ChartEdge - System Requirements

Introduction

ChartEdge is a lightweight, high-performance open-source charting library, focused on financial data visualization (e.g., trading charts) with future flexibility for broader data types.

Purpose

- Provide fast, interactive charts for web applications.

- Enable real-time data updates and streaming support.

- Support user annotations: lines, rectangles, circles, angles, text.

- Deliver high design flexibility (themes, custom styles).

- Prepare for future extensions: indicators, plugins, and mobile responsiveness.

Scope

- Web-based chart rendering (initially Canvas 2D).

- TypeScript project structure.

- No external rendering libraries (D3.js, etc.).

- Planned optional WebGL upgrade in the future.

Functional Requirements

- Line chart and candlestick chart.

- Pan and zoom capabilities.

- Tooltip or fixed value box when hovering data points.

- Data append (live updating).

- Support for data streaming via API.

- Add static shapes (lines, rectangles, circles, angles, text) via API.

- Interactive drawing and editing of shapes (future phase).

- Theme and style configuration at initialization and runtime.

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Non-Functional Requirements

- Must maintain 60fps performance even with thousands of data points.

- Modular architecture to enable partial builds (tree-shaking).

- Simple and intuitive public API.

- Minimal bundle size.

- Cross-browser compatibility (latest Chrome, Firefox, Safari, Edge).

- Mobile-friendly rendering (stretch goal).

Technical Requirements

- Language: TypeScript (strict mode).

- Build Tool: Vite.

- Rendering: HTML5 Canvas 2D.

- Styling: Custom CSS (no framework like Tailwind).

- GitHub hosting for code, issues, and documentation.

- Testing Framework: Vitest.

Limitations

- No initial support for 3D charts.

- No out-of-the-box indicators (RSI, MACD) in MVP.

- No data storage; all data must be passed from client-side.

Future Extensions

- WebGL renderer for massive datasets.

- Indicator plugins.

- Responsive mode (mobile touch gestures).

- Export charts as images (PNG, SVG).

- Collaborative drawing mode (multi-user annotations).