

# Tech Stack Documentation

## Frontend Technologies

### React 18.2.0

- **Purpose:** UI library for building interactive user interfaces
- **Why:** Component-based architecture, efficient rendering, large ecosystem
- **Usage:** All UI components, state management, routing

### Vite 5.0.8

- **Purpose:** Build tool and development server
- **Why:** Fast HMR (Hot Module Replacement), optimized builds, modern tooling
- **Usage:** Development server, production builds, module bundling

### Chart.js 4.4.0

- **Purpose:** Charting library for data visualization
- **Why:** Easy to use, customizable, responsive charts
- **Usage:** Pie charts for expense analytics

### react-chartjs-2 5.2.0

- **Purpose:** React wrapper for Chart.js
- **Why:** Seamless integration with React components
- **Usage:** ExpensePieChart component

## CSS3

- **Purpose:** Styling and layout
- **Features:** RTL support, responsive design, modern CSS features
- **Usage:** All visual styling, animations, responsive breakpoints

## Backend Technologies

### Node.js

- **Purpose:** JavaScript runtime environment
- **Why:** Same language as frontend, large ecosystem, async I/O
- **Version:** Latest LTS (v24.12.0)

### Express 4.18.2

- **Purpose:** Web application framework
- **Why:** Minimal, flexible, widely used, middleware support
- **Usage:** RESTful API endpoints, request handling, middleware

### MongoDB 6.3.0

- **Purpose:** NoSQL database
- **Why:** Flexible schema, JSON-like documents, easy scaling
- **Usage:** Storing children data and transactions

### CORS 2.8.5

- **Purpose:** Cross-Origin Resource Sharing middleware
- **Why:** Allow frontend (Vercel) to call backend (Railway)

- **Usage:** Enable API access from different origins

### dotenv 16.3.1

- **Purpose:** Environment variable management
- **Why:** Secure configuration, separate dev/prod settings
- **Usage:** Loading MongoDB URI and PORT from environment

## Deployment Platforms

### Vercel

- **Purpose:** Frontend hosting and deployment
- **Features:**
  - Automatic deployments from GitHub
  - Global CDN
  - Environment variables
  - Preview deployments
- **Plan:** Free tier (sufficient for this project)

### Railway

- **Purpose:** Backend hosting and deployment
- **Features:**
  - Automatic deployments from GitHub
  - Environment variables
  - Logs and monitoring
  - Custom domains
- **Plan:** Paid (required for Node.js services)

### MongoDB Atlas

- **Purpose:** Cloud database hosting
- **Features:**
  - Managed MongoDB
  - Automatic backups
  - Network security
  - Free tier (512MB)
- **Plan:** Free M0 cluster

## Development Tools

### Git

- **Purpose:** Version control
- **Usage:** Code versioning, collaboration

### GitHub

- **Purpose:** Code repository and collaboration
- **Usage:** Source code hosting, CI/CD triggers

### concurrently 8.2.2

- **Purpose:** Run multiple npm scripts simultaneously
- **Usage:** Development (run frontend + backend together)

## Package Management

- **npm** - Node Package Manager
- **package.json** - Dependency management
- **package-lock.json** - Locked dependency versions

## Build Tools

- **Vite** - Frontend bundler and dev server
- **ESBuild** - Fast JavaScript bundler (used by Vite)
- **Node.js** - Backend runtime

## Browser Support

- Modern browsers (Chrome, Firefox, Safari, Edge)
- RTL (Right-to-Left) support for Hebrew
- Responsive design (mobile, tablet, desktop)

## API Communication

- **RESTful API** - Standard HTTP methods (GET, POST)
- **JSON** - Data exchange format
- **CORS** - Cross-origin requests enabled
- **Error Handling** - HTTP status codes and error messages

## Data Storage

- **Primary:** MongoDB Atlas (cloud)
- **Fallback:** In-memory storage (development/testing)
- **Session Storage:** Browser sessionStorage for login state

## Security Features

- Password protection for parent dashboard
- Session-based authentication
- Input validation (server-side)
- CORS configuration
- MongoDB network access restrictions

## Performance Optimizations

- Auto-refresh intervals (5 seconds for child views)
- Efficient database queries
- CDN for static assets (Vercel)
- Optimized React rendering

## Monitoring & Logging

- **Railway:** Application logs
  - **Vercel:** Build logs and function logs
  - **MongoDB Atlas:** Database metrics
  - **Console Logging:** Server-side error tracking
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