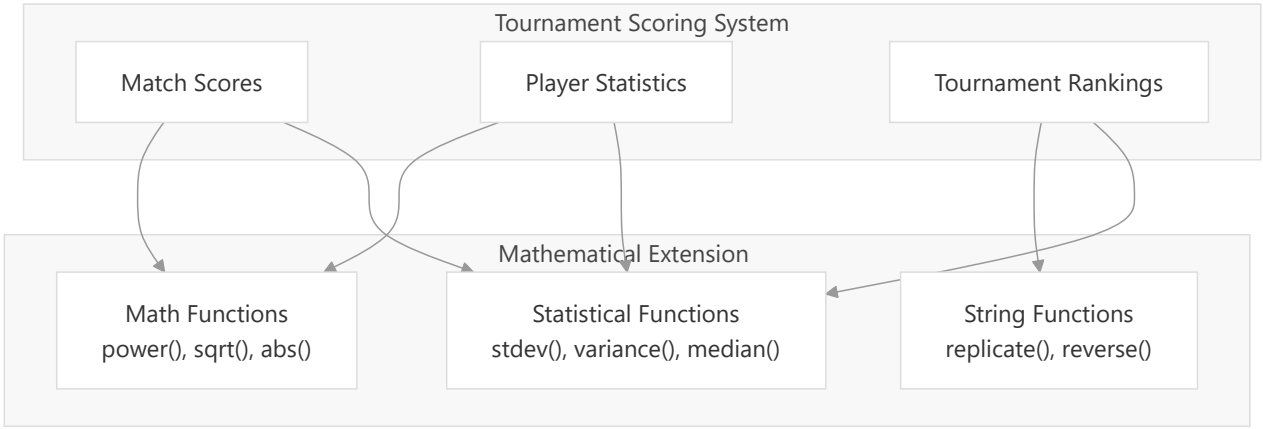
db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/formats.dll

Mathematical Functions

The mathematical extension provides comprehensive numerical operations for tournament calculations, player statistics, and scoring algorithms.

Function Categories

Category	Functions	Use Case
Trigonometric	`acos` , `asin` , `atan` , `cos` , `sin` , `tan`	Geometric calculations
Statistical	`stdev` , `variance` , `median` , `mode`	Player performance analysis
Arithmetic	`power` , `sqrt` , `sign` , `abs`	Score calculations
String Processing	`replicate` , `charindex` , `reverse`	Data manipulation



Sources: db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/math.dll

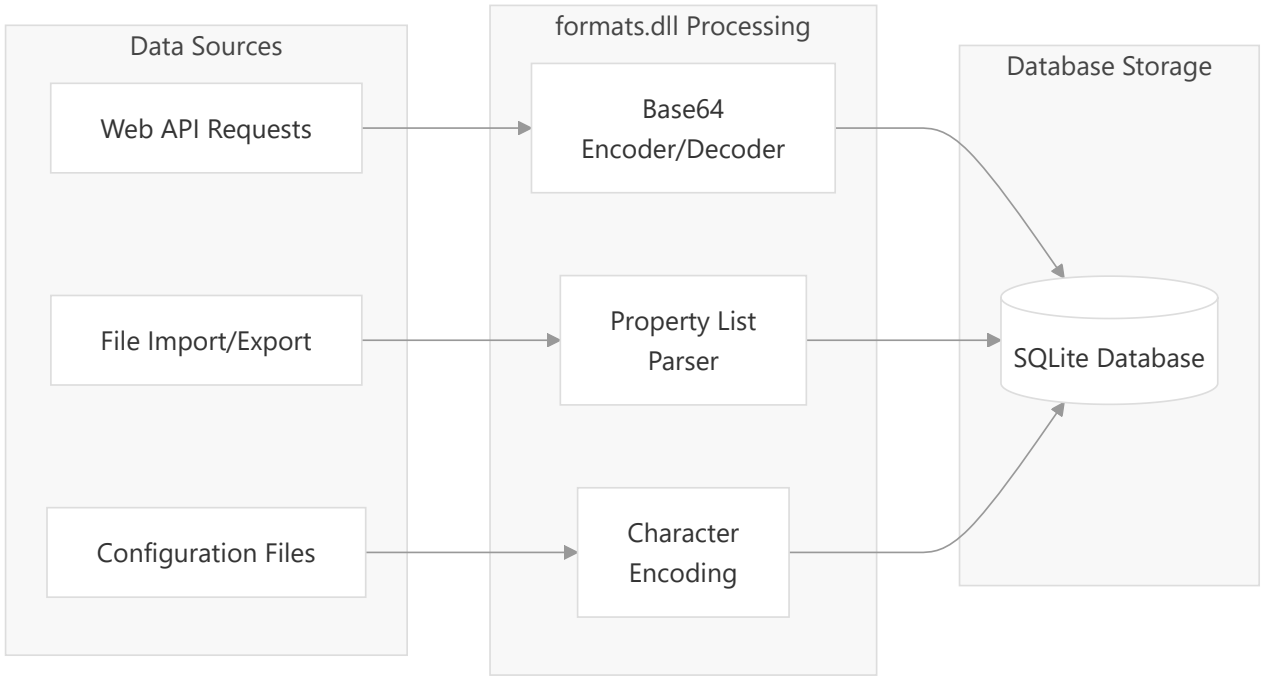
Data Formatting Extension

The formatting extension handles data serialization, encoding conversions, and structured data processing for tournament data interchange.

Format Support

The `formats.dll` extension provides support for multiple data formats commonly used in web applications and data exchange:

- **Base64 Encoding/Decoding**: For binary data transmission
- **Property List (plist) Processing**: For structured configuration data
- **Character Encoding Utilities**: For text processing and internationalization



Sources: db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/formats.dll

Extension Management

The extensions are managed through the DB Browser for SQLite application and are automatically loaded when the database connection is established. The extension system supports both automatic loading during database initialization and manual loading for specific operations.

Extension File Locations

All extension files are located in the `db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/` directory:

- `math.dll` - Mathematical and statistical functions
- `formats.dll` - Data formatting and encoding functions
- `sqlean.dll` - Additional SQL utility functions (referenced but not provided)

The extensions integrate seamlessly with the SQLite query engine, allowing SQL statements to use extended functions as if they were native SQLite functions.

Sources: db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/math.dll

db/DB.Browser.for.SQLite-v3.13.1-win32/extensions/formats.dll