

Technical Specification

Chat Window / LLM Interface

Cursor-Style AI Assistant Integration

Specification Document

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Version 1.0

Abstract

This document provides a comprehensive technical specification for implementing a Cursor-style chat window and LLM interface within an existing TypeScript application. The chat window supports both local LLM inference (via Ollama or similar) and cloud API providers, features a collapsible panel positioned to the right of the Inspector panel, and provides context-aware AI assistance for development workflows.

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1 Overview

1.1 Purpose

This specification defines the architecture, interfaces, and implementation requirements for an integrated AI chat assistant panel. The system provides:

- Real-time conversational AI assistance within the application
- Context-aware responses utilizing application state and selected elements
- Support for multiple LLM backends (local and API-based)
- Streaming response rendering with code syntax highlighting
- Persistent conversation history with session management

1.2 Scope

The chat window component integrates into the existing application layout as a collapsible right-side panel adjacent to the Inspector panel. It operates independently while maintaining awareness of the application's current context.

1.3 Design Goals

1. **Stability:** Rock-solid operation with graceful degradation on failures
2. **Performance:** Non-blocking UI with efficient streaming response handling
3. **Flexibility:** Provider-agnostic LLM integration supporting local and cloud backends
4. **Accessibility:** WCAG 2.1 AA compliance for all interactive elements
5. **Developer Experience:** Clean TypeScript APIs with comprehensive type safety

2 Architecture

2.1 High-Level Component Diagram

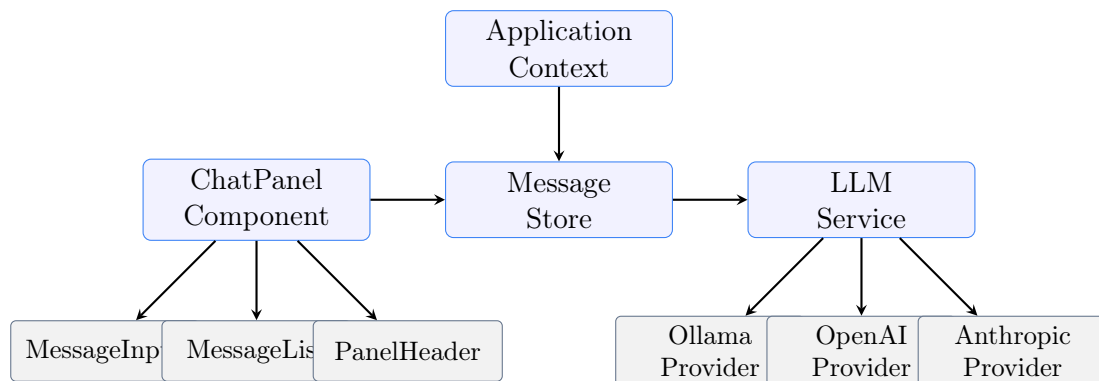


Figure 1: High-level architecture showing component relationships

2.2 Module Structure

```

1 src/
2   chat/
3     components/
4       ChatPanel.tsx      # Main panel container
5       MessageList.tsx   # Scrollable message display

```

6	MessageItem.tsx	# Individual message rendering
7	MessageInput.tsx	# Input area <i>with</i> actions
8	CodeBlock.tsx	# Syntax-highlighted code
9	PanelHeader.tsx	# Title bar <i>with</i> controls
10	ModelSelector.tsx	# LLM provider/model picker
11	ContextIndicator.tsx	# Shows active context
12	hooks/	
13	useChatStore.ts	# Zustand store hook
14	useStreamingResponse.ts	# SSE/streaming handler
15	useLLMConnection.ts	# Provider connection state
16	useAutoScroll.ts	# Smart scroll behavior
17	services/	
18	LLMService.ts	# Provider abstraction layer
19	providers/	
20	OllamaProvider.ts	# Local Ollama integration
21	OpenAIProvider.ts	# OpenAI API provider
22	AnthropicProvider.ts	# Anthropic API provider
23	BaseProvider.ts	# Abstract base <i>class</i>
24	ContextBuilder.ts	# Application context aggregator
25	MessageFormatter.ts	# Markdown/code processing
26	store/	
27	chatStore.ts	# Conversation state management
28	settingsStore.ts	# User preferences
29	types/	
30	index.ts	# Core <i>type</i> definitions
31	messages.ts	# Message-related types
32	providers.ts	# LLM provider types
33	context.ts	# Application context types
34	utils/	
35	tokenCounter.ts	# Token estimation utilities
36	codeParser.ts	# Code block extraction
37	streamParser.ts	# SSE stream parsing
38	constants.ts	# Configuration constants
39	index.ts	# Public API exports

3 TypeScript Type Definitions

3.1 Core Message Types

```

1 // types/messages.ts
2
3 export type MessageRole = 'user' | 'assistant' | 'system';
4
5 export type MessageStatus =
6   | 'pending'      // Awaiting send
7   | 'streaming'    // Currently receiving
8   | 'complete'     // Finished successfully
9   | 'error'        // Failed with error
10  | 'cancelled';    // User cancelled
11
12 export interface CodeBlock {
13   readonly id: string;
14   readonly language: string;
15   readonly code: string;
16   readonly startLine?: number;
17   readonly filename?: string;

```

```

18 }
19
20 export interface MessageAttachment {
21   readonly id: string;
22   readonly type: 'file' | 'selection' | 'image' | 'context';
23   readonly name: string;
24   readonly content: string;
25   readonly mimeType?: string;
26   readonly metadata?: Record<string, unknown>;
27 }
28
29 export interface ChatMessage {
30   readonly id: string;
31   readonly role: MessageRole;
32   readonly content: string;
33   readonly timestamp: Date;
34   readonly status: MessageStatus;
35   readonly codeBlocks: readonly CodeBlock[];
36   readonly attachments: readonly MessageAttachment[];
37   readonly tokenCount?: number;
38   readonly modelId?: string;
39   readonly error?: ChatError;
40   readonly metadata?: MessageMetadata;
41 }
42
43 export interface MessageMetadata {
44   readonly duration?: number;           // Response time in ms
45   readonly promptTokens?: number;
46   readonly completionTokens?: number;
47   readonly totalTokens?: number;
48   readonly finishReason?: string;
49 }
50
51 export interface ChatError {
52   readonly code: string;
53   readonly message: string;
54   readonly recoverable: boolean;
55   readonly details?: unknown;
56 }
57
58 export interface Conversation {
59   readonly id: string;
60   readonly title: string;
61   readonly messages: readonly ChatMessage[];
62   readonly createdAt: Date;
63   readonly updatedAt: Date;
64   readonly modelId: string;
65   readonly systemPrompt?: string;
66   readonly contextConfig: ContextConfig;
67 }

```

3.2 LLM Provider Types

```

1 // types/providers.ts
2
3 export type ProviderType = 'ollama' | 'openai' | 'anthropic' | '
  custom';

```

```

4
5 export interface LLMModel {
6   readonly id: string;
7   readonly name: string;
8   readonly provider: ProviderType;
9   readonly contextWindow: number;
10  readonly maxOutputTokens: number;
11  readonly supportsStreaming: boolean;
12  readonly supportsVision: boolean;
13  readonly costPerInputToken?: number;
14  readonly costPerOutputToken?: number;
15 }
16
17 export interface ProviderConfig {
18   readonly type: ProviderType;
19   readonly enabled: boolean;
20   readonly baseUrl: string;
21   readonly apiKey?: string;
22   readonly defaultModel: string;
23   readonly timeout: number;
24   readonly maxRetries: number;
25   readonly customHeaders?: Record<string, string>;
26 }
27
28 export interface OllamaConfig extends ProviderConfig {
29   readonly type: 'ollama';
30   readonly baseUrl: string; // Default: http://localhost:11434
31   readonly keepAlive?: string;
32   readonly numGpu?: number;
33   readonly numThread?: number;
34 }
35
36 export interface OpenAIConfig extends ProviderConfig {
37   readonly type: 'openai';
38   readonly apiKey: string;
39   readonly organization?: string;
40   readonly baseUrl: string; // Default: https://api.openai.com/v1
41 }
42
43 export interface AnthropicConfig extends ProviderConfig {
44   readonly type: 'anthropic';
45   readonly apiKey: string;
46   readonly baseUrl: string; // Default: https://api.anthropic.com
47   readonly apiVersion: string;
48 }
49
50 export type AnyProviderConfig =
51   | OllamaConfig
52   | OpenAIConfig
53   | AnthropicConfig;
54
55 export interface CompletionRequest {
56   readonly messages: readonly ChatMessage[];
57   readonly model: string;
58   readonly temperature?: number;
59   readonly maxTokens?: number;
60   readonly topP?: number;
61   readonly frequencyPenalty?: number;

```

```

62   readonly presencePenalty?: number;
63   readonly stop?: readonly string[];
64   readonly stream?: boolean;
65   readonly signal?: AbortSignal;
66 }
67
68 export interface CompletionResponse {
69   readonly id: string;
70   readonly content: string;
71   readonly model: string;
72   readonly finishReason: 'stop' | 'length' | 'error';
73   readonly usage: TokenUsage;
74 }
75
76 export interface TokenUsage {
77   readonly promptTokens: number;
78   readonly completionTokens: number;
79   readonly totalTokens: number;
80 }
81
82 export interface StreamChunk {
83   readonly id: string;
84   readonly delta: string;
85   readonly finishReason?: string;
86 }
87
88 export type StreamCallback = (chunk: StreamChunk) => void;
89 export type ErrorCallback = (error: ChatError) => void;

```

3.3 Application Context Types

```

1 // types/context.ts
2
3 export interface SelectionContext {
4   readonly type: 'element' | 'text' | 'code' | 'range';
5   readonly content: string;
6   readonly elementIds?: readonly string[];
7   readonly metadata?: Record<string, unknown>;
8 }
9
10 export interface FileContext {
11   readonly path: string;
12   readonly name: string;
13   readonly content: string;
14   readonly language?: string;
15   readonly selection?: {
16     readonly start: number;
17     readonly end: number;
18   };
19 }
20
21 export interface ApplicationContext {
22   readonly selection: SelectionContext | null;
23   readonly activeFile: FileContext | null;
24   readonly openFiles: readonly FileContext[];
25   readonly projectInfo: ProjectInfo | null;
26   readonly customContext: Record<string, unknown>;

```

```

27 }
28
29 export interface ProjectInfo {
30   readonly name: string;
31   readonly type: string;
32   readonly rootPath: string;
33   readonly dependencies?: Record<string, string>;
34 }
35
36 export interface ContextConfig {
37   readonly includeSelection: boolean;
38   readonly includeActiveFile: boolean;
39   readonly includeOpenFiles: boolean;
40   readonly includeProjectInfo: boolean;
41   readonly maxContextTokens: number;
42   readonly customInstructions?: string;
43 }

```

3.4 Store Types

```

1 // types/store.ts
2
3 export interface ChatState {
4   // Conversations
5   readonly conversations: Map<string, Conversation>;
6   readonly activeConversationId: string | null;
7
8   // UI State
9   readonly isPanelOpen: boolean;
10  readonly isPanelCollapsed: boolean;
11  readonly isLoading: boolean;
12  readonly error: ChatError | null;
13
14  // Provider State
15  readonly activeProvider: ProviderType;
16  readonly activeModel: string;
17  readonly providerStatus: Map<ProviderType, ProviderStatus>;
18
19  // Context
20  readonly contextConfig: ContextConfig;
21  readonly applicationContext: ApplicationContext;
22 }
23
24 export interface ProviderStatus {
25   readonly connected: boolean;
26   readonly lastChecked: Date;
27   readonly availableModels: readonly LLMModel[];
28   readonly error?: string;
29 }
30
31 export interface ChatActions {
32   // Panel
33   togglePanel(): void;
34   setCollapsed(collapsed: boolean): void;
35
36   // Conversations
37   createConversation(title?: string): string;

```

```

38 deleteConversation(id: string): void;
39 setActiveConversation(id: string): void;
40 clearConversation(id: string): void;
41
42 // Messages
43 sendMessage(content: string, attachments?: MessageAttachment[]):
    Promise<void>;
44 cancelStreaming(): void;
45 retryMessage(messageId: string): Promise<void>;
46 deleteMessage(messageId: string): void;
47
48 // Provider
49 setProvider(provider: ProviderType): void;
50 setModel(modelId: string): void;
51 refreshProviderStatus(provider: ProviderType): Promise<void>;
52
53 // Context
54 updateContextConfig(config: Partial<ContextConfig>): void;
55 refreshApplicationContext(): void;
56 }
57
58 export type ChatStore = ChatState & ChatActions;

```

4 LLM Service Implementation

4.1 Abstract Provider Base

```

1 // services/providers/BaseProvider.ts
2
3 export abstract class BaseProvider {
4   protected config: ProviderConfig;
5   protected abortController: AbortController | null = null;
6
7   constructor(config: ProviderConfig) {
8     this.config = config;
9   }
10
11   abstract get name(): string;
12   abstract get type(): ProviderType;
13
14   abstract connect(): Promise<boolean>;
15   abstract disconnect(): Promise<void>;
16   abstract isConnected(): boolean;
17
18   abstract listModels(): Promise<LLMModel[]>;
19
20   abstract complete(
21     request: CompletionRequest
22   ): Promise<CompletionResponse>;
23
24   abstract stream(
25     request: CompletionRequest,
26     onChunk: StreamCallback,
27     onError: ErrorCallback
28   ): Promise<void>;
29

```

```

30  cancel(): void {
31      if (this.abortController) {
32          this.abortController.abort();
33          this.abortController = null;
34      }
35  }
36
37  protected createAbortController(): AbortController {
38      this.cancel();
39      this.abortController = new AbortController();
40      return this.abortController;
41  }
42
43  protected async fetchWithRetry(
44      url: string,
45      options: RequestInit,
46      retries = this.config.maxRetries
47  ): Promise<Response> {
48      let lastError: Error | null = null;
49
50      for (let i = 0; i <= retries; i++) {
51          try {
52              const response = await fetch(url, {
53                  ...options,
54                  signal: this.abortController?.signal,
55              });
56
57              if (response.ok) return response;
58
59              if (response.status >= 500 && i < retries) {
60                  await this.delay(Math.pow(2, i) * 1000);
61                  continue;
62              }
63
64              throw new Error(`HTTP ${response.status}: ${response.
65                  statusText}`);
66          } catch (error) {
67              lastError = error as Error;
68              if (error instanceof Error && error.name === 'AbortError') {
69                  throw error;
70              }
71              if (i < retries) {
72                  await this.delay(Math.pow(2, i) * 1000);
73              }
74          }
75
76          throw lastError;
77      }
78
79      private delay(ms: number): Promise<void> {
80          return new Promise(resolve => setTimeout(resolve, ms));
81      }
82  }

```

4.2 Ollama Provider Implementation

```

1 // services/providers/OllamaProvider.ts
2
3 import { BaseProvider } from './BaseProvider';
4
5 export class OllamaProvider extends BaseProvider {
6   private connected = false;
7
8   get name(): string { return 'Ollama'; }
9   get type(): ProviderType { return 'ollama'; }
10
11   async connect(): Promise<boolean> {
12     try {
13       const response = await fetch(`${this.config.baseUrl}/api/tags`)
14       ;
15       this.connected = response.ok;
16       return this.connected;
17     } catch {
18       this.connected = false;
19       return false;
20     }
21   }
22
23   async disconnect(): Promise<void> {
24     this.connected = false;
25   }
26
27   isConnected(): boolean {
28     return this.connected;
29   }
30
31   async listModels(): Promise<LLMModel[]> {
32     const response = await this.fetchWithRetry(
33       `${this.config.baseUrl}/api/tags`,
34       { method: 'GET' }
35     );
36
37     const data = await response.json();
38
39     return data.models.map((model: any) => ({
40       id: model.name,
41       name: model.name,
42       provider: 'ollama',
43       contextWindow: model.details?.parameter_size || 4096,
44       maxOutputTokens: 4096,
45       supportsStreaming: true,
46       supportsVision: model.details?.families?.includes('clip') ??
47         false,
48     })));
49
50   async complete(request: CompletionRequest): Promise<
51     CompletionResponse> {
52     const controller = this.createAbortController();
53
54     const response = await this.fetchWithRetry(
55       `${this.config.baseUrl}/api/chat`,
56       {

```

```

55     method: 'POST',
56     headers: { 'Content-Type': 'application/json' },
57     body: JSON.stringify({
58         model: request.model,
59         messages: this.formatMessages(request.messages),
60         stream: false,
61         options: {
62             temperature: request.temperature ?? 0.7,
63             num_predict: request.maxTokens ?? 2048,
64             top_p: request.topP ?? 0.9,
65             stop: request.stop,
66         },
67     }),
68     signal: controller.signal,
69 }
70 );
71
72 const data = await response.json();
73
74 return {
75     id: crypto.randomUUID(),
76     content: data.message.content,
77     model: request.model,
78     finishReason: data.done ? 'stop' : 'length',
79     usage: {
80         promptTokens: data.prompt_eval_count ?? 0,
81         completionTokens: data.eval_count ?? 0,
82         totalTokens: (data.prompt_eval_count ?? 0) + (data.eval_count
            ?? 0),
83     },
84 };
85 }
86
87 async stream(
88     request: CompletionRequest,
89     onChunk: StreamCallback,
90     onError: ErrorCallback
91 ): Promise<void> {
92     const controller = this.createAbortController();
93
94     try {
95         const response = await fetch(`${this.config.baseUrl}/api/chat`,
            {
96             method: 'POST',
97             headers: { 'Content-Type': 'application/json' },
98             body: JSON.stringify({
99                 model: request.model,
100                 messages: this.formatMessages(request.messages),
101                 stream: true,
102                 options: {
103                     temperature: request.temperature ?? 0.7,
104                     num_predict: request.maxTokens ?? 2048,
105                     top_p: request.topP ?? 0.9,
106                     stop: request.stop,
107                 },
108             }),
109             signal: controller.signal,
110         });

```

```

111
112     if (!response.ok) {
113         throw new Error(`HTTP ${response.status}`);
114     }
115
116     const reader = response.body?.getReader();
117     if (!reader) throw new Error('No response body');
118
119     const decoder = new TextDecoder();
120     let buffer = '';
121
122     while (true) {
123         const { done, value } = await reader.read();
124         if (done) break;
125
126         buffer += decoder.decode(value, { stream: true });
127         const lines = buffer.split('\n');
128         buffer = lines.pop() ?? '';
129
130         for (const line of lines) {
131             if (!line.trim()) continue;
132
133             try {
134                 const data = JSON.parse(line);
135                 onChunk({
136                     id: crypto.randomUUID(),
137                     delta: data.message?.content ?? '',
138                     finishReason: data.done ? 'stop' : undefined,
139                 });
140             } catch (e) {
141                 // Skip malformed JSON
142             }
143         }
144     }
145     } catch (error) {
146         if (error instanceof Error && error.name !== 'AbortError') {
147             onError({
148                 code: 'STREAM_ERROR',
149                 message: error.message,
150                 recoverable: true,
151             });
152         }
153     }
154 }
155
156 private formatMessages(messages: readonly ChatMessage[]): any[] {
157     return messages.map(msg => ({
158         role: msg.role,
159         content: msg.content,
160     }));
161 }
162 }

```

4.3 LLM Service Facade

```

1 // services/LLMService.ts
2

```

```

3 import { OllamaProvider } from '../providers/OllamaProvider';
4 import { OpenAIProvider } from '../providers/OpenAIProvider';
5 import { AnthropicProvider } from '../providers/AnthropicProvider';
6
7 export class LLMService {
8     private providers: Map<ProviderType, BaseProvider> = new Map();
9     private activeProvider: BaseProvider | null = null;
10
11     constructor(configs: AnyProviderConfig[]) {
12         for (const config of configs) {
13             if (!config.enabled) continue;
14
15             const provider = this.createProvider(config);
16             if (provider) {
17                 this.providers.set(config.type, provider);
18             }
19         }
20     }
21
22     private createProvider(config: AnyProviderConfig): BaseProvider |
        null {
23         switch (config.type) {
24             case 'ollama':
25                 return new OllamaProvider(config);
26             case 'openai':
27                 return new OpenAIProvider(config);
28             case 'anthropic':
29                 return new AnthropicProvider(config);
30             default:
31                 return null;
32         }
33     }
34
35     async initialize(): Promise<Map<ProviderType, boolean>> {
36         const results = new Map<ProviderType, boolean>();
37
38         for (const [type, provider] of this.providers) {
39             const connected = await provider.connect();
40             results.set(type, connected);
41         }
42
43         // Set first connected provider as active
44         for (const [type, connected] of results) {
45             if (connected) {
46                 this.activeProvider = this.providers.get(type) ?? null;
47                 break;
48             }
49         }
50
51         return results;
52     }
53
54     setActiveProvider(type: ProviderType): boolean {
55         const provider = this.providers.get(type);
56         if (provider?.isConnected()) {
57             this.activeProvider = provider;
58             return true;
59         }

```

```

60     return false;
61 }
62
63 getActiveProvider(): BaseProvider | null {
64     return this.activeProvider;
65 }
66
67 async complete(request: CompletionRequest): Promise<
68     CompletionResponse> {
69     if (!this.activeProvider) {
70         throw new Error('No active LLM provider');
71     }
72     return this.activeProvider.complete(request);
73 }
74
75 async stream(
76     request: CompletionRequest,
77     onChunk: StreamCallback,
78     onError: ErrorCallback
79 ): Promise<void> {
80     if (!this.activeProvider) {
81         throw new Error('No active LLM provider');
82     }
83     return this.activeProvider.stream(request, onChunk, onError);
84 }
85
86 cancel(): void {
87     this.activeProvider?.cancel();
88 }
89
90 async listModels(type?: ProviderType): Promise<LLMModel[]> {
91     if (type) {
92         const provider = this.providers.get(type);
93         return provider?.listModels() ?? [];
94     }
95
96     const allModels: LLMModel[] = [];
97     for (const provider of this.providers.values()) {
98         if (provider.isConnected()) {
99             allModels.push(...await provider.listModels());
100         }
101     }
102     return allModels;
103 }

```

5 UI Component Specifications

5.1 Panel Layout

Layout Requirements

- Position: Right side of application, adjacent to Inspector panel
- Default width: 400px (configurable: 300px–600px)
- Collapsible: Minimize to 48px icon strip
- Resizable: Horizontal drag handle on left edge
- Z-index: Above main canvas, below modals (z-index: 100)
- Responsive: Collapse automatically below 1200px viewport width

```

1 // components/ChatPanel.tsx
2
3 import { useState, useCallback, useRef } from 'react';
4 import { useChatStore } from '../hooks/useChatStore';
5
6 interface ChatPanelProps {
7   defaultWidth?: number;
8   minWidth?: number;
9   maxWidth?: number;
10  collapsedWidth?: number;
11 }
12
13 export const ChatPanel: React.FC<ChatPanelProps> = ({
14   defaultWidth = 400,
15   minWidth = 300,
16   maxWidth = 600,
17   collapsedWidth = 48,
18 }) => {
19   const {
20     isPanelOpen,
21     isPanelCollapsed,
22     isLoading,
23     togglePanel,
24     setCollapsed,
25   } = useChatStore();
26
27   const [width, setWidth] = useState(defaultWidth);
28   const panelRef = useRef<HTMLDivElement>(null);
29   const resizing = useRef(false);
30
31   const handleResizeStart = useCallback((e: React.MouseEvent) => {
32     e.preventDefault();
33     resizing.current = true;
34
35     const startX = e.clientX;
36     const startWidth = width;
37
38     const handleMouseMove = (e: MouseEvent) => {
39       if (!resizing.current) return;
40       const delta = startX - e.clientX;
41       const newWidth = Math.min(maxWidth, Math.max(minWidth,
42         startWidth + delta));
43       setWidth(newWidth);
44     };
45
46     const handleMouseUp = () => {

```

```

46     resizing.current = false;
47     document.removeEventListener('mousemove', handleMouseMove);
48     document.removeEventListener('mouseup', handleMouseUp);
49 };
50
51     document.addEventListener('mousemove', handleMouseMove);
52     document.addEventListener('mouseup', handleMouseUp);
53 }, [width, minWidth, maxWidth]);
54
55 if (!isPanelOpen) return null;
56
57 const panelWidth = isPanelCollapsed ? collapsedWidth : width;
58
59 return (
60     <aside
61         ref={panelRef}
62         className="chat-panel"
63         style={{ width: panelWidth }}
64         aria-label="AI Chat Assistant"
65         role="complementary"
66     >
67         { /* Resize Handle */ }
68         { !isPanelCollapsed && (
69             <div
70                 className="chat-panel__resize-handle"
71                 onMouseDown={handleResizeStart}
72                 role="separator"
73                 aria-orientation="vertical"
74                 aria-label="Resize chat panel"
75             />
76         ) }
77
78         { /* Panel Content */ }
79         { isPanelCollapsed ? (
80             <CollapsedPanel onExpand={() => setCollapsed(false)} />
81         ) : (
82             <>
83                 <PanelHeader onCollapse={() => setCollapsed(true)} />
84                 <MessageList />
85                 <MessageInput disabled={isLoading} />
86             </>
87         ) }
88     </aside>
89 );
90 };

```

5.2 Message List Component

```

1 // components/MessageList.tsx
2
3 import { useRef, useEffect, useCallback } from 'react';
4 import { useChatStore } from '../hooks/useChatStore';
5 import { useAutoScroll } from '../hooks/useAutoScroll';
6 import { MessageItem } from './MessageItem';
7
8 export const MessageList: React.FC = () => {
9     const { activeConversation } = useChatStore();

```

```

10  const containerRef = useRef<HTMLDivElement>(null);
11  const { scrollToBottom, isAtBottom } = useAutoScroll(containerRef);
12
13  const messages = activeConversation?.messages ?? [];
14
15  // Auto-scroll on new messages when at bottom
16  useEffect(() => {
17    if (isAtBottom) {
18      scrollToBottom();
19    }
20  }, [messages.length, isAtBottom, scrollToBottom]);
21
22  if (messages.length === 0) {
23    return (
24      <div className="message-list message-list--empty">
25        <div className="message-list__placeholder">
26          <IconSparkles size={48} />
27          <h3>Start a conversation</h3>
28          <p>Ask questions, get help with code, or discuss your
29            project.</p>
30        </div>
31      </div>
32    );
33  }
34
35  return (
36    <div
37      ref={containerRef}
38      className="message-list"
39      role="log"
40      aria-live="polite"
41      aria-label="Conversation messages"
42    >
43      {messages.map((message, index) => (
44        <MessageItem
45          key={message.id}
46          message={message}
47          isLast={index === messages.length - 1}
48        />
49      ))}
50    </div>
51  );

```

5.3 Message Input Component

```

1  // components/MessageInput.tsx
2
3  import { useState, useRef, useCallback, KeyboardEvent } from 'react';
4  import { useChatStore } from '../hooks/useChatStore';
5
6  interface MessageInputProps {
7    disabled?: boolean;
8    maxLength?: number;
9  }
10
11  export const MessageInput: React.FC<MessageInputProps> = ({

```

```

12   disabled = false,
13   maxLength = 32000,
14 }) => {
15   const [input, setInput] = useState('');
16   const [attachments, setAttachments] = useState<MessageAttachment
17     []>([]);
18   const textareaRef = useRef<HTMLTextAreaElement>(null);
19   const { sendMessage, isLoading, cancelStreaming } = useChatStore();
20
21   const handleSubmit = useCallback(async () => {
22     const trimmed = input.trim();
23     if (!trimmed || disabled || isLoading) return;
24
25     setInput('');
26     setAttachments([]);
27
28     await sendMessage(trimmed, attachments);
29   }, [input, attachments, disabled, isLoading, sendMessage]);
30
31   const handleKeyDown = useCallback((e: KeyboardEvent<
32     HTMLTextAreaElement>) => {
33     if (e.key === 'Enter' && !e.shiftKey) {
34       e.preventDefault();
35       handleSubmit();
36     }
37   }, [handleSubmit]);
38
39   // Auto-resize textarea
40   useEffect(() => {
41     const textarea = textareaRef.current;
42     if (textarea) {
43       textarea.style.height = 'auto';
44       textarea.style.height = `${Math.min(textarea.scrollHeight, 200)}px`;
45     }
46   }, [input]);
47
48   return (
49     <div className="message-input">
50       {/* Attachments Preview */}
51       {attachments.length > 0 && (
52         <AttachmentList
53           attachments={attachments}
54           onRemove={(id) => setAttachments(a => a.filter(x => x.id
55             !== id))}
56         />
57       )}
58
59       {/* Input Area */}
60       <div className="message-input__field">
61         <textarea
62           ref={textareaRef}
63           value={input}
64           onChange={(e) => setInput(e.target.value)}
65           onKeyDown={handleKeyDown}
66           placeholder="Ask anything..."
67           disabled={disabled}

```

```

66         maxLength={maxLength}
67         rows={1}
68         aria-label="Message input"
69     />
70
71     {/* Actions */}
72     <div className="message-input__actions">
73         <AttachButton onAttach={(a) => setAttachments(prev => [...
74             prev, a])} />
75
76         {isLoading ? (
77             <button
78                 onClick={cancelStreaming}
79                 className="message-input__cancel"
80                 aria-label="Cancel response"
81             >
82                 <IconStop size={20} />
83             </button>
84         ) : (
85             <button
86                 onClick={handleSubmit}
87                 disabled={!input.trim() || disabled}
88                 className="message-input__send"
89                 aria-label="Send message"
90             >
91                 <IconSend size={20} />
92             </button>
93         )}
94     </div>
95
96     {/* Character Count */}
97     <div className="message-input__footer">
98         <span className="message-input__count">
99             {input.length} / {maxLength}
100         </span>
101         <ModelIndicator />
102     </div>
103 </div>
104 );
105 };

```

5.4 Code Block Rendering

```

1 // components/CodeBlock.tsx
2
3 import { useState, useCallback } from 'react';
4 import { highlight, languages } from 'prismjs';
5 import 'prismjs/components/prism-typescript';
6 import 'prismjs/components/prism-javascript';
7 import 'prismjs/components/prism-python';
8 import 'prismjs/components/prism-css';
9 import 'prismjs/components/prism-json';
10
11 interface CodeBlockProps {
12     code: string;
13     language: string;

```

```

14   filename?: string;
15   showLineNumbers?: boolean;
16   onCopy?: () => void;
17   onInsert?: (code: string) => void;
18 }
19
20 export const CodeBlock: React.FC<CodeBlockProps> = ({
21   code,
22   language,
23   filename,
24   showLineNumbers = true,
25   onCopy,
26   onInsert,
27 }) => {
28   const [copied, setCopied] = useState(false);
29
30   const handleCopy = useCallback(async () => {
31     await navigator.clipboard.writeText(code);
32     setCopied(true);
33     onCopy?.();
34     setTimeout(() => setCopied(false), 2000);
35   }, [code, onCopy]);
36
37   const highlightedCode = highlight(
38     code,
39     languages[language] || languages.plaintext,
40     language
41   );
42
43   return (
44     <div className="code-block">
45       {/* Header */}
46       <div className="code-block__header">
47         {filename && (
48           <span className="code-block__filename">
49             <IconFile size={14} />
50             {filename}
51           </span>
52         )}
53       <span className="code-block__language">{language}</span>
54
55       <div className="code-block__actions">
56         {onInsert && (
57           <button
58             onClick={() => onInsert(code)}
59             className="code-block__action"
60             title="Insert at cursor"
61           >
62             <IconCursorText size={16} />
63           </button>
64         )}
65         <button
66           onClick={handleCopy}
67           className="code-block__action"
68           title={copied ? 'Copied!' : 'Copy code'}
69         >
70           {copied ? <IconCheck size={16} /> : <IconCopy size={16} />}

```

```

71         </button>
72     </div>
73 </div>
74
75     { /* Code Content */ }
76     <pre className="code-block__content">
77         <code
78             className={`language-${language}`}
79             dangerouslySetInnerHTML={{ __html: highlightedCode }}
80         />
81     </pre>
82 </div>
83 );
84 };

```

6 State Management

6.1 Zustand Store Implementation

```

1 // store/chatStore.ts
2
3 import { create } from 'zustand';
4 import { devtools, persist } from 'zustand/middleware';
5 import { immer } from 'zustand/middleware/immer';
6
7 export const useChatStore = create<ChatStore>()(
8     devtools(
9         persist(
10             immer((set, get) => ({
11                 // Initial State
12                 conversations: new Map(),
13                 activeConversationId: null,
14                 isPanelOpen: false,
15                 isPanelCollapsed: false,
16                 isLoading: false,
17                 error: null,
18                 activeProvider: 'ollama',
19                 activeModel: 'llama3.1:8b',
20                 providerStatus: new Map(),
21                 contextConfig: {
22                     includeSelection: true,
23                     includeActiveFile: true,
24                     includeOpenFiles: false,
25                     includeProjectInfo: true,
26                     maxContextTokens: 8000,
27                 },
28                 applicationContext: {
29                     selection: null,
30                     activeFile: null,
31                     openFiles: [],
32                     projectInfo: null,
33                     customContext: {},
34                 },
35
36                 // Panel Actions
37                 togglePanel: () => set(state => {

```

```

38     state.isPanelOpen = !state.isPanelOpen;
39   }},
40
41   setCollapsed: (collapsed) => set(state => {
42     state.isPanelCollapsed = collapsed;
43   }},
44
45   // Conversation Actions
46   createConversation: (title) => {
47     const id = crypto.randomUUID();
48     const conversation: Conversation = {
49       id,
50       title: title ?? `Chat ${new Date().toLocaleDateString()}`,
51       messages: [],
52       createdAt: new Date(),
53       updatedAt: new Date(),
54       modelId: get().activeModel,
55       contextConfig: get().contextConfig,
56     };
57
58     set(state => {
59       state.conversations.set(id, conversation);
60       state.activeConversationId = id;
61     });
62
63     return id;
64   },
65
66   deleteConversation: (id) => set(state => {
67     state.conversations.delete(id);
68     if (state.activeConversationId === id) {
69       const remaining = Array.from(state.conversations.keys());
70       state.activeConversationId = remaining[0] ?? null;
71     }
72   }},
73
74   setActiveConversation: (id) => set(state => {
75     if (state.conversations.has(id)) {
76       state.activeConversationId = id;
77     }
78   }},
79
80   clearConversation: (id) => set(state => {
81     const conv = state.conversations.get(id);
82     if (conv) {
83       conv.messages = [];
84       conv.updatedAt = new Date();
85     }
86   }},
87
88   // Message Actions
89   sendMessage: async (content, attachments = []) => {
90     const { activeConversationId, activeModel } = get();
91
92     let conversationId = activeConversationId;
93     if (!conversationId) {
94       conversationId = get().createConversation();

```

```

95     }
96
97     // Create user message
98     const userMessage: ChatMessage = {
99         id: crypto.randomUUID(),
100         role: 'user',
101         content,
102         timestamp: new Date(),
103         status: 'complete',
104         codeBlocks: [],
105         attachments,
106     };
107
108     // Create placeholder assistant message
109     const assistantMessage: ChatMessage = {
110         id: crypto.randomUUID(),
111         role: 'assistant',
112         content: '',
113         timestamp: new Date(),
114         status: 'streaming',
115         codeBlocks: [],
116         attachments: [],
117         modelId: activeModel,
118     };
119
120     // Add messages to conversation
121     set(state => {
122         const conv = state.conversations.get(conversationId!);
123         if (conv) {
124             conv.messages = [...conv.messages, userMessage,
125                 assistantMessage];
126             conv.updatedAt = new Date();
127         }
128         state.isLoading = true;
129         state.error = null;
130     });
131
132     // Stream response
133     try {
134         const llmService = getLLMService();
135         const conv = get().conversations.get(conversationId);
136
137         await llmService.stream(
138             {
139                 messages: conv?.messages ?? [],
140                 model: activeModel,
141                 temperature: 0.7,
142                 maxTokens: 4096,
143             },
144             // On chunk
145             (chunk) => {
146                 set(state => {
147                     const conv = state.conversations.get(conversationId
148                         !);
149                     if (conv) {
150                         const msgIndex = conv.messages.findIndex(
151                             m => m.id === assistantMessage.id
152                         );

```

```

151         if (msgIndex >= 0) {
152             const msg = conv.messages[msgIndex];
153             conv.messages[msgIndex] = {
154                 ...msg,
155                 content: msg.content + chunk.delta,
156                 status: chunk.finishReason ? 'complete' : '
streaming',
157             };
158         }
159     }
160 });
161 },
162 // On error
163 (error) => {
164     set(state => {
165         state.error = error;
166         const conv = state.conversations.get(conversationId
!);
167         if (conv) {
168             const msgIndex = conv.messages.findIndex(
169                 m => m.id === assistantMessage.id
170             );
171             if (msgIndex >= 0) {
172                 conv.messages[msgIndex] = {
173                     ...conv.messages[msgIndex],
174                     status: 'error',
175                     error,
176                 };
177             }
178         }
179     });
180 }
181 );
182 } finally {
183     set(state => {
184         state.isLoading = false;
185     });
186 }
187 },
188
189 cancelStreaming: () => {
190     getLLMService().cancel();
191     set(state => {
192         state.isLoading = false;
193         const convId = state.activeConversationId;
194         if (convId) {
195             const conv = state.conversations.get(convId);
196             if (conv) {
197                 const lastMsg = conv.messages[conv.messages.length -
1];
198                 if (lastMsg?.status === 'streaming') {
199                     conv.messages[conv.messages.length - 1] = {
200                         ...lastMsg,
201                         status: 'cancelled',
202                     };
203                 }
204             }
205         }

```

```

206     });
207   },
208
209   retryMessage: async (messageId) => {
210     // Implementation for retry logic
211   },
212
213   deleteMessage: (messageId) => set(state => {
214     const convId = state.activeConversationId;
215     if (convId) {
216       const conv = state.conversations.get(convId);
217       if (conv) {
218         conv.messages = conv.messages.filter(m => m.id !==
219           messageId);
220       }
221     }
222   })),
223
224   // Provider Actions
225   setProvider: (provider) => set(state => {
226     state.activeProvider = provider;
227   })),
228
229   setModel: (modelId) => set(state => {
230     state.activeModel = modelId;
231   })),
232
233   refreshProviderStatus: async (provider) => {
234     // Implementation for provider status refresh
235   },
236
237   // Context Actions
238   updateContextConfig: (config) => set(state => {
239     state.contextConfig = { ...state.contextConfig, ...config
240     });
241   })),
242
243   refreshApplicationContext: () => {
244     // Hook into application state to get current context
245   },
246 })),
247 {
248   name: 'chat-storage',
249   partialize: (state) => ({
250     conversations: Array.from(state.conversations.entries()),
251     activeProvider: state.activeProvider,
252     activeModel: state.activeModel,
253     contextConfig: state.contextConfig,
254   }),
255 }
256 ),
257 { name: 'ChatStore' }
258 );

```

7 Context Building

7.1 Context Builder Service

```
1 // services/ContextBuilder.ts
2
3 export class ContextBuilder {
4   private config: ContextConfig;
5   private tokenCounter: TokenCounter;
6
7   constructor(config: ContextConfig) {
8     this.config = config;
9     this.tokenCounter = new TokenCounter();
10  }
11
12  build(context: ApplicationContext): string {
13    const sections: string[] = [];
14    let totalTokens = 0;
15
16    // System instructions
17    const systemPrompt = this.buildSystemPrompt();
18    sections.push(systemPrompt);
19    totalTokens += this.tokenCounter.count(systemPrompt);
20
21    // Selection context
22    if (this.config.includeSelection && context.selection) {
23      const selectionCtx = this.formatSelection(context.selection);
24      const tokens = this.tokenCounter.count(selectionCtx);
25
26      if (totalTokens + tokens <= this.config.maxContextTokens) {
27        sections.push(selectionCtx);
28        totalTokens += tokens;
29      }
30    }
31
32    // Active file context
33    if (this.config.includeActiveFile && context.activeFile) {
34      const fileCtx = this.formatFile(context.activeFile);
35      const tokens = this.tokenCounter.count(fileCtx);
36
37      if (totalTokens + tokens <= this.config.maxContextTokens) {
38        sections.push(fileCtx);
39        totalTokens += tokens;
40      }
41    }
42
43    // Project info
44    if (this.config.includeProjectInfo && context.projectInfo) {
45      const projectCtx = this.formatProject(context.projectInfo);
46      const tokens = this.tokenCounter.count(projectCtx);
47
48      if (totalTokens + tokens <= this.config.maxContextTokens) {
49        sections.push(projectCtx);
50        totalTokens += tokens;
51      }
52    }
53
54    // Custom instructions
```

```

55     if (this.config.customInstructions) {
56         sections.push('\n## Custom Instructions\n${this.config.
            customInstructions}');
57     }
58
59     return sections.join('\n\n');
60 }
61
62 private buildSystemPrompt(): string {
63     return 'You are an AI assistant integrated into a design/
        development application.
64 Your role is to help users with:
65 - Understanding and modifying their designs
66 - Writing and debugging code
67 - Explaining concepts and best practices
68 - Answering questions about the application
69
70 Always be concise and helpful. When providing code, use appropriate
    syntax highlighting.
71 If you're unsure about something, ask for clarification.';
72 }
73
74 private formatSelection(selection: SelectionContext): string {
75     return '## Current Selection
76 Type: ${selection.type}
77 ${selection.elementIds ? 'Elements: ${selection.elementIds.join(', ')}
    }' : ''}
78
79 \'\'\'\
80 ${selection.content}
81 \'\'\'\';
82 }
83
84 private formatFile(file: FileContext): string {
85     const lang = file.language ?? this.detectLanguage(file.name);
86     let content = file.content;
87
88     // Highlight selection if present
89     if (file.selection) {
90         content = this.highlightSelection(content, file.selection);
91     }
92
93     return '## Active File: ${file.name}
94 Path: ${file.path}
95
96 \'\'\\'${lang}
97 ${content}
98 \'\'\'\';
99 }
100
101 private formatProject(project: ProjectInfo): string {
102     return '## Project Information
103 Name: ${project.name}
104 Type: ${project.type}
105 Path: ${project.rootPath}';
106 }
107
108 private detectLanguage(filename: string): string {

```

```

109     const ext = filename.split('.').pop()?.toLowerCase();
110     const langMap: Record<string, string> = {
111         ts: 'typescript',
112         tsx: 'typescript',
113         js: 'javascript',
114         jsx: 'javascript',
115         py: 'python',
116         css: 'css',
117         json: 'json',
118         html: 'html',
119     };
120     return langMap[ext ?? ''] ?? 'plaintext';
121 }
122
123 private highlightSelection(
124     content: string,
125     selection: { start: number; end: number }
126 ): string {
127     const before = content.slice(0, selection.start);
128     const selected = content.slice(selection.start, selection.end);
129     const after = content.slice(selection.end);
130     return `${before}/* >>> SELECTED START >>> */${selected}/* <<<
        SELECTED END <<< */${after}`;
131 }
132 }

```

8 Configuration

8.1 Default Configuration

```

1 // constants.ts
2
3 export const DEFAULT_PROVIDERS: AnyProviderConfig[] = [
4     {
5         type: 'ollama',
6         enabled: true,
7         baseUrl: 'http://localhost:11434',
8         defaultModel: 'llama3.1:8b',
9         timeout: 120000,
10        maxRetries: 3,
11    },
12    {
13        type: 'openai',
14        enabled: false,
15        baseUrl: 'https://api.openai.com/v1',
16        apiKey: '',
17        defaultModel: 'gpt-4-turbo',
18        timeout: 60000,
19        maxRetries: 3,
20    },
21    {
22        type: 'anthropic',
23        enabled: false,
24        baseUrl: 'https://api.anthropic.com',
25        apiKey: '',
26        apiVersion: '2024-01-01',

```

```
27     defaultModel: 'claude-3-sonnet-20240229',
28     timeout: 60000,
29     maxRetries: 3,
30   },
31 ];
32
33 export const PANEL_CONFIG = {
34   defaultWidth: 400,
35   minWidth: 300,
36   maxWidth: 600,
37   collapsedWidth: 48,
38   autoCollapseBreakpoint: 1200,
39 } as const;
40
41 export const MESSAGE_CONFIG = {
42   maxLength: 32000,
43   maxAttachments: 10,
44   maxAttachmentSize: 10 * 1024 * 1024, // 10MB
45 } as const;
46
47 export const CONTEXT_CONFIG: ContextConfig = {
48   includeSelection: true,
49   includeActiveFile: true,
50   includeOpenFiles: false,
51   includeProjectInfo: true,
52   maxContextTokens: 8000,
53 };
54
55 export const SUPPORTED_CODE_LANGUAGES = [
56   'typescript',
57   'javascript',
58   'python',
59   'css',
60   'html',
61   'json',
62   'markdown',
63   'yaml',
64   'sql',
65   'bash',
66   'rust',
67   'go',
68 ] as const;
```

9 Accessibility Requirements

9.1 WCAG 2.1 AA Compliance

Accessibility Requirements

1. Keyboard Navigation:

- All interactive elements focusable via Tab
- Escape closes panel/cancels streaming
- Enter sends message (Shift+Enter for newline)
- Arrow keys navigate conversation history

2. Screen Reader Support:

- ARIA labels on all interactive elements
- Live regions for streaming responses
- Proper heading hierarchy
- Descriptive button labels

3. Visual Accessibility:

- Minimum contrast ratio 4.5:1 for text
- Focus indicators visible (2px outline minimum)
- No reliance on color alone for information
- Resizable text up to 200%

4. Motion/Animation:

- Respect `prefers-reduced-motion`
- No auto-playing animations
- Typing indicator can be disabled

10 Error Handling

10.1 Error Categories and Recovery

Error Code	Category	Recovery Strategy
PROVIDER_OFFLINE	Connection	Auto-retry with exponential backoff; fallback to alternative provider
RATE_LIMITED	API	Queue requests; display cooldown timer
CONTEXT_TOO_LARGE	Input	Truncate context; warn user
MODEL_NOT_FOUND	Configuration	Fallback to default model; prompt reconfiguration
STREAM_INTERRUPTED	Network	Offer retry; preserve partial response
AUTH_FAILED	API	Prompt for credential update
TIMEOUT	Network	Cancel request; offer retry
INVALID_RESPONSE	API	Log error; display generic message

```

1 // utils/errorHandler.ts
2
3 export function handleChatError(error: ChatError): ErrorRecovery {
4   const strategies: Record<string, ErrorRecovery> = {
5     PROVIDER_OFFLINE: {
6       action: 'retry',
7       message: 'Connection lost. Retrying...',
8       retryDelay: 2000,
9       maxRetries: 3,
10      fallback: () => tryAlternativeProvider(),
11    },
12    RATE_LIMITED: {
13      action: 'wait',
14      message: 'Rate limited. Please wait...',
15      retryDelay: 60000,

```

```

16     maxRetries: 1,
17   },
18   CONTEXT_TOO_LARGE: {
19     action: 'modify',
20     message: 'Context too large. Reducing...',
21     modification: () => truncateContext(),
22   },
23   STREAM_INTERRUPTED: {
24     action: 'prompt',
25     message: 'Response interrupted. Retry?',
26     userAction: true,
27   },
28 };
29
30 return strategies[error.code] ?? {
31   action: 'display',
32   message: error.message,
33 };
34 }

```

11 Performance Considerations

11.1 Optimization Strategies

1. **Virtual Scrolling:** Implement windowed rendering for conversations with 100+ messages using `react-window` or similar.
2. **Debounced Input:** Debounce input handlers and auto-resize calculations (150ms).
3. **Lazy Code Highlighting:** Defer syntax highlighting for off-screen code blocks.
4. **Message Memoization:** Memoize `MessageItem` components to prevent unnecessary re-renders.
5. **Streaming Buffer:** Buffer streaming chunks (50ms) to reduce render frequency.
6. **IndexedDB Persistence:** Store conversation history in IndexedDB for conversations exceeding 1MB.

Performance Targets

- Panel open/close: < 100ms
- Message send to first token: < 500ms (local), < 2s (API)
- Scroll performance: 60fps with 1000+ messages
- Memory usage: < 50MB for typical session

12 Security Considerations

12.1 Security Requirements

1. **API Key Storage:** Store API keys in system keychain or encrypted storage; never in `localStorage`.
2. **Input Sanitization:** Sanitize all user input before display; use `DOMPurify` for HTML content.

3. **Content Security Policy:** Restrict inline scripts; whitelist trusted CDNs only.
4. **Rate Limiting:** Implement client-side rate limiting to prevent accidental API abuse.
5. **Context Filtering:** Filter sensitive data (passwords, tokens) from context before sending.

13 Testing Strategy

13.1 Test Coverage Requirements

Testing Requirements

1. **Unit Tests** (> 80% coverage):
 - All provider implementations
 - Store actions and selectors
 - Context builder logic
 - Message formatting utilities
2. **Integration Tests:**
 - Provider connection flows
 - Streaming response handling
 - Error recovery scenarios
 - State persistence/restoration
3. **E2E Tests:**
 - Complete conversation flow
 - Panel collapse/expand
 - Model switching
 - Context attachment
4. **Accessibility Audit:**
 - Automated axe-core scanning
 - Manual screen reader testing
 - Keyboard-only navigation verification

14 Implementation Phases

14.1 Development Roadmap

1. **Phase 1 - Foundation** (Week 1-2):
 - Core type definitions
 - Zustand store setup
 - Basic panel layout
 - Message list/input components
2. **Phase 2 - LLM Integration** (Week 3-4):
 - Provider abstraction layer
 - Ollama provider implementation
 - Streaming response handling

- Basic error handling

3. Phase 3 - Context & Features (Week 5-6):

- Context builder integration
- Code block rendering
- File attachments
- Conversation persistence

4. Phase 4 - Polish (Week 7-8):

- OpenAI/Anthropic providers
- Accessibility compliance
- Performance optimization
- Comprehensive testing

15 Appendix A: CSS Architecture

```

1  /* Chat Panel Container */
2  .chat-panel {
3      position: fixed;
4      right: 0;
5      top: var(--header-height, 48px);
6      bottom: 0;
7      display: flex;
8      flex-direction: column;
9      background: var(--bg-primary);
10     border-left: 1px solid var(--border-color);
11     z-index: 100;
12     transition: width 0.2s ease-out;
13 }
14
15 @media (prefers-reduced-motion: reduce) {
16     .chat-panel {
17         transition: none;
18     }
19 }
20
21 /* Resize Handle */
22 .chat-panel__resize-handle {
23     position: absolute;
24     left: 0;
25     top: 0;
26     bottom: 0;
27     width: 4px;
28     cursor: ew-resize;
29     background: transparent;
30     transition: background 0.15s;
31 }
32
33 .chat-panel__resize-handle:hover,
34 .chat-panel__resize-handle:active {
35     background: var(--color-primary);
36 }
37
38 /* Message List */
39 .message-list {

```

```
40     flex: 1;
41     overflow-y: auto;
42     padding: 16px;
43     scroll-behavior: smooth;
44 }
45
46 @media (prefers-reduced-motion: reduce) {
47     .message-list {
48         scroll-behavior: auto;
49     }
50 }
51
52 .message-list--empty {
53     display: flex;
54     align-items: center;
55     justify-content: center;
56 }
57
58 /* Message Item */
59 .message-item {
60     margin-bottom: 16px;
61     padding: 12px;
62     border-radius: 8px;
63 }
64
65 .message-item--user {
66     background: var(--bg-user-message);
67     margin-left: 24px;
68 }
69
70 .message-item--assistant {
71     background: var(--bg-assistant-message);
72     margin-right: 24px;
73 }
74
75 /* Code Block */
76 .code-block {
77     margin: 8px 0;
78     border-radius: 6px;
79     overflow: hidden;
80     border: 1px solid var(--border-color);
81 }
82
83 .code-block__header {
84     display: flex;
85     align-items: center;
86     justify-content: space-between;
87     padding: 8px 12px;
88     background: var(--bg-secondary);
89     border-bottom: 1px solid var(--border-color);
90     font-size: 12px;
91 }
92
93 .code-block__content {
94     margin: 0;
95     padding: 12px;
96     overflow-x: auto;
97     font-family: var(--font-mono);
```

```

98     font-size: 13px;
99     line-height: 1.5;
100 }
101
102 /* Message Input */
103 .message-input {
104     padding: 12px;
105     border-top: 1px solid var(--border-color);
106     background: var(--bg-primary);
107 }
108
109 .message-input__field {
110     display: flex;
111     align-items: flex-end;
112     gap: 8px;
113     padding: 8px 12px;
114     border-radius: 8px;
115     border: 1px solid var(--border-color);
116     background: var(--bg-input);
117 }
118
119 .message-input__field:focus-within {
120     border-color: var(--color-primary);
121     box-shadow: 0 0 0 2px var(--color-primary-alpha);
122 }
123
124 .message-input__field textarea {
125     flex: 1;
126     border: none;
127     background: transparent;
128     resize: none;
129     font-family: inherit;
130     font-size: 14px;
131     line-height: 1.5;
132     max-height: 200px;
133 }
134
135 .message-input__field textarea:focus {
136     outline: none;
137 }

```

styles/chat-panel.css

16 Appendix B: Keyboard Shortcuts

Shortcut	Action	Scope
Cmd/Ctrl + Shift + L	Toggle chat panel	Global
Escape	Close panel / Cancel streaming	Panel
Enter	Send message	Input
Shift + Enter	New line in message	Input
Cmd/Ctrl + K	Clear conversation	Panel
Cmd/Ctrl + N	New conversation	Panel
Up Arrow	Previous message (when input empty)	Input

Shortcut	Action	Scope
Cmd/Ctrl + C	Copy selected code	Code block