



# GameForge IDE — Project Journal

Damo The Troll Killer - A Satirical Platformer From FutureVision Studios!

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# Table of Contents

GameForge IDE — Project Journal

🎮 Project Journal: GameForge IDE™

🌐 Project Overview

🧠 Core Concept

🌟 Planned Features

MVP (v1.0) - Core Functionality

v2.0 - Enhanced Features

🎨 UI/UX Design Considerations

Design Philosophy

Layout & Panels

User Workflows

Visual Design Details

Keyboard Shortcuts

Accessibility Features

Responsive Layout Features

User Experience Enhancements

Future UX Considerations (v2.0+)

🛠️ Technical Architecture

Electron Application Structure

Core Components Architecture

Data Flow Examples

Performance Considerations

Security Considerations

Build & Deployment

Testing Strategy

📅 Implementation Roadmap

Phase 1: Foundation (Weeks 1-2)

Phase 2: Editor Integration (Weeks 3-4)

Phase 3: Live Preview (Weeks 5-6)

Phase 4: Project Management (Weeks 7-8)

Phase 5: Asset Browser (Weeks 9-10)

Phase 6: AI Integration (Weeks 11-12)

Phase 7: Genre Rule Files (Weeks 13-14)

Phase 8: Polish & Testing (Weeks 15-16)

Phase 9: Beta Release & Feedback (Weeks 17-20)

Phase 10: v1.0 Release (Weeks 21-24)

Post-v1.0: v2.0 Features (Future)

🔒 API Key Management UI

Design Overview

UI Layout

Components

User Workflow

Security Implementation

Error Handling

Future Enhancements

📝 Template Library Details

Template Structure

Template Descriptions

Template Customization

Template Metadata

Template Management

Template Best Practices

🚀 Export & Deployment

Overview

Web Export (Primary)

Mobile Export (v1.0+)

Desktop Export (v2.0+)

Export UI

Deployment Helpers

Export Guidelines

## 🌐 Competitive Analysis

Overview

GameMaker Studio

Construct 3

Unity (Visual Scripting)

GDevelop

CodePen / JSFiddle (Educational)

Market Positioning

Pricing Comparison

Marketing Differentiators

## ⌚ Feature Prioritization

Overview

MVP (v1.0) - Must Have

Nice to Have (v1.0+) - Can Defer

v2.0 Features - Future Vision

MVP Scope Reduction Options

Feature Priority Matrix

MVP Success Criteria

Risk Mitigation

Timeline Considerations

## 🎯 Marketing Strategy

Overview

Target Audience

Key Messages

Marketing Channels

Launch Plan

Pricing Strategy

Success Metrics

Messaging by Channel

Competitive Messaging

Content Calendar

Budget Estimate

## 🚀 V2.0 Feature Deep Dives

Overview

Visual Scene Editor

Animation Timeline Editor

Sprite Sheet Generator

Tiled Map Integration

Plugin System

Community Features

## ✍ Testing Strategy

Overview

Unit Testing

Integration Testing

End-to-End Testing

Performance Testing

Cross-Platform Testing

User Acceptance Testing

## ⚡ Performance Optimization

Overview

Memory Optimization

Startup Performance

Preview Pane Performance

Bundle Size Optimization

UI Responsiveness

## 👥 Community Features

Overview

Template Sharing

Asset Marketplace

Game Showcase

Discussion Forums

User Profiles

📅 Development Timeline

💡 Key Decisions Made

💰 Business Model & Pricing

📝 Notes & Ideas

🚀 Current Status & Blockers

📅 Recent Work Sessions

Session: Phase 2 Editor Integration - Monaco Editor & File Tree 🎨

Session: Phase 1 Foundation - Electron Setup & Basic UI 🚀

Session: Initial Planning & Architecture Exploration 🎨💡

Session: Auto-Bundle Preview, TFA Module Integration, and Safety Nets 🚀🎮 (Today)

Product Positioning

v2 → v3 Value Ladder

Vision

Phase 1–3 Recap (Concise Run-Down)

12-Hour Sprint Recap — November 6→7, 2025 (AEST)

Achievements

Decisions

People

Competitive Positioning (today)

Cursy AI Path (v3)

Team Realtime (v2.5→v3)

Revenue Targets (directional)

Next 3–5 Days

Risks / Mitigation

V3 — Cursy AI (Our Model) and Team Realtime Suite

Why build “Cursy AI”

Strategy: stair-step (12–24 months)

Licensing & Pricing

Workstreams

Timeline & Cost (rough)

Risks & Mitigations

Naming

Team Realtime: Screenshare, Whiteboard, Telepresence (IDE-native)

Phased plan

Pricing

Competitive Positioning (Reflection)



**Project Type:** Desktop IDE Application

**Target Platform:** Windows, macOS, Linux (Electron)

**Tech Stack:** Electron, Monaco Editor, Phaser.js, Node.js

**Status:** 🟢 Planning Phase

**Lead Developer:** Damian (Remix Steward, Civic Banhammer Wielder)

**Logo:** Futuristic neon circuit board design with metallic "GAMEFORGE IDE" text and glowing geometric frames - perfect for a high-tech game development IDE! 🎮✨

# Project Overview

[↑ Back to TOC](#)

**What does this project do?** GameForge IDE is a Phaser.js-exclusive game development environment that combines code editing, live preview, and AI assistance. Unlike AI game generators that remove creative control, GameForge keeps developers in control while providing intelligent code suggestions, rapid prototyping tools, and seamless asset management.

## Key Philosophy:

-  **AI Assistance, Not Replacement** - Developers stay in creative control
  -  **Rapid Prototyping** - "Vibe Coding" rapid iteration for Phaser.js
  -  **Phaser.js Exclusive** - Focused, not diluted across multiple frameworks
  -  **One-Click Deploy** - Web, mobile, desktop export options
-

## Core Concept

[↑ Back to TOC](#)

### Target Audience:

- Indie game developers
- Rapid prototypers
- Beginners learning Phaser.js
- Developers who want AI help without losing control

### Unique Selling Points:

1. **Phaser.js-First** - Built specifically for Phaser.js workflows
  2. **AI Context-Aware** - Understands Phaser architecture (Scenes, Groups, Physics)
  3. **Live Preview** - Instant feedback loop
  4. **Asset Pipeline** - Drag-and-drop sprites/audio → auto-generate load code
  5. **Template Library** - Game starter templates (platformer, shooter, puzzle)
-

## Planned Features

[↑ Back to TOC](#)

### MVP (v1.0) - Core Functionality

#### 1. Monaco Editor - Code Editing with Phaser.js Support

**Description:** Full-featured code editor using Monaco Editor (VS Code's editor engine)

**Features:**

- Syntax highlighting for JavaScript/TypeScript
- Phaser.js autocomplete and IntelliSense
- Code snippets for common Phaser patterns:
  - Scene creation template
  - Sprite creation shortcuts
  - Physics body setup
  - Input handling patterns
- Multi-file editing (tabs)
- Find & replace
- Code folding
- Error highlighting (basic syntax errors)

**Technical Notes:**

- Monaco Editor is self-contained, works in Electron
- Can load Phaser.js type definitions for autocomplete
- Custom language server for Phaser-specific suggestions (optional)

---

#### 2. Live Preview Pane - Hot Reload Phaser Game

**Description:** Real-time preview of Phaser game that updates as you code

**Features:**

- Webview/iframe running Phaser.js
- Hot reload on file save (or auto-save on change)
- Debug console output visible
- Resizable preview pane
- Fullscreen preview mode
- Camera control (pause, step frame, restart)

**Technical Notes:**

- Electron's `<webview>` tag or `BrowserWindow`
- File watcher for auto-reload
- Inject Phaser.js into preview context
- Handle asset loading (sprites, audio, etc.)

---

#### 3. File Tree - Project Management

**Description:** Sidebar file explorer for project navigation

**Features:**

- Navigate project folders
- Create new files/folders
- Delete files/folders
- Rename files
- Open files in editor
- Show file icons (HTML, JS, CSS, images, etc.)
- Filter/search files

**Technical Notes:**

- Electron's `fs` module for file operations
- Tree view component (maybe use existing library)
- Context menu for file operations
- Handle file system events (external changes)

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#### 4. Asset Browser - Media Management

**Description:** Visual browser for game assets (sprites, audio, tiles)

**Features:**

- Browse assets folder
- Preview images (sprites, tiles)
- Preview audio (play button)
- Drag-and-drop assets into project
- Copy asset paths to clipboard
- Auto-generate asset loading code
- Supported formats:
  - Images: PNG, JPG, GIF, SVG
  - Audio: MP3, OGG, WAV
  - JSON: Tiled maps, sprite sheets

#### Technical Notes:

- Thumbnail generation for images
- Audio waveform visualization (optional)
- Copy asset files to project on add
- Generate `this.load.image()` code snippets

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## 5. AI Chat Panel - Phaser-Aware Code Assistance

**Description:** Context-aware AI chat that understands Phaser.js architecture

#### Features:

- Chat interface for code questions
- Phaser-specific context awareness:
  - Understands Scenes, Groups, Physics
  - Knows Phaser API patterns
  - Suggests best practices
- Code generation (on request):
  - Scene templates
  - Player controller examples
  - Enemy AI patterns
  - Collision detection code
- Explanation of Phaser concepts
- Debugging help

#### Technical Notes:

- Integrate OpenAI/Anthropic API
- **User-provided API keys** - Users bring their own OpenAI API key (transparent, user-controlled)
- Send current file context to AI
- System prompt: "You are a Phaser.js expert..."
- Rate limiting and cost management handled by user's API account
- Local model option (future)

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## 6. Project Templates - Starter Game Templates

**Description:** Pre-built game templates to jumpstart development

#### Templates Included:

- **Blank Project** - Minimal Phaser setup
- **Platformer** - Player, platforms, basic physics
- **Top-Down Shooter** - Player movement, shooting, enemies
- **Puzzle Game** - Basic grid-based puzzle framework
- **Endless Runner** - Scrolling background, obstacles

#### Template Contents:

- Project structure
- Core scene files
- Asset loading code
- Basic game loop
- Comments and documentation

#### Technical Notes:

- Store templates in `/templates/` folder
- Copy template files on project creation
- Allow customization (game name, dimensions, etc.)
- Update template library over time

---

## 7. Genre Rule Files - Configuration Files for Game Genres

**Description:** Preset configuration files that define common patterns, best practices, and AI context rules for different game genres.

#### Purpose:

- Help AI understand genre-specific patterns
- Provide code validation rules
- Suggest appropriate Phaser.js patterns for each genre
- Guide developers with genre-specific best practices

#### Genre Rule Files Included:

- **platformer.json** - Platformer game rules
  - Jump mechanics patterns
  - Collision detection best practices
  - Camera follow patterns
  - Physics settings (gravity, friction)
  - Common enemy types (patrol, chase)
  - Collectible patterns
- **shooter.json** - Top-down shooter rules
  - Shooting mechanics (bullet patterns, spread, auto-fire)
  - Enemy spawning patterns
  - Health system patterns
  - Weapon system structure
  - Score/combos
  - Power-up patterns
- **puzzle.json** - Puzzle game rules
  - Grid-based mechanics
  - Match/swap patterns
  - Win condition checks
  - Level progression
  - Hint systems
- **runner.json** - Endless runner rules
  - Procedural generation patterns
  - Scrolling camera
  - Obstacle spawning
  - Speed progression
  - Score multipliers
- **rpg.json** - RPG rules (future)
  - Stats system
  - Inventory patterns
  - Dialogue systems
  - Quest/task systems

#### How It Works:

1. User selects genre when creating project (or adds later)
2. Genre rule file loaded into AI context
3. AI suggestions align with genre patterns
4. Code snippets follow genre conventions
5. Validation checks ensure genre consistency

#### Rule File Structure (example):

```
{
  "genre": "platformer",
  "commonPatterns": {
    "player": {
      "movement": "horizontal + jump",
      "physics": {
        "gravity": 800,
        "jumpSpeed": -600,
        "maxSpeed": 200
      },
      "collisionLayers": ["platforms", "enemies", "pickups"]
    },
    "enemies": {
      "types": ["patrol", "chase", "static"],
      "spawnPatterns": ["onPlatform", "random", "fixed"]
    },
    "camera": {
      "follow": "player",
      "bounds": "levelBounds",
      "deadzone": 50
    }
  },
  "aiSuggestions": {
    "context": "You are helping create a platformer game. Common patterns include: horizontal movement with arrow keys, sp
    "codeExamples": [...]
  },
  "validationRules": {
    ...
  }
}
```

```
        "requiredComponents": ["player", "platforms", "collision"],  
        "recommendedPatterns": ["scene transitions", "audio feedback"]  
    }  
}
```

#### Benefits:

- AI provides genre-appropriate suggestions
- Consistent code patterns across projects
- Faster development (know what patterns to use)
- Better code quality (follows genre best practices)
- Easier to extend (add new genres)

#### Technical Notes:

- JSON format for easy editing
- Stored in /templates/genre-rules/ folder
- Loaded into AI system prompt
- Can be customized per project
- Community-contributed rules (future)

#### v2.0 - Enhanced Features

- **Visual Scene Editor** - Drag-and-drop sprites on canvas
  - **Animation Timeline Editor** - Sprite animation creation
  - **Mobile Export** - Cordova/Capacitor wrapping
  - **Plugin System** - Extensible architecture
  - **Sprite Sheet Generator** - Build sprite sheets from individual frames
  - **Tiled Map Integration** - Import/edit Tiled maps
- 
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# UI/UX Design Considerations

↑ Back to TOC

## Design Philosophy

### Core Principles:

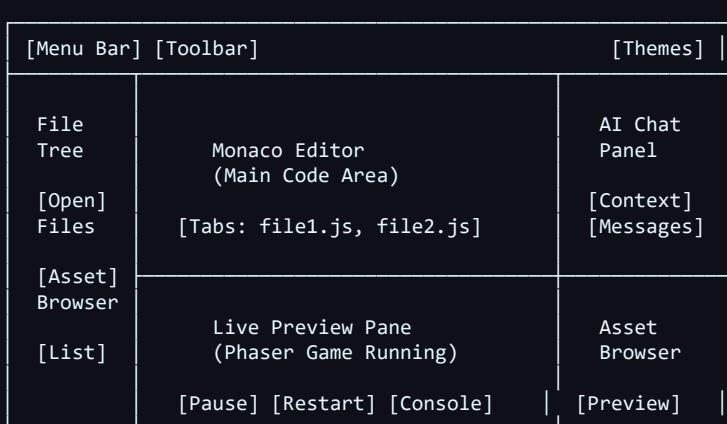
- **Code-First, Visual-Assist** - Code editor is primary, visual tools support it
- **Rapid Feedback** - See changes instantly in live preview
- **Minimal Mental Overhead** - UI stays out of the way while coding
- **Familiar Patterns** - Leverage VS Code/IDE conventions users already know
- **Customizable** - Users can adjust layout, themes, shortcuts

### Visual Style:

- Clean, modern interface
- Dark theme by default (better for long coding sessions)
- Light theme option
- Subtle animations for feedback (not distracting)
- Clear visual hierarchy

## Layout & Panels

### Main Layout Structure:



### Panel Details:

#### 1. File Tree Panel (Left Sidebar)

- Expandable folder structure
- File icons (JS, HTML, CSS, images, etc.)
- Right-click context menu (New, Delete, Rename)
- Currently open file highlighted
- Search/filter box at top
- Collapsible (can hide for more editor space)

#### 2. Monaco Editor (Center)

- Takes up majority of screen space
- Tabbed interface for multiple files
- Split view option (side-by-side editing)
- Line numbers, syntax highlighting
- Minimap (right side, optional)
- Find & replace bar (Ctrl+F)
- Breadcrumb navigation (file path)

#### 3. Live Preview Pane (Bottom Center)

- Resizable split with editor
- Game canvas (Phaser.js running)
- Toolbar above canvas:
  - Play/Pause button
  - Restart button
  - Fullscreen toggle
  - Zoom controls (50%, 100%, 200%)
- Console output below canvas (collapsible)
- Error overlay (red banner if game crashes)

#### 4. AI Chat Panel (Right Sidebar)

- Collapsible panel (can hide for more space)

- Chat messages (user/AI)
- Input box at bottom
- Context badge (shows current file being discussed)
- Code snippets render with syntax highlighting
- Copy/paste code buttons
- Token usage indicator (optional, small)

## 5. Asset Browser (Bottom Tab or Sidebar)

- Grid view of assets (thumbnails)
- List view option
- Filter by type (Images, Audio, JSON)
- Drag-and-drop to add assets
- Preview on hover/click
- "Generate Load Code" button

## 6. Scene Inspector (Bottom Tab, v2.0)

- Hierarchy of Phaser objects
- Properties panel
- Currently MVP focuses on code + preview

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## User Workflows

### Workflow 1: Creating New Project

1. Open GameForge IDE
2. File → New Project
3. Select template (Blank, Platformer, etc.)
4. Choose project folder
5. IDE opens with template files loaded
6. Live preview auto-starts
7. Start coding!

### Workflow 2: Adding Assets

1. Drag sprite/image file into Asset Browser
2. Asset appears in grid
3. Click "Generate Load Code" button
4. Code snippet copied to clipboard
5. Paste into PreloadScene.js
6. Asset automatically appears in preview

### Workflow 3: Getting AI Help

1. Select code in editor (or type question)
2. Open AI Chat panel (if closed)
3. Type question or click "Explain this code"
4. AI responds with Phaser-aware suggestions
5. Copy code snippet to editor
6. See changes instantly in preview

### Workflow 4: Debugging

1. Code has error → Preview shows error banner
2. Click error → Editor jumps to problem line
3. Check console output in preview pane
4. Ask AI Chat "What's wrong with this Phaser code?"
5. Fix code → Preview auto-reloads
6. Success!

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## Visual Design Details

### Color Scheme (Dark Theme - Default):

- Background: #1e1e1e (VS Code dark)
- Editor background: #252526
- Text: #cccccc
- Accent: #0e639c (blue for actions)
- Success: #4ec9b0 (green for successful operations)
- Error: #f48771 (red for errors)
- Warning: #dcdcaa (yellow for warnings)

### Color Scheme (Light Theme - Option):

- Background: #ffffff
- Editor background: #f8f8f8
- Text: #333333

- Accent: #007acc
- Similar contrast ratios for accessibility

## Typography:

- Monospace font for code (Consolas, 'Courier New', Monaco)
- Sans-serif for UI (system default)
- Clear size hierarchy (h1: 24px, body: 14px, code: 13px)

## Icons:

- Consistent icon set (maybe Feather Icons or Heroicons)
- Clear visual meaning
- Subdued colors (not distracting)

## Spacing:

- Generous padding (8px base unit)
- Clear separation between panels
- Comfortable line height in editor

---

## Keyboard Shortcuts

### Essential Shortcuts:

- Ctrl+N / Cmd+N - New file
- Ctrl+S / Cmd+S - Save file
- Ctrl+Shift+P / Cmd+Shift+P - Command palette
- Ctrl+B / Cmd+B - Toggle file tree sidebar
- Ctrl+/ / Cmd+/ - Toggle terminal/console
- Ctrl+/ / Cmd+/ - Toggle comment
- F5 - Run/preview game
- Ctrl+Shift+F / Cmd+Shift+F - Find in files
- Ctrl+P / Cmd+P - Quick file open

### Editor Shortcuts (Monaco defaults):

- Ctrl+D / Cmd+D - Select next occurrence
- Alt+Up/Down - Move line up/down
- Ctrl+Shift+K / Cmd+Shift+K - Delete line
- Ctrl+Enter / Cmd+Enter - Insert line below

### Custom GameForge Shortcuts:

- Ctrl+Shift+A / Cmd+Shift+A - Open AI Chat
- Ctrl+Shift+P / Cmd+Shift+P - Open Asset Browser
- Ctrl+Shift+L / Cmd+Shift+L - Toggle live preview

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## Accessibility Features

### Included:

- Keyboard navigation for all UI elements
- Screen reader support (ARIA labels)
- High contrast mode option
- Font size adjustment
- Color blind friendly color schemes
- Focus indicators clearly visible

### Considerations:

- All panels resizable/dockable
- Dense/spacious layout options
- Reduced motion option (for animations)

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## Responsive Layout Features

### Panel Resizing:

- Drag borders to resize panels
- Double-click borders to collapse/expand
- "Maximize Editor" button (hides all sidebars)
- "Restore Layout" button (resets to default)

### Window Management:

- Remember window size/position
- Multi-monitor support
- Maximize editor option (fullscreen coding)

## User Experience Enhancements

### Onboarding:

- Welcome screen on first launch
- Quick tutorial (5-minute walkthrough)
- Sample project included
- Tooltips for first-time users

### Progress Indicators:

- Loading spinner for asset operations
- Progress bar for large file operations
- Toast notifications for success/errors

### Error Handling:

- Clear error messages
- Suggestions for fixing errors
- Link to documentation
- AI chat can help debug

### Customization:

- Theme selector (Dark/Light/High Contrast)
- Font size slider
- Layout presets (Code Focus, Preview Focus, Balanced)
- Custom keyboard shortcuts

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## Future UX Considerations (v2.0+)

- Visual scene editor (drag-and-drop canvas)
- Animation timeline (visual keyframe editor)
- Asset optimization tools (spritesheet builder)
- Project templates marketplace
- Community plugins/extensions
- Tutorial system integrated
- Code snippets library

# 🛠️ Technical Architecture

↑ Back to TOC

## Electron Application Structure

### Main Process (src/main/):

- Application entry point (main.js)
- Window management (create, resize, close)
- Menu bar (File, Edit, View, Help)
- File system operations (read/write files)
- Process management
- IPC (Inter-Process Communication) handlers

### Renderer Process (src/renderer/):

- UI components (React/Vue/vanilla JS)
- Monaco Editor integration
- Live preview webview
- AI chat interface
- Asset browser UI
- File tree component

### Shared Utilities (src/shared/):

- Project configuration parser
- Genre rule file loader
- Asset path utilities
- Code generation helpers
- Template system

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## Core Components Architecture

### 1. Monaco Editor Integration

#### Setup:

```
// Load Monaco Editor
import * as monaco from 'monaco-editor';

// Create editor instance
const editor = monaco.editor.create(container, {
  value: code,
  language: 'javascript',
  theme: 'vs-dark',
  minimap: { enabled: true },
  fontSize: 14
});
```

#### Phaser.js Type Definitions:

- Load Phaser.js type definitions for autocomplete
- Custom snippet provider for Phaser patterns
- Syntax highlighting for Phaser-specific code

#### File Management:

- Tab system for multiple files
- File watcher for external changes
- Auto-save on blur/change
- Undo/redo support

#### Code Intelligence:

- Autocomplete for Phaser API
- Hover documentation
- Error detection (syntax, Phaser-specific)
- Find references / Go to definition

---

### 2. Live Preview Pane

#### Implementation:

```
// Electron webview for Phaser preview
<webview
  src="preview.html"
  preload="preload.js"
```

```
nodeintegration="false"
></webview>
```

### Hot Reload System:

- File watcher monitors project files
- On change: rebuild bundle → inject into preview
- Error handling: show error overlay
- Console capture: redirect console.log to IDE console

### Preview Features:

- Resizable canvas (drag to resize)
- Zoom controls (50%, 100%, 200%)
- Fullscreen mode
- Pause/Resume/Restart buttons
- Performance metrics (FPS, memory)

### Communication:

- IPC between preview and main process
- Message passing for game state
- Debug info capture

---

## 3. AI Chat Panel

### API Integration:

```
// OpenAI API client
const openai = new OpenAI({
  apiKey: userApiKey // From secure storage
});

// Send request with context
const response = await openai.chat.completions.create({
  model: 'gpt-4',
  messages: [
    {
      role: 'system',
      content: genreRuleFile.aiContext + phaserContext
    },
    {
      role: 'user',
      content: userQuestion + currentFileContext
    }
  ]
});
```

### Context Management:

- Load genre rule file for context
- Include current file code in prompt
- Track conversation history
- Token usage estimation
- Rate limiting (user's API quota)

### UI Features:

- Chat message bubbles
- Code syntax highlighting in responses
- Copy code button
- Insert code button (pastes into editor)
- Context badge (shows current file/genre)

### Security:

- API keys stored in Electron's secure storage
- Never sent to external servers (except OpenAI)
- Optional: Local model support (future)

---

## 4. File Tree Component

### Implementation:

```
// File system operations
const fs = require('fs').promises;
const path = require('path');

// Read directory structure
async function readProjectTree(projectPath) {
  // Recursive directory reading
```

```
// Build tree structure  
// Return JSON tree  
}
```

#### Features:

- Expandable/collapsible folders
- File icons (by extension)
- Right-click context menu
- Drag-and-drop file reordering
- Search/filter files
- Show/hide hidden files

#### File Operations:

- Create file/folder
- Delete file/folder
- Rename file/folder
- Open file in editor
- Open in file explorer (external)

## 5. Asset Browser

#### Asset Management:

```
// Scan assets folder  
async function scanAssets(assetsPath) {  
  const files = await fs.readdir(assetsPath);  
  return files.map(file => ({  
    name: file,  
    path: path.join(assetsPath, file),  
    type: getFileType(file),  
    thumbnail: generateThumbnail(file)  
  }));  
}
```

#### Features:

- Grid view with thumbnails
- List view option
- Filter by type (Images, Audio, JSON)
- Preview on hover/click
- Drag-and-drop to add assets
- Generate load code (copies to clipboard)

#### Code Generation:

```
// Generate Phaser load code  
function generateLoadCode(asset) {  
  if (asset.type === 'image') {  
    return `this.load.image('${asset.key}', '${asset.path}');`;  
  } else if (asset.type === 'audio') {  
    return `this.load.audio('${asset.key}', '${asset.path}');`;  
  }  
  // etc.  
}
```

## 6. Project Templates System

#### Template Structure:

```
templates/  
  blank/  
    index.html  
    src/  
      main.js  
      scenes/  
      package.json  
  platfromer/  
    index.html  
    src/  
      main.js  
      config.js  
      scenes/  
      package.json  
  genre-rules/  
    platfromer.json  
    shooter.json  
    ...
```

## Template Loading:

- Copy template files to project folder
- Replace placeholder variables (game name, dimensions)
- Initialize project configuration
- Load genre rule file
- Set up default assets folder

## 7. Genre Rule Files System

### Rule File Loader:

```
// Load genre rule file
async function loadGenreRules(genre) {
  const rulePath = path.join(__dirname, 'templates/genre-rules/', `${genre}.json`);
  const rules = await fs.readFile(rulePath, 'utf-8');
  return JSON.parse(rules);
}
```

### AI Context Integration:

- Merge genre rules into AI system prompt
- Update AI context when genre changes
- Provide code examples from rule file
- Validation checks based on rules

### Customization:

- Users can edit rule files
- Project-specific rule overrides
- Community-contributed rules (future)

## Data Flow Examples

### Example 1: User Types Code → Preview Updates

1. User types in Monaco Editor
2. Auto-save triggers (on change or blur)
3. File watcher detects change
4. Webpack/dev server rebuilds bundle
5. Preview webview reloads automatically
6. User sees changes instantly

### Example 2: User Asks AI for Help

1. User selects code + types question
2. AI Chat panel sends request:
  - Current file code
  - Genre rule file context
  - User question
3. OpenAI API responds with suggestion
4. AI Chat displays response with syntax highlighting
5. User clicks "Insert Code" button
6. Code pasted into editor at cursor

### Example 3: User Adds Asset

1. User drags sprite.png into Asset Browser
2. File copied to project's assets folder
3. Asset Browser scans and displays thumbnail
4. User clicks "Generate Load Code"
5. Code snippet: `this.load.image('sprite', 'assets/sprite.png')`
6. Code copied to clipboard
7. User pastes into PreloadScene.js
8. Preview reloads, sprite appears

## Performance Considerations

### Monaco Editor:

- Lazy load for large files
- Virtual scrolling for long files
- Debounce auto-save to avoid excessive writes

### Live Preview:

- Throttle reload frequency (max once per second)

- Only reload changed files
- Memory management for preview webview

### File Operations:

- Async file operations (don't block UI)
- Background file watching
- Debounce file tree updates

### AI API:

- Queue requests (prevent spam)
- Cache common responses (optional)
- Show loading indicators
- Handle API errors gracefully

## Security Considerations

### API Key Storage:

```
// Electron secure storage
const { safeStorage } = require('electron').safeStorage;

// Encrypt API key
const encrypted = safeStorage.encryptString(apiKey);

// Decrypt API key
const decrypted = safeStorage.decryptString(encrypted);
```

### File System:

- Sandbox project files (don't access outside project)
- Validate file paths (prevent directory traversal)
- Secure file operations (user permissions)

### Webview Security:

- Disable node integration in preview
- CSP (Content Security Policy) headers
- Isolated preview context

## Build & Deployment

### Development:

```
npm run dev      # Start Electron dev mode
npm run build    # Build for production
npm run package  # Package app (Windows/Mac/Linux)
```

### Electron Builder:

- Cross-platform builds (Windows, macOS, Linux)
- Auto-updater integration (future)
- Code signing (for distribution)
- Installer creation (.exe, .dmg, .deb)

### Dependencies:

- Electron (~25MB base)
- Monaco Editor (~5MB)
- Phaser.js (loaded in preview, not bundled)
- Node modules (~100MB+)

## Testing Strategy

### Unit Tests:

- File operations (create, delete, rename)
- Code generation utilities
- Genre rule file parsing
- Asset browser logic

### Integration Tests:

- Monaco Editor operations
- Preview webview communication
- AI API integration
- File tree operations

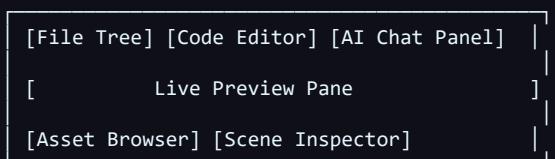
## E2E Tests:

- Create project → Add code → See preview
- Ask AI → Get response → Insert code
- Add asset → Generate code → Use in game

## Core Stack:

- **Electron** - Desktop app framework
- **Monaco Editor** - VS Code's editor component
- **Phaser.js** - Live preview engine
- **Node.js** - File system, project management
- **AI API** - OpenAI/Anthropic/Claude integration (user-provided API keys)

## UI Layout:



## File Structure (proposed):

```
GameForge/
└── src/
    ├── main/           # Electron main process
    ├── renderer/       # UI components
    │   ├── editor/     # Monaco Editor integration
    │   ├── preview/    # Phaser preview pane
    │   └── assets/     # Asset browser
    ├── ai/             # AI chat panel
    ├── shared/         # Shared utilities
    ├── templates/      # Game starter templates
    └── assets/         # IDE assets (icons, UI)
    PROJECT_JOURNAL.md # This file - maintains project memory and context
```

**Note:** GameForge IDE itself uses the PROJECT\_JOURNAL.md technique for maintaining context across development sessions. This proven workflow ensures continuity, decision tracking, and clear documentation - the same system that keeps Damo The Troll Killer development organized and efficient.

# Implementation Roadmap

[↑ Back to TOC](#)

## Phase 1: Foundation (Weeks 1-2)

**Goal:** Get basic Electron app running with core structure

**Tasks:**

- **Setup Electron Project**

- Initialize npm project with Electron
- Configure webpack/build system
- Set up main process entry point
- Create basic window with menu bar
- Test cross-platform builds (Windows, Mac, Linux)

- **Basic UI Layout**

- Create main window layout (panels structure)
- Implement panel resizing system
- Add theme support (dark/light)
- Create basic menu bar (File, Edit, View, Help)
- Test UI responsiveness

**Deliverable:** Working Electron app with basic UI layout

---

## Phase 2: Editor Integration (Weeks 3-4)

**Goal:** Integrate Monaco Editor with file management

**Tasks:**

- **Monaco Editor Setup**

- Install Monaco Editor package
- Create editor container component
- Configure editor settings (theme, font, etc.)
- Load Phaser.js type definitions
- Test basic editing functionality

- **File Tree Component**

- Implement file tree UI component
- Add file system operations (read, write, create, delete)
- Implement file tree navigation
- Add file icons (by extension)
- Create context menu (right-click operations)

- **File ↔ Editor Integration**

- Open file in editor on click
- Tab system for multiple files
- Save file functionality
- Auto-save on change/blur
- File watcher for external changes

**Deliverable:** Working code editor with file management

---

## Phase 3: Live Preview (Weeks 5-6)

**Goal:** Get Phaser game running in preview pane

**Tasks:**

- **Preview Webview Setup**

- Create Electron webview component
- Set up preview HTML template
- Load Phaser.js library in preview
- Test basic Phaser game in preview

- **Hot Reload System**

- Implement file watcher for project files
- Build/dev server setup (webpack or similar)
- Auto-reload on file change
- Error handling and display
- Console output capture

- **■ Preview Controls**

- Play/Pause button
- Restart button
- Fullscreen toggle
- Zoom controls
- Performance metrics display

**Deliverable:** Live preview pane with hot reload

---

## Phase 4: Project Management (Weeks 7-8)

**Goal:** Users can create and manage projects

**Tasks:**

- **■ Project Creation**

- New Project dialog
- Template selection UI
- Project folder selection
- Template file copying
- Project configuration file creation

- **■ Template System**

- Create blank template
- Create platformer template
- Create shooter template
- Create puzzle template
- Create runner template
- Template customization (game name, dimensions)

- **■ Project Opening**

- Open existing project dialog
- Recent projects list
- Project validation
- Load project configuration

**Deliverable:** Complete project management system

---

## Phase 5: Asset Browser (Weeks 9-10)

**Goal:** Visual asset management with code generation

**Tasks:**

- **■ Asset Browser UI**

- Grid view component
- List view option
- Thumbnail generation for images
- Asset preview (hover/click)
- Filter by type (Images, Audio, JSON)

- **■ Asset Operations**

- Drag-and-drop file addition
- Copy asset to project folder
- Delete asset
- Rename asset
- Organize assets in folders

- **■ Code Generation**

- Generate load code for images
- Generate load code for audio
- Generate load code for JSON (Tiled maps)
- Copy to clipboard functionality
- Insert into editor option

**Deliverable:** Working asset browser with code generation

---

## Phase 6: AI Integration (Weeks 11-12)

**Goal:** AI chat panel with Phaser-aware assistance

**Tasks:**

- **■ API Key Management**
  - Settings UI for API key entry
  - Secure storage (Electron safeStorage)
  - API key validation
  - Multiple provider support (OpenAI, Anthropic)

- **■ AI Chat Panel UI**

- Chat interface component
- Message bubbles (user/AI)
- Code syntax highlighting in responses
- Copy code button
- Insert code button
- Loading indicators
- Error message display

- **■ Context Management**

- Load current file content
- Load genre rule files
- Build system prompt with context
- Track conversation history
- Token usage estimation

- **■ AI API Integration**

- OpenAI API client setup
- Request/response handling
- Error handling and retries
- Rate limiting
- Stream responses (future)

**Deliverable:** Working AI chat with Phaser-aware assistance

---

## Phase 7: Genre Rule Files (Weeks 13-14)

**Goal:** Genre-specific AI assistance

**Tasks:**

- **■ Genre Rule File System**

- Create genre rule file structure
- JSON parser for rule files
- Rule file loader
- Rule file editor (optional)

- **■ Create Rule Files**

- platformer.json
- shooter.json
- puzzle.json
- runner.json
- rpg.json (optional)

- **■ AI Integration**

- Load rule file into AI context
- Update AI context when genre changes
- Provide code examples from rules
- Validation checks based on rules

**Deliverable:** Genre-aware AI assistance

---

## Phase 8: Polish & Testing (Weeks 15-16)

**Goal:** Polish UI, fix bugs, prepare for release

**Tasks:**

- **■ UI Polish**

- Refine spacing and typography
- Add animations (subtle, not distracting)
- Improve error messages
- Add tooltips and help text
- Accessibility improvements

- **■ Testing**

- Unit tests for utilities

- Integration tests for components
- E2E tests for workflows
- Cross-platform testing (Windows, Mac, Linux)
- Performance testing

- **■ Documentation**

- User guide
- API documentation
- Template documentation
- Tutorial videos (optional)

- **■ Bug Fixes**

- Fix reported issues
- Performance optimizations
- Memory leak fixes
- Security review

**Deliverable:** Polished, tested MVP ready for beta release

---

## Phase 9: Beta Release & Feedback (Weeks 17-20)

**Goal:** Release beta version and gather feedback

**Tasks:**

- **■ Beta Preparation**

- Create installer packages
- Set up distribution (website, download)
- Create beta signup form
- License key system (if needed)

- **■ Beta Testing**

- Recruit beta testers
- Collect feedback
- Track bugs/issues
- Prioritize fixes

- **■ Iteration**

- Fix critical bugs
- Implement high-priority feature requests
- Improve based on feedback
- Prepare for v1.0 release

**Deliverable:** Beta version with user feedback

---

## Phase 10: v1.0 Release (Weeks 21-24)

**Goal:** Release stable v1.0 version

**Tasks:**

- **■ Final Polish**

- Address all critical bugs
- Complete documentation
- Create launch materials
- Set up payment/licensing system

- **■ Marketing**

- Website and landing page
- Demo video
- Screenshots and examples
- Social media promotion

- **■ Launch**

- Release v1.0
- Monitor feedback
- Quick hotfixes if needed
- Celebrate! 🎉

**Deliverable:** Stable v1.0 release

---

## Post-v1.0: v2.0 Features (Future)

- Visual Scene Editor
  - Animation Timeline Editor
  - Mobile Export
  - Plugin System
  - Sprite Sheet Generator
  - Tiled Map Integration
  - Community features
- 
-

# 🔒 API Key Management UI

↑ Back to TOC

## Design Overview

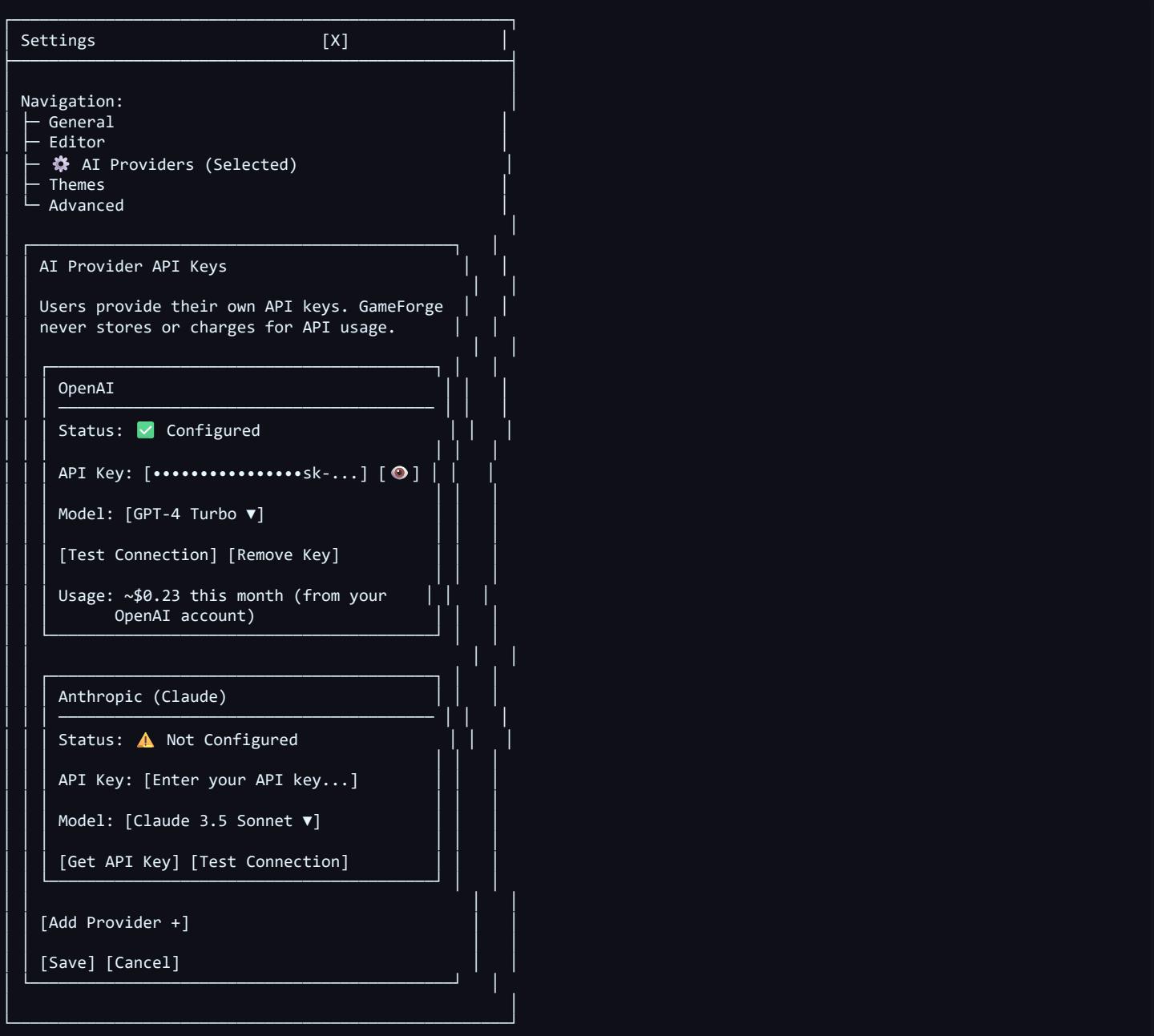
**Location:** Settings Panel (accessible via menu: File → Settings or Ctrl+,)

**Purpose:** Allow users to securely enter and manage their AI API keys for different providers (OpenAI, Anthropic, etc.)

### Design Principles:

- Clear and simple (no confusion)
- Secure (keys never visible in plain text)
- Transparent (users understand what they're doing)
- Helpful (clear instructions and links)

## UI Layout



## Components

### 1. Provider Card

#### Display:

- Provider name (OpenAI, Anthropic, etc.)
- Status indicator (✓ Configured, ⚠ Not Configured, ✗ Error)
- API Key input field (masked by default)
- Model selector dropdown

- Action buttons (Test Connection, Remove Key)

#### API Key Input:

- Masked display (shows bullets: •••••••••••••••sk-....)
- Show/Hide toggle button ( icon)
- Placeholder: "Enter your API key..."
- Validation: Check format (OpenAI keys start with sk-, etc.)
- Real-time validation feedback

#### Status Indicators:

- **Configured** - Green checkmark, key saved and test passed
- **Not Configured** - Yellow warning, no key entered
- **Error** - Red X, key invalid or test failed
- **Testing** - Spinner, connection test in progress

## 2. Model Selector

#### Available Models:

- **OpenAI:**
  - GPT-4 Turbo (recommended)
  - GPT-4
  - GPT-3.5 Turbo (cheaper option)
- **Anthropic:**
  - Claude 3.5 Sonnet (recommended)
  - Claude 3 Opus
  - Claude 3 Haiku (faster/cheaper)

#### UI:

- Dropdown selector
- Model description (speed, cost, capabilities)
- Cost indicator (estimated cost per request)

## 3. Test Connection Button

#### Functionality:

- Sends test request to API
- Validates API key
- Shows result (success/error)
- Updates status indicator

#### Test Request:

```
// Simple test: "Say 'API connection successful'"
const testResponse = await api.testConnection({
  provider: 'openai',
  apiKey: userApiKey,
  model: selectedModel
});
```

#### Feedback:

- Success: " Connection successful!"
- Error: " Connection failed: [error message]"
- Loading: Spinner animation

## 4. Usage Display

#### Information Shown:

- Estimated usage this month (read-only, from user's API account)
- Link to provider's usage dashboard
- Token usage per request (optional)

**Note:** User manages their own API usage through provider's dashboard. GameForge IDE doesn't track or charge for usage.

## 5. Help Section

#### Content:

- "How to get an API key" links for each provider

- "Where to find your API key" instructions
- "How GameForge uses your API key" explanation
- Security/privacy information

#### Links:

- OpenAI: <https://platform.openai.com/api-keys>
- Anthropic: <https://console.anthropic.com/>
- (Provider-specific links)

---

## User Workflow

### Adding/Updating API Key:

1. User opens Settings (File → Settings or Ctrl+,)
2. Clicks "AI Providers" tab
3. Selects provider (e.g., OpenAI)
4. Clicks in API Key field
5. Pastes API key (or types it)
6. Selects model from dropdown
7. Clicks "Test Connection"
8. Sees success/error message
9. Status updates to "✅ Configured"
10. Clicks "Save"
11. API key encrypted and stored securely

### Removing API Key:

1. User opens Settings
2. Finds provider card
3. Clicks "Remove Key" button
4. Confirmation dialog appears
5. User confirms
6. Key removed from storage
7. Status updates to "⚠️ Not Configured"

---

## Security Implementation

### Storage:

```
// Electron secure storage
const { safeStorage } = require('electron').safeStorage;

// Encrypt API key
function saveApiKey(provider, apiKey) {
  if (!safeStorage.isEncryptionAvailable()) {
    // Fallback: Show warning, use system keychain
    return false;
  }

  const encrypted = safeStorage.encryptString(apiKey);
  // Store encrypted key in app data
  store.set(`apiKeys.${provider}`, encrypted);
}

// Decrypt API key
function loadApiKey(provider) {
  const encrypted = store.get(`apiKeys.${provider}`);
  if (!encrypted) return null;

  try {
    return safeStorage.decryptString(encrypted);
  } catch (error) {
    // Handle decryption error
    return null;
  }
}
```

### Security Features:

- Keys encrypted at rest (Electron safeStorage)
- Keys never sent to GameForge servers (only to AI provider)
- Masked by default (show/hide toggle)
- Clear warnings about key security
- Option to remove keys at any time

---

## Error Handling

## Common Errors:

- **Invalid API Key Format** - "API key format is invalid. OpenAI keys start with 'sk-'"
- **Connection Failed** - "Could not connect to API. Check your internet connection."
- **Unauthorized** - "API key is invalid or expired. Please check your key."
- **Rate Limited** - "Rate limit reached. Check your API usage limits."
- **Encryption Unavailable** - "Secure storage not available. Using system keychain instead."

## Error Messages:

- Clear, actionable error messages
- Links to provider documentation
- Suggestions for fixing issues

---

## Future Enhancements

- Multiple API keys per provider (switch between keys)
  - Usage quota warnings (user sets limits)
  - Local model support (no API key needed)
  - Community-contributed providers
  - API key import/export (encrypted, for backup)
-

# Template Library Details

[↑ Back to TOC](#)

## Template Structure

### Base Template Structure:

```
templates/
  blank/
    index.html
    package.json
    webpack.config.js
    assets/
      (empty, ready for assets)
    src/
      main.js
      config.js
      scenes/
        PreloadScene.js
        TitleScene.js
        GameScene.js

  platformer/
    index.html
    package.json
    webpack.config.js
    assets/
      images/
        (placeholder sprites)
      audio/
        (placeholder sounds)
    src/
      main.js
      config.js
      entities/
        Player.js
        Enemy.js
      scenes/
        PreloadScene.js
        TitleScene.js
        GameScene.js

  shooter/
    (similar structure)

  puzzle/
    (similar structure)

  runner/
    (similar structure)

  genre-rules/
    platformer.json
    shooter.json
    puzzle.json
    runner.json
    rpg.json
```

## Template Descriptions

### 1. Blank Template

**Purpose:** Minimal Phaser.js setup for starting from scratch

#### Files Included:

- index.html - Basic HTML structure
- package.json - Dependencies (Phaser.js, webpack)
- webpack.config.js - Build configuration
- src/main.js - Game initialization
- src/config.js - Game configuration (dimensions, physics)
- src/scenes/PreloadScene.js - Asset loading scene
- src/scenes/TitleScene.js - Basic title screen
- src/scenes/GameScene.js - Empty game scene

#### Features:

- Basic Phaser.js setup
- Scene management structure
- Webpack bundling ready
- No game logic (clean slate)

## **Best For:**

- Experienced developers
  - Custom game ideas
  - Learning Phaser.js structure
- 

## **2. Platformer Template**

**Purpose:** Complete platformer game foundation

### **Files Included:**

- All base template files
- `src/entities/Player.js` - Player controller with:
  - Horizontal movement (arrow keys)
  - Jump mechanic (spacebar)
  - Physics body setup
  - Animation states (idle, walk, jump)
- `src/entities/Enemy.js` - Basic enemy with:
  - Patrol AI
  - Collision detection
  - Damage handling
- `src/scenes/GameScene.js` - Fully implemented with:
  - Platform creation
  - Player spawning
  - Enemy spawning
  - Collision handling
  - Basic UI (score, health)

### **Features:**

- Working player movement
- Jump physics
- Platform collision
- Enemy AI (patrol)
- Basic UI
- Camera follow player
- Collectibles system

### **Customization Points:**

- Player speed, jump height
- Gravity settings
- Enemy behavior
- Platform layout
- Level dimensions

## **Best For:**

- Platformer games
  - Learning Phaser physics
  - Quick prototypes
- 

## **3. Top-Down Shooter Template**

**Purpose:** Complete top-down shooter foundation

### **Files Included:**

- All base template files
- `src/entities/Player.js` - Player controller with:
  - 8-directional movement (WASD/arrows)
  - Rotation toward mouse cursor
  - Smooth movement
- `src/entities/Bullet.js` - Bullet entity with:
  - Velocity-based movement
  - Lifetime management
  - Collision detection
- `src/entities/Enemy.js` - Enemy with:
  - Chase AI (moves toward player)
  - Shooting behavior
  - Health system
- `src/scenes/GameScene.js` - Fully implemented with:
  - Shooting mechanics
  - Bullet pooling
  - Enemy spawning (waves)
  - Score system
  - Health bar

### **Features:**

- 8-directional movement
- Mouse/aim shooting
- Bullet pooling (performance)
- Enemy waves
- Score/health system
- Power-up system (optional)

#### Customization Points:

- Player speed, rotation speed
- Bullet speed, damage
- Enemy spawn rate, health
- Shooting patterns
- Power-up types

#### Best For:

- Action games
- Shooter prototypes
- Learning bullet mechanics

---

## 4. Puzzle Game Template

**Purpose:** Grid-based puzzle game foundation

#### Files Included:

- All base template files
- `src/utils/Grid.js` - Grid management utility
- `src/entities/Tile.js` - Tile entity for grid
- `src/scenes/GameScene.js` - Fully implemented with:
  - Grid system (configurable size)
  - Tile matching logic
  - Swap/match detection
  - Win condition checking
  - Level progression

#### Features:

- Configurable grid (6x6, 8x8, etc.)
- Tile matching system
- Swap animation
- Match detection
- Score calculation
- Level progression
- Timer (optional)

#### Customization Points:

- Grid size
- Tile types/count
- Match rules (3-in-a-row, etc.)
- Win conditions
- Difficulty curve

#### Best For:

- Match-3 games
- Puzzle game prototypes
- Learning grid-based logic

---

## 5. Endless Runner Template

**Purpose:** Side-scrolling endless runner foundation

#### Files Included:

- All base template files
- `src/entities/Player.js` - Runner with:
  - Jump mechanic (spacebar)
  - Duck mechanic (down arrow)
  - Animations (run, jump, duck)
- `src/entities/Obstacle.js` - Obstacle entity
- `src/utils/Scroller.js` - Background scrolling
- `src/scenes/GameScene.js` - Fully implemented with:
  - Procedural obstacle generation
  - Scrolling background
  - Score system (distance)
  - Speed progression
  - Game over logic

## Features:

- Scrolling background
- Procedural obstacles
- Jump/duck mechanics
- Speed progression
- Score system (distance)
- Collision detection
- Game over screen

## Customization Points:

- Player speed
- Obstacle frequency
- Background themes
- Power-ups (speed boost, shield)
- Difficulty curve

## Best For:

- Endless runner games
- Simple mobile games
- Learning procedural generation

## Template Customization

### When Creating Project:

1. **Project Name** - Replace {{GAME\_NAME}} in all files
2. **Game Dimensions** - Set width/height in config.js
3. **Genre Selection** - Loads corresponding genre rule file
4. **Asset Folders** - Creates assets/images/ and assets/audio/ folders

### Placeholder Variables:

```
// In template files:  
const GAME_NAME = '{{GAME_NAME}}';  
const GAME_WIDTH = '{{GAME_WIDTH}}';  
const GAME_HEIGHT = '{{GAME_HEIGHT}}';  
const GENRE = '{{GENRE}}';
```

### Replacement Process:

```
// When creating project:  
function customizeTemplate(templatePath, projectName, dimensions, genre) {  
    // Read template files  
    // Replace placeholders:  
    // {{GAME_NAME}} → projectName  
    // {{GAME_WIDTH}} → dimensions.width  
    // {{GAME_HEIGHT}} → dimensions.height  
    // {{GENRE}} → genre  
    // Copy to project folder  
}
```

## Template Metadata

### Template Info File (template.json):

```
{  
  "id": "platformer",  
  "name": "Platformer",  
  "description": "Complete platformer game foundation with player, enemies, and platforms",  
  "genre": "platformer",  
  "version": "1.0.0",  
  "author": "GameForge IDE",  
  "features": [  
    "Player movement",  
    "Jump mechanics",  
    "Enemy AI",  
    "Platform collision",  
    "Basic UI"  
  ],  
  "difficulty": "beginner",  
  "estimatedTime": "2-4 hours to customize",  
  "screenshots": ["screenshot1.png"],  
  "video": "demo.mp4"  
}
```

### Display in UI:

- Template card with screenshot
  - Description and features list
  - Difficulty indicator
  - Estimated customization time
  - Preview video (optional)
- 

## Template Management

### Adding New Templates:

- Create template folder in `/templates/`
- Add `template.json` metadata file
- Create template files
- Test template creation
- Add to template list in UI

### Updating Templates:

- Edit template files
- Update version number
- Test template creation
- Update documentation

### User Custom Templates:

- Users can create custom templates
  - Save templates in user folder
  - Share templates with community (future)
- 

## Template Best Practices

### Code Quality:

- Clean, commented code
- Follow Phaser.js best practices
- Use consistent naming conventions
- Include error handling

### Documentation:

- Inline comments explaining logic
- README.md in each template
- Code examples for customization
- Common pitfalls noted

### Extensibility:

- Easy to customize
- Clear separation of concerns
- Modular code structure
- Configurable values

### Performance:

- Optimized for performance
  - Object pooling where appropriate
  - Efficient collision detection
  - Memory management
-

# Export & Deployment

[↑ Back to TOC](#)

## Overview

**Purpose:** Allow users to export their Phaser.js games as deployable packages for web, mobile, or desktop platforms.

**Philosophy:** Simple, one-click export with customizable options. Users shouldn't need to understand build tools—GameForge handles it.

## Web Export (Primary)

### Output Format:

- Static HTML/CSS/JS files
- Ready to deploy to any web hosting
- Self-contained bundle (all assets included)

### Export Process:

1. User clicks **File** → **Export** → **Web**
2. Select export options:
  - Minify code (production builds)
  - Optimize assets (compress images)
  - Include source maps (debugging)
  - Service worker (PWA support - optional)
3. Choose export folder
4. GameForge builds project:
  - Runs webpack production build
  - Copies assets
  - Generates `index.html`
  - Creates deployment-ready folder
5. Export complete! Folder ready to upload

### Export Structure:

```
export/
└── index.html      # Main HTML file
└── dist/
    └── main.js      # Bundled game code (minified)
└── assets/
    ├── images/      # All game images
    └── audio/        # All game audio
└── README.md       # Deployment instructions
```

### Deployment Options:

- **GitHub Pages** - One-click deploy (if GitHub repo)
- **Netlify** - Drag-and-drop folder
- **Vercel** - Connect GitHub repo
- **Itch.io** - Upload ZIP file
- **Custom Hosting** - Upload via FTP/SFTP

### Export Features:

- Production build (optimized, minified)
- Asset optimization (compressed images)
- Cross-browser compatibility
- Mobile-responsive (if configured)
- PWA support (optional service worker)

## Mobile Export (v1.0+)

### Platforms:

- iOS (App Store)
- Android (Google Play)

### Technology:

- **Cordova/PhoneGap** - Wrap web game as native app
- **Capacitor** - Modern alternative (future)

### Export Process:

1. User clicks **File** → **Export** → **Mobile**
2. Select platform:
  - iOS
  - Android

- o Both
- 3. Configure app:
  - o App name
  - o Bundle ID/package name
  - o App icon (generate from image)
  - o Splash screen
  - o Permissions (camera, storage, etc.)
- 4. GameForge builds:
  - o Creates Cordova project
  - o Adds Phaser game files
  - o Configures platform-specific settings
  - o Generates build files
- 5. Output: Xcode project (iOS) or Android Studio project (Android)

#### **Mobile Export Features:**

- Native app wrapper
- App icon generation
- Splash screen support
- Touch controls (if configured)
- Orientation settings (portrait/landscape)
- Store listing preparation

#### **Build Requirements:**

- **iOS:** Xcode (Mac only), Apple Developer account (\$99/year)
- **Android:** Android Studio, Google Play Developer account (\$25 one-time)

**Note:** GameForge generates the project, but users need platform-specific tools for final builds.

## **Desktop Export (v2.0+)**

#### **Platforms:**

- Windows (.exe)
- macOS (.app)
- Linux (.ApplImage / .deb)

#### **Technology:**

- **Electron** - Similar to how GameForge IDE is built
- Package game as standalone Electron app

#### **Export Process:**

1. User clicks File → Export → Desktop
2. Select platforms:
  - o Windows
  - o macOS
  - o Linux
  - o All platforms
3. Configure app:
  - o App name
  - o App icon
  - o Window size (fixed/resizable)
  - o Menu bar (show/hide)
4. GameForge builds:
  - o Creates Electron wrapper
  - o Bundles game files
  - o Packages for each platform
5. Output: Installable packages (.exe, .dmg, .ApplImage)

#### **Desktop Export Features:**

- Standalone executable (no browser needed)
- Cross-platform builds
- Custom window settings
- Menu bar customization
- Auto-updater support (optional)

## **Export UI**

#### **Export Dialog:**

Export Game	[X]
Export Type: <input checked="" type="checkbox"/> Web (HTML/JS)	

- Mobile (iOS/Android)
- Desktop (Electron)

#### Export Options

- Minify code
- Optimize assets
- Include source maps
- Add service worker (PWA)

Build Size: ~2.5 MB (estimated)

#### Export Location:

[Browse...] C:\Users\...\my-game-export

[Export] [Cancel]

### Export Progress:

- Progress bar during build
- Step-by-step feedback:
  - "Building project..."
  - "Optimizing assets..."
  - "Generating files..."
  - "Export complete!"

### Post-Export:

- "Export successful!" message
- "Open folder" button
- Quick deploy options (if configured)
- Export summary (file sizes, build time)

## Deployment Helpers

### GitHub Pages Integration:

- One-click deploy to GitHub Pages
- Creates gh-pages branch
- Configures GitHub Actions (auto-deploy on push)

### Netlify Integration:

- Connect Netlify account
- Auto-deploy on export
- Custom domain support

### Export Presets:

- Development build (fast, unminified)
- Production build (optimized, minified)
- Debug build (source maps, verbose)

## Export Guidelines

### User Instructions:

- README.md included in export with:
  - Deployment instructions
  - Platform-specific notes
  - Build requirements
  - Troubleshooting tips

### Best Practices:

- Optimize assets before export
- Test export locally before deploying
- Check file sizes (mobile has limits)
- Validate build works on target platform

# 🔍 Competitive Analysis

↑ Back to TOC

## Overview

**Purpose:** Understand the market landscape and identify GameForge IDE's unique position.

### Key Competitors:

- GameMaker Studio
  - Construct 3
  - Unity (Visual Scripting)
  - GDevelop
  - CodePen / JSFiddle (for web games)
- 

## GameMaker Studio

### Strengths:

- Mature platform (20+ years)
- Large user base and community
- Comprehensive feature set
- Export to multiple platforms
- Visual scripting (GML) + code editor
- Asset marketplace

### Weaknesses:

- Expensive pricing (\$99-\$799/year)
- Proprietary language (GML)
- Steep learning curve
- Heavy/feature-bloated
- Not web-first (desktop app focus)

### GameForge Advantage:

- **Phaser.js focused** - Web-native, modern JavaScript
- **Lower cost** - One-time yearly payment (~\$50-100 vs \$99-799/year)
- **AI assistance** - Built-in AI chat (competitors have limited AI)
- **Simpler** - Focused on rapid prototyping, not AAA games
- **Open ecosystem** - JavaScript/Phaser.js knowledge transfers

### Target Audience Overlap:

- Both target indie developers
  - Both target hobbyists and professionals
  - GameMaker users frustrated with cost/complexity → GameForge
- 

## Construct 3

### Strengths:

- Browser-based (no install)
- Visual editor (no code required)
- Easy to learn
- Good for non-programmers
- Export to web/mobile

### Weaknesses:

- Visual-only (limited code control)
- Performance limitations
- Less flexible than code-based
- Subscription pricing (\$99/year+)
- Limited customization

### GameForge Advantage:

- **Code-first** - Full JavaScript control
- **AI assistance** - Learn to code with AI help
- **More powerful** - Phaser.js full capabilities
- **Better for learning** - AI teaches coding, not just clicking
- **One-time payment** - No subscription

### Target Audience Overlap:

- Construct users wanting more control → GameForge
- Construct users frustrated with visual limitations → GameForge

## Unity (Visual Scripting)

### Strengths:

- Industry standard
- Powerful 3D/2D engine
- Massive community
- Asset store
- Export to all platforms

### Weaknesses:

- Heavy/overkill for 2D web games
- Complex setup
- Pricing changes (confusing)
- Not web-first (needs build process)
- Overkill for simple games

### GameForge Advantage:

- **Web-first** - Immediate browser preview
- **Simpler** - Focused on 2D web games
- **Faster** - Rapid prototyping focus
- **Lower barrier** - No engine installation
- **Phaser.js** - Web-native, lightweight

### Target Audience Overlap:

- Unity users making simple 2D games → GameForge (faster workflow)
- Unity users overwhelmed by complexity → GameForge

---

## GDevelop

### Strengths:

- Free and open source
- Visual scripting
- Browser-based option
- Good for beginners
- No code required

### Weaknesses:

- Visual-only (limited code control)
- Less powerful than code-based
- Community smaller than competitors
- Less polished UI
- Export limitations

### GameForge Advantage:

- **Code-first** - Full JavaScript control
- **AI assistance** - Learn coding with AI
- **More professional** - Polished IDE experience
- **Better support** - Commercial product with support
- **Phaser.js** - Modern, well-maintained framework

### Target Audience Overlap:

- GDevelop users wanting code control → GameForge
- GDevelop users wanting professional tooling → GameForge

---

## CodePen / JSFiddle (Educational)

### Strengths:

- Free
- Browser-based
- Great for learning
- Share code easily
- Live preview

### Weaknesses:

- Not designed for games
- No game-specific features
- No project management
- Limited asset management
- No export/deployment

## GameForge Advantage:

- **Game-focused** - Built for Phaser.js games
- **Project management** - File tree, project templates
- **Asset browser** - Visual asset management
- **Export** - One-click deployment
- **AI assistance** - Game-specific help

## Target Audience Overlap:

- CodePen users making games → GameForge (better tooling)
- CodePen users wanting better game workflow → GameForge

## Market Positioning

### GameForge IDE's Unique Position:

#### 🎯 Target Market:

- Indie developers making 2D web games
- Hobbyists learning game development
- Professionals prototyping quickly
- Phaser.js enthusiasts
- Developers wanting AI-assisted coding

#### 💎 Unique Value Propositions:

1. **Phaser.js Exclusive** - Deep integration, not generic
2. **AI-Powered** - Built-in AI chat with game context
3. **Code-First** - Full JavaScript control (not visual-only)
4. **Rapid Prototyping** - Fast iteration with live preview
5. **Affordable** - One-time yearly payment (~\$50-100)
6. **Web-First** - Browser preview, instant feedback
7. **PROJECT\_JOURNAL** - Built-in project documentation

#### 📊 Competitive Advantages:

Feature	GameForge	GameMaker	Construct	Unity	GDevelop
Price	Low (\$50-100/yr)	High (\$99-799/yr)	Medium (\$99/yr)	Free/Paid	Free
Code Control	<input checked="" type="checkbox"/> Full JS	<input checked="" type="checkbox"/> GML	<input type="checkbox"/> Visual	<input checked="" type="checkbox"/> C#/JS	<input type="checkbox"/> Visual
AI Assistance	<input checked="" type="checkbox"/> Built-in	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> Limited	<input type="checkbox"/> No
Web-First	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
Rapid Prototyping	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
Learning Curve	<input type="checkbox"/> Moderate	<input type="checkbox"/> Steep	<input checked="" type="checkbox"/> Easy	<input type="checkbox"/> Steep	<input checked="" type="checkbox"/> Easy
Phaser.js Focus	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No

#### 🎯 Market Gaps GameForge Fills:

1. **AI-Assisted Game Development** - No competitor has built-in AI chat
2. **Phaser.js IDE** - No dedicated IDE for Phaser.js
3. **Code-First Web Games** - Combines code control with rapid prototyping
4. **Affordable Professional Tool** - Lower cost than GameMaker/Construct
5. **Learning-Focused** - AI helps users learn, not just generate code

## Pricing Comparison

### GameMaker Studio:

- Creator: \$99/year
- Indie: \$399/year
- Enterprise: \$799/year

### Construct 3:

- Personal: \$99/year
- Business: \$249/year

### Unity:

- Personal: Free (with restrictions)
- Pro: \$2,040/year
- Plus: \$399/year

### GDevelop:

- Free (open source)

### GameForge IDE (Proposed):

- **One-time yearly payment: \$50-100/year**

- All features included
- No tiers, no restrictions
- Transparent pricing

#### **Competitive Advantage:**

- Lower cost than GameMaker/Construct
  - One-time payment (not subscription)
  - All features included (no tiers)
  - Transparent pricing model
- 

#### **Marketing Differentiators**

##### **Key Messages:**

1. "The Phaser.js IDE with AI Assistance"
2. "Code-First Game Development, Rapid Prototyping"
3. "AI-Powered Learning for Game Developers"
4. "Affordable Professional Tooling for Indie Developers"
5. "Web-First Game Development"

##### **Target Personas:**

- **The Learner** - Wants to learn game development with AI help
  - **The Prototyper** - Needs fast iteration for game ideas
  - **The Indie Dev** - Wants professional tools at affordable price
  - **The Phaser Enthusiast** - Deep Phaser.js user needing better tooling
  - **The Escapee** - Escaping expensive/complex alternatives
-

# ⌚ Feature Prioritization

↑ Back to TOC

## Overview

**Purpose:** Define what MUST be in v1.0 MVP vs what can wait for v2.0+.

**Philosophy:** Ship fast, iterate based on feedback. Better to have a focused MVP than a bloated v1.0.

---

## MVP (v1.0) - Must Have

**Core Features (Non-Negotiable):**

1.  **Monaco Editor**
  - **Why:** Essential for code editing
  - **Priority:** P0 (Critical)
  - **Effort:** Medium
  - **Dependencies:** None
2.  **Live Preview Pane**
  - **Why:** Core value proposition (instant feedback)
  - **Priority:** P0 (Critical)
  - **Effort:** Medium
  - **Dependencies:** Monaco Editor
3.  **File Tree**
  - **Why:** Project navigation (basic requirement)
  - **Priority:** P0 (Critical)
  - **Effort:** Low-Medium
  - **Dependencies:** None
4.  **Project Templates**
  - **Why:** Starter projects (Blank, Platformer, Shooter, Puzzle, Runner)
  - **Priority:** P0 (Critical)
  - **Effort:** Medium
  - **Dependencies:** None
5.  **AI Chat Panel**
  - **Why:** Unique differentiator (competitors don't have this)
  - **Priority:** P0 (Critical)
  - **Effort:** High
  - **Dependencies:** API key management
6.  **Asset Browser**
  - **Why:** Visual asset management (images, audio)
  - **Priority:** P1 (High)
  - **Effort:** Medium
  - **Dependencies:** File Tree
7.  **Web Export**
  - **Why:** Basic deployment (users need to ship games)
  - **Priority:** P1 (High)
  - **Effort:** Medium
  - **Dependencies:** Build system
8.  **Genre Rule Files**
  - **Why:** AI context (makes AI chat valuable)
  - **Priority:** P1 (High)
  - **Effort:** Low
  - **Dependencies:** AI Chat Panel

---

## Nice to Have (v1.0+) - Can Defer

**Features We Can Add Later:**

1.  **Mobile Export**
  - **Why:** Nice to have, but web export is priority
  - **Priority:** P2 (Medium)
  - **Effort:** High
  - **Defer to:** v1.1 or v2.0

## 2. ⚠ Desktop Export

- **Why:** Even less critical than mobile
- **Priority:** P3 (Low)
- **Effort:** High
- **Defer to:** v2.0

## 3. ⚠ Multiple AI Providers

- **Why:** Start with OpenAI, add others later
- **Priority:** P2 (Medium)
- **Effort:** Low-Medium
- **Defer to:** v1.1 (add Anthropic)

## 4. ⚠ Advanced Asset Operations

- **Why:** Basic asset browser is enough for MVP
- **Priority:** P2 (Medium)
- **Effort:** Medium
- **Defer to:** v1.1

## 5. ⚠ Custom Themes

- **Why:** Dark/light themes are enough for MVP
- **Priority:** P3 (Low)
- **Effort:** Low
- **Defer to:** v1.1

---

## v2.0 Features - Future Vision

### Major Features Reserved for v2.0:

#### 1. Visual Scene Editor

- Drag-and-drop scene creation
- Visual entity placement
- Properties panel

#### 2. Animation Timeline Editor

- Visual sprite animation creation
- Timeline-based editing
- Preview animations

#### 3. Sprite Sheet Generator

- Combine images into sprite sheets
- Animation frame extraction
- Atlas generation

#### 4. Tiled Map Integration

- Visual Tiled map editor
- Import/export Tiled maps
- Tile-based level editing

#### 5. Plugin System

- Extend IDE functionality
- Community plugins
- Plugin marketplace

#### 6. Community Features

- Template sharing
- Asset marketplace
- Game showcase

---

## MVP Scope Reduction Options

### If Behind Schedule, Can Cut:

#### 1. Asset Browser → Basic File Tree

- Users can manually add assets via file tree
- Defer visual asset browser to v1.1
- **Trade-off:** Less polished, but still functional

#### 2. Multiple Templates → Just Blank + Platformer

- Start with 2 templates, add more later
- **Trade-off:** Less variety, but faster to ship

### 3. Genre Rule Files → Basic AI Context

- Use generic Phaser.js context only
- Add genre-specific rules in v1.1
- **Trade-off:** Less specialized AI, but still useful

### 4. Polished UI → Functional UI

- Focus on functionality over polish
- Polish UI in v1.1
- **Trade-off:** Less beautiful, but works

---

## Feature Priority Matrix

### Priority Levels:

- **P0 (Critical)** - Must have for MVP
- **P1 (High)** - Should have for MVP
- **P2 (Medium)** - Nice to have, can defer
- **P3 (Low)** - Future consideration

### Effort Levels:

- **Low** - 1-2 days
- **Medium** - 1-2 weeks
- **High** - 2-4 weeks

Feature	Priority	Effort	MVP?	Notes
Monaco Editor	P0	Medium	✓	Yes Core functionality
Live Preview	P0	Medium	✓	Yes Core value prop
File Tree	P0	Low-Medium	✓	Yes Basic requirement
Project Templates	P0	Medium	✓	Yes Start with 2-3
AI Chat Panel	P0	High	✓	Yes Unique differentiator
Asset Browser	P1	Medium	✓	Yes Visual asset mgmt
Web Export	P1	Medium	✓	Yes Basic deployment
Genre Rule Files	P1	Low	✓	Yes AI context
Mobile Export	P2	High	✗	No v1.1 or v2.0
Desktop Export	P3	High	✗	No v2.0
Visual Scene Editor	P3	Very High	✗	No v2.0
Animation Timeline	P3	Very High	✗	No v2.0

---

## MVP Success Criteria

### v1.0 is "Done" When:

1. ✓ Users can create a new project from template
2. ✓ Users can edit code in Monaco Editor
3. ✓ Users can see live preview of game
4. ✓ Users can chat with AI about their game
5. ✓ Users can add assets (images, audio)
6. ✓ Users can export game as web build
7. ✓ Game runs in browser after export
8. ✓ All core features work without crashes

### Not Required for MVP:

- ✗ Mobile/desktop export
- ✗ Visual editing tools
- ✗ Advanced animations
- ✗ Plugin system
- ✗ Community features
- ✗ Multiple AI providers
- ✗ Polished UI (functional is enough)

---

## Risk Mitigation

### High-Risk Features:

1. **AI Chat Integration**
  - **Risk:** API costs, rate limits, quality
  - **Mitigation:** Start with OpenAI only, add error handling, test thoroughly
2. **Live Preview Hot Reload**
  - **Risk:** Performance, memory leaks

- **Mitigation:** Use proven webpack dev server, add memory limits

### 3. Web Export

- **Risk:** Build complexity, compatibility issues
- **Mitigation:** Use webpack production build, test on multiple browsers

#### Mitigation Strategy:

- Build risky features first (fail fast)
  - Have fallback plans (simpler alternatives)
  - Test continuously
  - Get early feedback from beta testers
- 

### Timeline Considerations

#### If Running Behind Schedule:

**Week 1-2:** Foundation (Electron, UI layout) **Week 3-4:** Monaco Editor + File Tree **Week 5-6:** Live Preview (Critical path) **Week 7-8:** Project Templates  
**Week 9-10:** Asset Browser **Week 11-12:** AI Chat (Critical path) **Week 13-14:** Genre Rule Files **Week 15-16:** Web Export **Week 17-18:** Polish & Testing  
**Week 19-20:** Beta Release **Week 21-24:** Iterate & Launch

#### If Behind:

- Cut Asset Browser → Users use file tree
- Cut Genre Rule Files → Use generic context
- Cut Polish → Functional UI is enough
- Extend timeline by 2-4 weeks if needed

**Key Principle:** Better to ship focused MVP than delayed bloated v1.0.

---

[↑ Back to TOC](#)

## Overview

**Purpose:** Define launch plan, target audience, messaging, and marketing channels.

**Philosophy:** Focus on indie developers, Phaser.js community, and game dev learners. Emphasize AI assistance and affordability.

---

## Target Audience

**Primary Personas:**

### 1. The Learner (40% of audience)

- Age: 18-35
- Experience: Beginner to intermediate
- Goals: Learn game development with AI help
- Pain Points: Steep learning curve, expensive tools
- Value Prop: AI teaches coding, affordable price

### 2. The Prototyper (30% of audience)

- Age: 25-40
- Experience: Intermediate to advanced
- Goals: Rapid game prototyping
- Pain Points: Slow iteration, complex tools
- Value Prop: Live preview, fast workflow

### 3. The Indie Dev (20% of audience)

- Age: 25-45
- Experience: Advanced
- Goals: Ship games affordably
- Pain Points: Expensive tools, subscription fatigue
- Value Prop: One-time payment, professional tooling

### 4. The Phaser Enthusiast (10% of audience)

- Age: 22-40
  - Experience: Advanced Phaser.js users
  - Goals: Better tooling for Phaser.js
  - Pain Points: No dedicated IDE for Phaser.js
  - Value Prop: Phaser.js exclusive, deep integration
- 

## Key Messages

**Primary Message:**

"GameForge IDE: The Phaser.js IDE with AI Assistance. Code-first game development for rapid prototyping."

**Supporting Messages:**

### 1. AI-Powered Learning

- "Learn game development with AI assistance"
- "AI helps you code, not just generate code"
- "Built-in AI chat understands your game"

### 2. Rapid Prototyping

- "Live preview, instant feedback"
- "From idea to playable game in minutes"
- "Fast iteration, not slow compilation"

### 3. Affordable Professional Tooling

- "Professional features at indie prices"
- "One-time payment, no subscription"
- "Half the cost of GameMaker or Construct"

### 4. Phaser.js Exclusive

- "Built exclusively for Phaser.js"
- "Deep integration, not generic editor"
- "Phaser.js knowledge transfers"

### 5. Code-First

- "Full JavaScript control"
  - "Not visual-only, code-first"
  - "Learn real programming skills"
- 

## Marketing Channels

### Phase 1: Pre-Launch (Weeks 1-12)

#### 1. Content Marketing

- Blog posts on game development
- Tutorial videos (YouTube)
- Phaser.js community engagement
- Twitter/X presence

#### 2. Community Building

- Discord server
- Reddit (r/gamedev, r/phaser, r/indiegaming)
- GitHub (open source components if possible)
- Dev.to articles

#### 3. Email List

- Signup form on landing page
- Weekly updates on progress
- Beta signup interest

### Phase 2: Beta Launch (Weeks 13-20)

#### 1. Beta Program

- Recruit 50-100 beta testers
- Free access for feedback
- Beta tester testimonials
- Beta highlights video

#### 2. Influencer Outreach

- Reach out to game dev YouTubers
- Offer free licenses for reviews
- Game dev streamers
- Phaser.js community leaders

#### 3. Press Kit

- Screenshots
- Demo video
- Feature list
- Press release

### Phase 3: Launch (Weeks 21-24)

#### 1. Product Hunt

- Launch day on Product Hunt
- Prepare materials (video, screenshots)
- Engage with comments
- Aim for top 3 products

#### 2. Game Dev Communities

- Announce on r/gamedev
- Post on IndieDB
- Share on Twitter/X
- Discord announcements

#### 3. YouTube Launch Video

- Demo video (5-10 minutes)
- Tutorial walkthrough
- Feature showcase
- Call-to-action

#### 4. Paid Advertising (Optional)

- Google Ads (targeting "game development tools")
  - Reddit ads (r/gamedev)
  - Twitter/X ads
  - Budget: \$500-1000 for launch
-

## Pre-Launch Checklist:

- Landing page live
- Email signup form working
- Demo video ready
- Screenshots captured
- Press kit prepared
- Beta tester recruitment
- Discord server setup
- Social media accounts created
- GitHub repository (if open source components)

## Beta Launch (Week 13):

- Beta program announcement
- Email list notified
- Beta tester onboarding
- Feedback collection system
- Bug tracking setup
- Weekly beta updates

## Public Launch (Week 21):

- Product Hunt launch
- Press release sent
- Social media blitz
- Community announcements
- Launch video published
- Website updated (pricing, buy now)
- Support system ready

---

## Pricing Strategy

### Launch Pricing:

- **Early Bird (First 100 users):** \$49/year
- **Regular Price:** \$79/year
- **Student Discount:** 50% off (\$39.50/year)

### Pricing Rationale:

- Lower than GameMaker (\$99/year)
- Lower than Construct (\$99/year)
- Affordable for indie developers
- One-time payment (not subscription)
- Clear value proposition

### Future Pricing:

- Increase to \$99/year after first 6 months
- Maintain student discount
- Consider lifetime option (\$199 one-time)

---

## Success Metrics

### Key Performance Indicators (KPIs):

#### 1. Pre-Launch:

- Email signups: 500+ before launch
- Beta signups: 100+ beta testers
- Social media followers: 1000+ (Twitter/Discord)

#### 2. Beta Launch:

- Beta testers active: 50+ active users
- Feedback submissions: 100+ pieces of feedback
- Bug reports: Track and fix critical bugs

#### 3. Public Launch:

- Day 1 sales: 20+ purchases
- Week 1 sales: 100+ purchases
- Month 1 sales: 300+ purchases
- Product Hunt rank: Top 10 products

#### 4. Ongoing:

- Monthly active users: Track usage
- Customer satisfaction: Survey users
- Churn rate: Track renewals

- Feature requests: Prioritize based on demand
- 

## Messaging by Channel

### Twitter/X:

- Short, punchy messages
- GIFs and screenshots
- Engage with game dev community
- Use hashtags: #gamedev #indiedev #phaserjs #gamedevelopment

### Reddit:

- Longer-form posts
- Honest, community-focused
- Share progress updates
- Answer questions thoroughly

### YouTube:

- Tutorial videos
- Feature showcases
- Demo walkthroughs
- Development vlogs

### Discord:

- Community support
- Real-time discussions
- Feature announcements
- User feedback

### Email:

- Weekly updates
  - Feature announcements
  - Tutorial highlights
  - Beta invites
- 

## Competitive Messaging

### Vs GameMaker:

- "Half the price, Phaser.js focused"
- "No proprietary language, use JavaScript"
- "AI assistance built-in"

### Vs Construct:

- "Code-first, not visual-only"
- "Learn real programming skills"
- "More powerful, same price"

### Vs Unity:

- "Simpler for 2D web games"
- "Faster iteration, no compilation"
- "Built for web, not desktop"

### Vs GDevelop:

- "Professional tooling"
  - "Code control, not visual-only"
  - "AI assistance for learning"
- 

## Content Calendar

### Pre-Launch (12 weeks):

- **Week 1-2:** Blog post: "Why Phaser.js for game development?"
- **Week 3-4:** Video: "Building your first Phaser.js game"
- **Week 5-6:** Blog post: "AI-assisted game development"
- **Week 7-8:** Video: "GameForge IDE preview"
- **Week 9-10:** Blog post: "Game development tools comparison"
- **Week 11-12:** Beta announcement, email campaign

### Beta Launch (8 weeks):

- **Week 1:** Beta launch announcement
- **Week 2:** Beta feedback summary blog post

- **Week 3:** Tutorial video: "Creating a platformer in GameForge"
- **Week 4:** Blog post: "What we learned from beta testing"
- **Week 5:** Feature showcase video
- **Week 6:** Beta tester testimonials
- **Week 7:** Launch date announcement
- **Week 8:** Final launch preparation

#### Launch Week:

- **Day 1:** Product Hunt launch
  - **Day 2:** Launch video published
  - **Day 3:** Community announcements
  - **Day 4:** Press outreach
  - **Day 5:** Feature blog post
  - **Day 6:** Tutorial video
  - **Day 7:** Launch recap and thank you
- 

#### Budget Estimate

##### Marketing Budget (6 months):

- **Content Creation:** \$500 (video editing, graphics)
- **Paid Advertising:** \$1,000 (Google Ads, Reddit ads)
- **Tools & Services:** \$300 (email marketing, analytics)
- **Influencer Outreach:** \$500 (free licenses for reviews)
- **Total:** \$2,300

##### Low-Cost Alternatives:

- Use free tools (Canva, OBS Studio)
  - Focus on organic growth (Reddit, Twitter)
  - Community-driven marketing (Discord, GitHub)
  - Total: \$500-1,000
-

# V2.0 Feature Deep Dives

[↑ Back to TOC](#)

## Overview

**Purpose:** Detail major features planned for v2.0, building on v1.0 MVP foundation.

**Philosophy:** v2.0 expands capabilities while maintaining simplicity. Focus on visual tooling and community features.

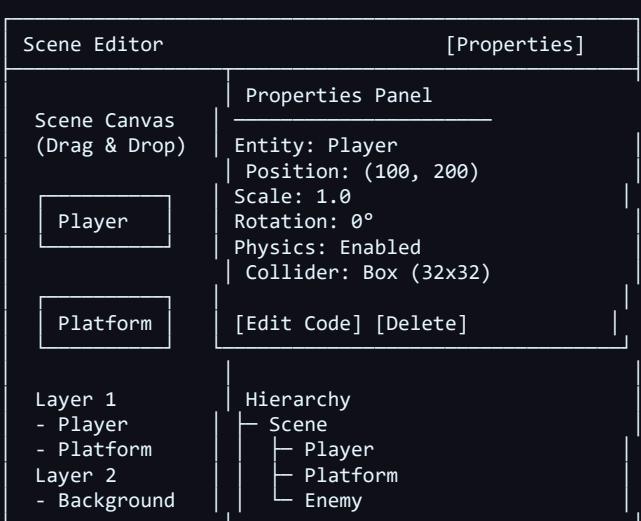
## Visual Scene Editor

**Purpose:** Allow users to visually create and edit game scenes without writing code.

### Features:

- Drag-and-drop entity placement
- Visual properties panel
- Scene hierarchy view
- Layer management
- Grid snapping
- Zoom/pan controls

### UI Layout:



### Code Generation:

- Visual edits generate JavaScript code
- Code stays in sync with visual editor
- Users can switch between visual/code views
- Round-trip editing (visual ↔ code)

### Technical Implementation:

- Phaser.js scene serialization
- Entity component system
- Visual canvas overlay
- Code generation engine

## Animation Timeline Editor

**Purpose:** Create and edit sprite animations visually with timeline-based editing.

### Features:

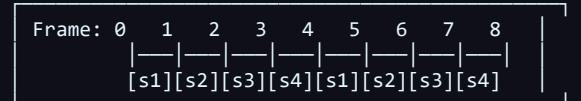
- Timeline-based animation editing
- Frame-by-frame sprite editing
- Animation preview
- Easing curves
- Animation loops
- Export animation JSON

### UI Layout:

Animation Timeline Editor

Preview: [Animated Sprite]

#### Timeline:



FPS: [12] Loop: [✓]

#### Sprite Frames:

[frame1] [frame2] [frame3] [frame4]

[Play] [Stop] [Export]

### Animation Export:

- Generates Phaser animation config
- Sprite sheet coordinates
- Animation JSON format
- Code snippet for loading

### Sprite Sheet Generator

**Purpose:** Combine multiple images into optimized sprite sheets automatically.

#### Features:

- Drag-and-drop image import
- Automatic sprite sheet generation
- Optimization (removal of duplicates)
- Atlas JSON export
- Frame extraction
- Multiple packing algorithms

#### Workflow:

1. Import sprite images
2. Select packing algorithm
3. Generate sprite sheet
4. Export atlas JSON
5. Generate Phaser load code

### Tiled Map Integration

**Purpose:** Visual tile-based level editor integrated into GameForge.

#### Features:

- Visual tile palette
- Brush tool for painting tiles
- Object layer editing
- Collision layer editing
- Export Tiled JSON format
- Import existing Tiled maps

#### Benefits:

- Faster level design
- Visual tile placement
- Familiar workflow (similar to Tiled)
- Integration with Phaser scene system

### Plugin System

**Purpose:** Allow community to extend GameForge IDE functionality.

#### Plugin API:

- Plugin registration system
- Hook system (pre-save, post-load, etc.)
- UI extension points
- File system access
- API integration points

#### Example Plugins:

- Asset marketplace integration

- Custom export formats
- Additional AI providers
- Theme extensions
- Code generators

#### **Plugin Marketplace:**

- Browse available plugins
  - Install/uninstall plugins
  - Rate plugins
  - Developer documentation
- 

### **Community Features**

#### **Template Sharing:**

- Upload custom templates
- Browse community templates
- Rate templates
- Template categories

#### **Asset Marketplace:**

- Sell/buy game assets
- Free asset library
- Asset preview
- License management

#### **Game Showcase:**

- Share completed games
- Browse community games
- Game ratings
- Featured games

#### **Social Features:**

- User profiles
  - Follow other developers
  - Share screenshots
  - Discussion forums
-

# Testing Strategy

[↑ Back to TOC](#)

## Overview

**Purpose:** Comprehensive testing plan to ensure quality and reliability.

### Testing Levels:

- Unit Tests
- Integration Tests
- End-to-End (E2E) Tests
- Performance Tests
- User Acceptance Tests

---

## Unit Testing

**Framework:** Jest or Mocha

### What to Test:

- Utility functions
- Code generation logic
- File parsing (JSON, etc.)
- Template processing
- Asset processing

### Example Test:

```
describe('TemplateProcessor', () => {
  test('replaces placeholders correctly', () => {
    const template = '{{GAME_NAME}}';
    const result = processTemplate(template, { GAME_NAME: 'MyGame' });
    expect(result).toBe('MyGame');
  });
});
```

**Coverage Goal:** 80%+ for utility functions

---

## Integration Testing

### What to Test:

- File tree → Editor integration
- Preview pane ↔ File system
- AI chat ↔ Code context
- Export → Build system
- Asset browser ↔ File system

### Test Scenarios:

- Create new project from template
- Edit file, see changes in preview
- Add asset, see in asset browser
- Export project, verify build
- AI chat generates code, insert into editor

---

## End-to-End Testing

**Framework:** Playwright or Electron Testing

### Critical User Flows:

#### 1. New Project Flow:

- Launch app
- Click "New Project"
- Select template
- Enter project name
- Verify project created
- Verify files exist

#### 2. Edit & Preview Flow:

- Open project
- Edit game code

- Verify preview updates
- Test game functionality

### 3. AI Chat Flow:

- Open AI chat panel
- Enter question
- Verify response
- Insert code snippet
- Verify code inserted

### 4. Export Flow:

- Click "Export"
- Select export options
- Choose export location
- Verify export complete
- Verify exported files work

**E2E Coverage:** All critical user flows

---

## Performance Testing

### What to Test:

- App startup time (< 3 seconds)
- File tree loading (< 1 second for 100 files)
- Preview pane hot reload (< 500ms)
- AI chat response time (< 5 seconds)
- Export build time (< 30 seconds for small project)
- Memory usage (< 500MB idle)

### Tools:

- Chrome DevTools (memory profiling)
- Electron DevTools
- Performance API
- Custom benchmarking

---

## Cross-Platform Testing

### Platforms:

- Windows 10/11
- macOS (latest)
- Linux (Ubuntu, Fedora)

### What to Test:

- App installation
- File system operations
- Native dialogs
- Keyboard shortcuts
- Performance
- UI rendering

---

## User Acceptance Testing

### Beta Testing:

- Recruit 50-100 beta testers
- Provide test scenarios
- Collect feedback
- Track bugs
- Iterate based on feedback

### Test Scenarios:

- Create platformer game
- Add custom assets
- Use AI chat for help
- Export game
- Deploy to web

# ⚡ Performance Optimization

[↑ Back to TOC](#)

## Overview

**Purpose:** Ensure GameForge IDE runs smoothly and efficiently.

### Key Metrics:

- Startup time: < 3 seconds
- Memory usage: < 500MB idle
- File tree loading: < 1 second
- Preview hot reload: < 500ms
- UI responsiveness: 60 FPS

---

## Memory Optimization

### Strategies:

#### 1. Lazy Loading

- Load editor only when needed
- Load preview pane on demand
- Load AI chat panel on open

#### 2. Asset Caching

- Cache loaded assets
- Clear cache on project close
- Limit cache size (100MB)

#### 3. File Watcher Optimization

- Debounce file change events
- Only watch project files
- Unwatch on project close

#### 4. Preview Pane Management

- Single preview instance
- Reuse webview
- Clear preview on project switch

---

## Startup Performance

### Optimizations:

#### 1. Defer Non-Critical Loads

- Load UI first
- Load editor after UI ready
- Load AI chat on demand

#### 2. Code Splitting

- Split by feature (editor, preview, AI)
- Load chunks on demand
- Reduce initial bundle size

#### 3. Native Module Optimization

- Lazy load native modules
- Use async imports
- Minimize native dependencies

**Target:** < 3 seconds from launch to usable UI

---

## Preview Pane Performance

### Optimizations:

#### 1. Hot Reload Optimization

- Debounce file changes (300ms)
- Only reload changed files
- Preserve game state when possible

#### 2. Webview Management

- Reuse webview instance
- Clear console on reload
- Limit memory usage

### 3. Build System

- Use webpack dev server caching
- Incremental builds
- Source maps only in dev mode

**Target:** < 500ms hot reload time

---

## Bundle Size Optimization

**Strategies:**

### 1. Tree Shaking

- Remove unused code
- Minimize dependencies
- Use ES modules

### 2. Code Splitting

- Split by route/feature
- Lazy load chunks
- Reduce initial bundle

### 3. Asset Optimization

- Compress images
- Use modern formats (WebP)
- Optimize SVG files

**Target:** < 50MB total bundle size

---

## UI Responsiveness

**Optimizations:**

### 1. Virtual Scrolling

- Use virtual lists for file tree
- Render only visible items
- Reduce DOM nodes

### 2. Debouncing

- Debounce search input
- Debounce file watchers
- Debounce preview updates

### 3. Request Animation Frame

- Use RAF for animations
- Batch DOM updates
- Avoid layout thrashing

**Target:** 60 FPS UI, smooth scrolling

---

## Community Features

[↑ Back to TOC](#)

### Overview

**Purpose:** Build a community around GameForge IDE and enable user collaboration.

#### Features:

- Template sharing
- Asset marketplace
- Game showcase
- Discussion forums
- User profiles

---

### Template Sharing

#### Features:

- Upload custom templates
- Browse community templates
- Rate templates (1-5 stars)
- Template categories (platformer, shooter, etc.)
- Template tags
- Template screenshots
- Download templates
- Template versioning

#### Workflow:

1. User creates template
2. User clicks "Share Template"
3. Upload template metadata
4. Submit for review (optional)
5. Template appears in marketplace
6. Other users can download

**Monetization:** Free (community-driven)

---

### Asset Marketplace

#### Features:

- Upload assets (images, audio, sprites)
- Set prices (free or paid)
- Browse assets by category
- Preview assets
- Purchase/download assets
- Asset ratings
- Asset licenses

#### Asset Categories:

- Sprites
- Audio (music, SFX)
- Backgrounds
- UI elements
- Particle effects

**Revenue Split:** 70% creator, 30% platform (if paid)

---

### Game Showcase

#### Features:

- Upload completed games
- Game screenshots
- Game description
- Play game (embedded)
- Rate games
- Share games
- Categories/tags
- Featured games

#### Benefits:

- Showcase user work
  - Inspire other developers
  - Build community
  - Marketing opportunities
- 

## Discussion Forums

### Features:

- General discussion
- Help & support
- Feature requests
- Showcase & feedback
- Tutorials & guides
- Announcements

### Integration:

- Link to Discord server
  - Or built-in forum system
  - Or integrate with existing platform (Discourse)
- 

## User Profiles

### Features:

- Profile page
- Uploaded templates
- Uploaded assets
- Showcased games
- Forum posts
- Follower/following system
- Achievement badges

### Achievement Examples:

- "First Template" - Uploaded first template
  - "Helper" - Helped 10 forum users
  - "Creator" - Created 5 templates
  - "Asset Master" - Uploaded 20 assets
-

# Development Timeline

[↑ Back to TOC](#)

## Phase 1: Planning & Research (Current)

- Architecture design
- Tech stack decisions
- Feature prioritization
- UI/UX mockups

## Phase 2: MVP Development (Next Month)

- Electron shell setup
- Monaco Editor integration
- Basic file tree
- Phaser preview pane
- AI chat integration

## Phase 3: Polish & Release

- Asset pipeline
  - Template library
  - Export functionality
  - Documentation
  - Beta testing
-

## Key Decisions Made

[↑ Back to TOC](#)

1. **Phaser.js Exclusive** - Focus on one framework for depth, not breadth
  2. **Monaco Editor** - Battle-tested, feature-rich, familiar to developers
  3. **Electron** - Cross-platform desktop app support
  4. **AI Assistance Model** - Suggest, don't generate entire games
  5. **Rapid Prototyping Focus** - "Vibe Coding" for quick iteration
  6. **PROJECT\_JOURNAL Technique** - Uses the proven PROJECT\_JOURNAL.md system for maintaining context across development sessions, AI assistant changes, and project memory. This technique has been successfully used in the Damo The Troll Killer project and ensures continuity, decision tracking, and clear documentation of progress.
  7. **User-Provided API Keys** - Users bring their own OpenAI API keys rather than charging them through the IDE. This transparent approach gives users full control over their AI usage and costs, avoids developer having to manage API billing, and aligns with ethical business practices. Users can see exactly what they're paying for AI assistance.
  8. **One-Time Yearly Payment Model** - GameForge IDE uses a simple, affordable one-time yearly payment model rather than subscription or expensive upfront costs. Since users provide their own API keys, the IDE can be priced competitively compared to other game development kits (e.g., Gamemaker Studio, Construct). This makes it accessible to indie developers while sustaining development.
  9. **Genre Rule Files** - Preset configuration files for different game genres (platformer, shooter, puzzle, runner, etc.) that provide AI context, code patterns, validation rules, and best practices. These rule files help the AI provide genre-appropriate suggestions and ensure consistent code patterns across projects.
-

## Business Model & Pricing

[↑ Back to TOC](#)

### Pricing Strategy:

- **One-Time Yearly Payment** - Simple, affordable yearly license
- **No Subscription** - Pay once per year, use for 12 months
- **No Hidden Costs** - Users provide their own API keys (no markup)
- **Competitive Pricing** - Accessible to indie developers, priced below premium game dev kits

### Why This Model Works:

- Users control their AI costs (bring your own API key)
- Developer focuses on IDE quality, not billing/complexity
- Transparent pricing - no surprises
- Affordable for hobbyists and indie devs
- Sustainable revenue for continued development

### Competitive Context:

- Gamenator Studio: ~\$100/year (commercial license)
- Construct 3: ~\$100/year (commercial license)
- Unity: Free (with limitations) or Pro subscription
- **GameForge IDE**: Affordable yearly license (price TBD)

### Future Considerations:

- Free trial period (14-30 days)
  - Educational discounts
  - Lifetime license option (for v2.0+)
-

# Notes & Ideas

[↑ Back to TOC](#)

## Inspiration:

- Cursor IDE (AI integration)
- Gamemaker Studio (visual game dev)
- VS Code (monaco editor)
- Phaser.js documentation (best practices)
- **PROJECT\_JOURNAL.md technique** - Proven workflow from Damo The Troll Killer project

## Competitive Advantage:

- First IDE specifically for Phaser.js
- AI-aware Phaser architecture
- Rapid prototyping focus
- Creator stays in control

## Future Considerations:

- Plugin marketplace
  - Community templates
  - Tutorial integration
  - Asset marketplace integration
-

# Current Status & Blockers

[↑ Back to TOC](#)

**Status:**  Phase 2: Editor Integration - COMPLETE! → Ready for Phase 3: Live Preview

## Current Work:

-  Electron project structure created
-  Basic UI layout implemented
-  Welcome screen with GameForge branding
-  Application menu bar functional
-  Panel resizing system (drag handles for all panels)
-  Theme toggle (dark/light themes)
-  Window state persistence (remembers size/position)
-  Collapsible panels (sidebars and preview pane)
-  Monaco Editor integrated (VS Code's editor component)
-  File tree navigation (click to open files)
-  Tab system (multiple files, close tabs, active tab indicator)
-  Syntax highlighting (JavaScript, JSON, HTML, CSS, etc.)
-  Code completion and IntelliSense
-  File operations (save/open from disk - Phase 4)
-  Phase 3: Live Preview (Phaser.js integration)

## Blockers:

- None - Phase 2 COMPLETE! 🎉

## Next Steps:

- Phase 3: Live Preview (Phaser.js hot reload)
  - Phase 4: File Operations (real file system integration)
-

## Recent Work Sessions

[↑ Back to TOC](#)

### Session: Phase 2 Editor Integration - Monaco Editor & File Tree

#### What we accomplished:

- Monaco Editor fully integrated (VS Code's editor component)
- File tree navigation with click-to-open functionality
- Tab system with multiple files, close buttons, active tab indicators
- Syntax highlighting for multiple languages (JS, JSON, HTML, CSS, Markdown, TypeScript, Python, PHP, XML, YAML)
- Code completion and IntelliSense working
- Theme switching works with Monaco Editor (dark/light themes)
- Demo file tree for testing (Phase 4 will add real file system)

#### Key technical decisions:

1. **Monaco Editor Loading** - Temporarily enabled `nodeIntegration: true` for Monaco's AMD loader compatibility
2. **File Structure** - Copied Monaco files to `src/renderer/assets/monaco` for local access
3. **Tab System** - Built custom tab management with state persistence
4. **File Tree** - Created demo file tree (real file system integration in Phase 4)

#### Files Created/Modified:

- `src/renderer/index.html` - Added Monaco Editor container and loader script
- `src/renderer/renderer.js` - Complete Monaco integration, tab system, file tree (500+ lines)
- `src/renderer/styles.css` - Tab styles, file tree styles, Monaco container styles
- `src/main/main.js` - Temporarily enabled `nodeIntegration` for Monaco compatibility
- `src/main/preload.js` - Updated for `nodeIntegration` mode

#### Features Implemented:

- Monaco Editor instance creation with VS Code-like configuration
- Language detection from file extensions
- Tab switching with content preservation
- File tree click handlers (opens files in editor)
- Syntax highlighting for all major file types
- Auto-formatting on paste/type
- Line numbers and minimap

**Status:** Phase 2 COMPLETE! 🚀 Monaco Editor fully functional, files open in tabs, syntax highlighting working perfectly. Ready for Phase 3: Live Preview!



---

### Session: Phase 1 Foundation - Electron Setup & Basic UI

#### What we accomplished:

- Created complete Electron project structure
- Configured `package.json` with Electron dependencies
- Set up main process (`src/main/main.js`)
- Created preload script (`src/main/preload.js`)
- Built basic UI layout with panels structure
- Implemented welcome screen with GameForge logo
- Created application menu bar (File, Edit, View, Help)
- Styled with dark theme matching GameForge aesthetic
- Created `README.md` with project documentation

#### Key decisions made:

1. **Electron 28.0.0** - Latest stable version
2. **Context Isolation** - Secure IPC communication
3. **Modular Structure** - Clean separation (`main/renderer/shared`)
4. **Welcome Screen** - User-friendly onboarding

#### Files Created:

- `src/main/main.js` - Electron main process entry point
- `src/main/preload.js` - IPC bridge between processes
- `src/renderer/index.html` - Main UI layout
- `src/renderer/renderer.js` - Frontend logic
- `src/renderer/styles.css` - Complete styling
- `README.md` - Project documentation

#### Technical Details:

- Window size: 1400x900 (min: 800x600) - persisted in `window-state.json`
- Dark theme: #1e1e1e background, #252526 panels
- Light theme: #ffffff background, #f9f9f9 panels
- Menu bar with keyboard shortcuts

- Panel resizing: Drag handles between panels (4px resizers) with visual feedback
- State persistence: localStorage for panel sizes, collapsed states, theme preference
- Window persistence: Saves size/position/maximized state to JSON file in userData
- Placeholder sections for Phase 2-6 features

#### Files Modified:

- src/main/main.js - Added window state persistence (load/save window bounds)
- src/renderer/index.html - Added resizers, toggle buttons, theme button
- src/renderer/renderer.js - Complete panel resizing system, theme toggle, state management (230 lines)
- src/renderer/styles.css - Resizer styles, light theme, collapsed states (470 lines)

#### Features Implemented:

- Drag-to-resize left sidebar (150px - 600px range)
- Drag-to-resize right sidebar (150px - 600px range)
- Drag-to-resize preview pane (100px - full height range)
- Toggle buttons for all panels (collapse/expand with arrows)
- Theme toggle button (🌙 dark / ☀️ light) in menu bar
- All state persisted to localStorage (panel sizes, collapsed states, theme)
- Window position/size persisted to JSON file (survives app restart)

**Status:** Phase 1 Foundation COMPLETE! 🎉 Electron app running with full UI features. Ready for Phase 2: Editor Integration! 🎮✨

---

## Session: Initial Planning & Architecture Exploration 🎨💡

#### What we accomplished:

- Created project journal
- Defined core concept and philosophy
- Outlined MVP features
- Designed technical architecture
- Identified unique selling points

#### Key decisions made:

1. **Phaser.js Exclusive** - Focused approach for rapid prototyping
2. **Monaco Editor** - Using VS Code's proven editor component
3. **AI Assistance Model** - Help developers, don't replace them
4. **Electron Base** - Cross-platform desktop app

#### Ideas explored:

- "Vibe Coding" rapid prototyping concept
- Live preview with hot reload
- Asset pipeline with auto-code generation
- Template library for common game types

**Status:** Ready to begin development next month! Architecture planned, MVP features defined. 🚶

---

*Last Updated: Today's Session*

*Session Duration: Initial planning and architecture exploration*

*Status: Ready to begin development next month!*

## Session: Auto-Bundle Preview, TFA Module Integration, and Safety Nets 🚶🎮 (Today)

We turned a tough preview day into a major capability jump for GameForge IDE. The live preview now bundles real Phaser projects on the fly, and we hardened file operations to protect users' work.

#### Highlights:

- Auto-bundle for Preview (esbuild) that detects src/main.js and returns an in-memory bundle; no files written
- Base URL fix for assets in preview (custom gf:/// protocol + GF\_BASE\_URL messaging)
- Runtime code injection into the preview iframe with proper redeclaration handling
- Bundle Log panel (collapsible) recording success/errors and paths
- FPS + memory overlay in preview (top-right)
- "Open in Browser" button that generates a standalone HTML (Phaser CDN + current bundle) in temp and opens it

#### Safety & UX Improvements:

- Automatic timestamped .bak backups on every write
- External files opened as read-only; Save routes to Save As
- Overwrite protection + confirmation on New Project / Create File when targets exist

#### TFA (The Final Attack – Resurgence) integration:

- Converted TFA to module-friendly code:
  - Added src/state.js and imported GameState where used
  - Exported defaults for entities/managers/utils (Player, Enemy, Bullet, Drone, Boss, PowerUp, EnemyManager, ScoreManager, TileBackgroundManager, ParticleManager, TouchControls)
  - Scenes and main.js updated to import modules explicitly with global fallbacks

#### Files Touched (GameForge):

- `src/main/main.js` — esbuild IPC, gf:// protocol, external preview IPC
- `src/main/preload.js` — exposed `bundleEsbuild` and `previewOpenExternal`
- `src/renderer/index.html` — added Auto-bundle toggle, “Open”, “Log” buttons, log panel
- `src/renderer/renderer.js` — bundle orchestration, log feed, external HTML builder, base-URL messaging
- `src/renderer/preview-templates/preview.html` — FPS/memory overlay; forwarded runtime errors to parent

#### Files Touched (TFA project):

- New: `src/state.js`
- Updated to export defaults + global fallbacks: `entities/*, managers/*, utils/*, scenes/*`
- Updated scene imports and `main.js` to import config/state/scenes explicitly

#### What this unlocks:

- Live-preview of real Phaser projects without running each project’s dev server
- One-click external browser testing for the current preview bundle
- Safer editing of user projects (read-only external files + automatic backups)

#### Next Up:

- Bundle cache + incremental rebuilds for large projects
- Optional sourcemap stacktrace mapping into the log panel
- Preview controls: frame-step, throttle FPS, and hot-reload hygiene tools
- Template: “Phaser + ES Modules” starter pre-wired for Auto-bundle

Status: Auto-bundle preview shipped. TFA runs in GameForge. Safety nets enabled. Coffee + donut deserved. ☕🍩

---

# Product Positioning

[↑ Back to TOC](#)

## v2 – Practical Excellence (Phaser IDE Alternative)

- Goal: feature-parity + convenience vs. incumbent tools
- Price: reasonable yearly license, indie-friendly
- Promise: "Build Phaser games faster with a tool that thinks in Phaser."
- Proofs: Monaco editor, live preview, auto-bundle, templates, asset pipeline, safety nets

## v3 – Next-Gen Creative Runway

- Goal: transcend single-engine IDEs with AI-augmented creation
- Price: premium tier(s) for heavy creators and studios
- Promise: "Create at the speed of imagination — generative media, intelligent balance, instant playtests."
- Pillars: generative media, code intelligence, analytics, distribution, collaboration

## v2 → v3 Value Ladder

Layer	v2 (Now/Next)	v3 (Vision)
Editing	Monaco, tabs, themes, file ops	Collaborative co-edit, review mode
Preview	Live iframe, hot reload, Auto-bundle, Open in Browser Frame-step, time-scale, perf throttle, sourcemaps in log	
Assets	Template starters, image/audio loading	Gen image/music/SFX, style-lock, batch jobs, provenance
Gameplay	Manual tuning	Auto-balancer, difficulty scaffolding, refactor agents
Analytics	FPS/mem overlay	Telemetry, heatmaps, funnels, replay clustering
Export	One-click web	Multi-target export, CDN, PWA/Steam wrappers
Team	—	Live co-edit, anchored comments, shareable replays

Messaging: v2 is the efficient daily driver; v3 is the creative turbo.

---

# Vision

[↑ Back to TOC](#)

## Tagline candidates

- GameForge v3 — Create at the speed of imagination.
- From indie spark to AAA scale.
- The Great Convergence for game creation.

**One-liner** An AI-augmented studio that turns ideas into shippable games faster than ever—without taking the pen out of the creator's hand.

## North Star

- Keep creators in control; use AI as an accelerator, not a replacement.
- Collapse the loop from concept → prototype → playtest → iterate to hours, not weeks.
- Make professional pipelines (assets, balance, analytics, release) accessible to small teams.

---

## Phase 1–3 Recap (Concise Run-Down)

### Phase 1 – Foundation (Electron shell + UI)

- App frame with menu bar, window state persistence (size/pos/maximized)
- Three-pane layout: Explorer, Editor, Live Preview
- Drag-to-resize sidebars/preview; collapse toggles; dark/light themes
- Persistent UI state (theme, panel sizes, collapsed states)

### Phase 2 – Editor Integration (Monaco)

- Monaco Editor initialized with language detection by filename
- Tabbed editing (create/switch/close) with dirty state tracking
- Automatic layout handling on panel resizes and theme switch
- Syntax highlighting for JS/TS/HTML/CSS/JSON

### Phase 3 – Live Preview (Phaser)

- Preview iframe with injected Phaser and runtime code reload
- Preview controls: Play/Pause/Restart/Reload
- Hot-reload hygiene: safe variable redeclaration and instance cleanup
- Robust HTML preview path using srcdoc (for non-Phaser HTML files)
- Today's upgrades: Auto-bundle (esbuild), gf:// base URL, Bundle Log, FPS/memory overlay, runtime error forwarding, and "Open in Browser"

# 12-Hour Sprint Recap — November 6→7, 2025 (AEST)

↑ Back to TOC

## Achievements

- FutureVision site built (frontpage + Damo/TFA/GameForge) with OG/Twitter cards
- Per-page audio pipelines (Damo/TFA), independent toggles
- GameForge IDE: Auto-bundle (esbuild), gf:// base, Bundle Log, FPS/memory, runtime error forwarding, Open-in-Browser
- Safety nets: read-only external files, timestamped backups, overwrite protection
- TFA module conversion; preview running inside IDE
- Easter eggs/polish: Canyon Mode, toast/badge system, Rewatch button
- Deploy readiness: robots.txt, sitemap.xml, 404.html, .htaccess, Cloudflare cache rules
- Journal: HTML updated; V3 "Cursy AI" + Team Realtime suite integrated

## Decisions

- Tiled level design over procedural slopes (Damo)
- Per-project audio folders
- Public, directional journal; v2 lifetime honored; v3 monetizes teams + Cursy AI tokens
- Cloudflare edge caching with Apache origin 404

## People

- Damian (Founder/Prod-Eng): direction, build, UX
- Cursy (AI CTO): architecture, IDE integration, preview pipeline, docs
- Canyon (microsoft Copilot AI collaborator): created the entire badge set and contributed copy/snippets

## Competitive Positioning (today)

- Human-in-the-loop Phaser IDE beats prompt-generators (structure, persistence, safety)
- Faster ramp and clearer UX than heavy/expensive alternatives; "vibe coding" as the philosophy

## Cursy AI Path (v3)

- Router → RAG → SFT → Distill; Cursy Core (cloud) + Cursy Lite (local)
- 3–6 mo: router+RAG+SFT; 6–12 mo: distillation + team features
- Risks tracked via eval harness; rollbackable via router

## Team Realtime (v2.5→v3)

- WebRTC video/audio/screenshare; whiteboard overlay (Fabric/Konva + Yjs)
- Shared cursors/selections; session recording
- Start with Daily/Agora; consider Janus self-host for v3

## Revenue Targets (directional)

- Year 1 (v2): \$150k–\$300k
  - Indie seats, Studio pilots, early consulting, template marketplace
- Year 2 (v3): \$1.0M–\$2.0M+
  - Studio/Enterprise teams, Cursy AI token bundles, on-prem/SLAs, training
- Mix assumptions
  - 2–3k Indie seats; 100–200 Studio seats; 10–20 Enterprise seats
  - Cursy AI tokens: ARPU uplift +20–40% for Studio/Enterprise

## Next 3–5 Days

- Add TFA/Damo themes; deploy site; validate cards
- Tiled import tool + scene wiring helpers
- Refresh starter templates (platformer/shooter) with hot-reload hygiene
- Begin RAG indexer (symbol/scene/asset graphs) + task eval harness

## Risks / Mitigation

- Vendor lock-in → router fallback + BYO keys
- Preview asset paths → gf:// + validation checks
- Scope creep → journal-driven scoping, phase gates

# V3 — Cursy AI (Our Model) and Team Realtime Suite

↑ Back to TOC

This section captures our strategic musings and turns them into a concrete plan for GameForge v3.

## Why build “Cursy AI”

- We already ship project-aware tooling (auto-bundle, runtime log, gf:// protocol, overlays, backups). The next 10x comes from an IDE-native assistant that understands Phaser projects by structure, not simple prompts.
- Prompt-generators lack persistent project context, safety nets, and iterative loops. Our assistant is designed for shipping, not demos.

## Strategy: stair-step (12–24 months)

### 1. Router & Orchestrator (now)

- Multi-provider model router with cost/latency/quality scoring.
- Project memory: code/asset graph, scene registry, build config, error corpus.
- Toolformer-style actions: file I/O, bundling, preview control, Tiled import.
- Eval harness on real tasks (e.g., “add scene,” “fix build,” “optimize draw calls”).

### 2. Domain Brain without training (RAG)

- Deep retrieval over: symbol graph, scene graph, asset schemas, lints, logs.
- Prompt programs for Phaser patterns (Scenes, collisions, tilemaps, audio pipeline).
- Agent playbooks: “Create Scene,” “Wire Tiled map,” “Optimize bundle,” “Ship to Itch/Steam.”

### 3. Fine-tune (SFT) on our traces

- Curate 20–100k high-quality sessions (inputs → edits → success state).
- SFT open models for tool use/code edits; add RL on our eval scores.
- Ship hosted “Cursy AI v1” backed by RAG + tools.

### 4. Distill & local

- Distill to 1–7B variants for offline suggestions/refactors; cloud for heavy tasks.
- Privacy-friendly: on-device completions; cloud refactors/playtests.

### 5. Research track (optional)

- Multi-agent synthesis (art + sfx + code + level), run-verify loops, playtest bots.

## Licensing & Pricing

- v2 lifetime is honored (perpetual access to v2/v2.5 + future local features).
- v3 monetizes teams and hosted Cursy AI tokens:
  - Indie (solo): base features + token pool.
  - Studio: collaboration, roles, CI bots, higher pool.
  - Enterprise/AAA: SSO, on-prem Cursy AI, custom evals, SLAs.
- BYO API keys mode remains for hobbyists.

## Workstreams

- Data: consented logs, redaction/PII scrubbing, dedup, test-set locking.
- Infra: vector + code graph indexer, toolchain, eval farm, observability.
- Model: SFT pipelines, distillation, guardrails (regex/AST), jailbreak tests.
- Product: in-editor agents, Autopilot PR, template generator, perf fixer, code review E2E.
- Compliance: data licenses, opt-out, privacy analytics.

## Timeline & Cost (rough)

- 3–6 months: Router + RAG + SFT (rented GPUs). Low 6 figures.
- 6–12 months: Distillation + on-device + Studio features. Mid 6 figures.
- Ongoing: inference hosting, evals, red-team: monthly 4–5 figures.

## Risks & Mitigations

- Model drift → track task win-rate per release, rollback via router.
- Tool misuse → strict function calling allowlists; AST patching for edits.
- Vendor lock-in → keep router fallback to third-party models.

## Naming

- “Cursy AI”: “Cursy Core” (cloud) + “Cursy Lite” (local).

# Team Realtime: Screenshare, Whiteboard, Telepresence (IDE-native)

[↑ Back to TOC](#)

## Phased plan

1. Video/Audio baseline (fast path)
  - WebRTC via Daily.co/Agora SDK in Electron; managed signaling.
2. Screenshare
  - Electron desktopCapturer + WebRTC; region/window sharing.
3. Whiteboard overlay
  - Canvas (Fabric/Konva) + Yjs (operational transforms) for sync; stamps for sprites/tiles.
4. Deep IDE context
  - Shared cursors/selections (Yjs) in Monaco; "Share file/scene" deep links; session recording.

## Pricing

- Studio: limited monthly hours included; Enterprise: unlimited + on-prem TURN.
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## Competitive Positioning (Reflection)

↑ Back to TOC

- Prompt-generators: great demos, weak shipping. They hallucinate structure; we maintain it (entries, scenes, assets, build). No persistent project context; we have RAG + safety nets.
- Phaser IDE: powerful but heavy/costly with a steeper ramp. GameForge focuses on “vibe coding”: frictionless preview, opinionated guardrails, fast iteration.
- Our velocity + UX polish are the moat. Even if competitors notice, execution gap keeps us ahead.

## Appendix — Changelog (Auto-extracted)

- Build & Deployment
- 📈 Implementation Roadmap
- Phase 1: Foundation (Weeks 1-2)
- Phase 2: Editor Integration (Weeks 3-4)
- Phase 3: Live Preview (Weeks 5-6)
- Phase 4: Project Management (Weeks 7-8)
- Phase 5: Asset Browser (Weeks 9-10)
- Phase 6: AI Integration (Weeks 11-12)
- Phase 7: Genre Rule Files (Weeks 13-14)
- Phase 8: Polish & Testing (Weeks 15-16)
- Phase 9: Beta Release & Feedback (Weeks 17-20)
- Phase 10: v1.0 Release (Weeks 21-24)
- 🚀 Export & Deployment
- Deployment Helpers
- v2.0 Features - Future Vision
- Preview Pane Performance
- Session: Phase 2 Editor Integration - Monaco Editor & File Tree 🎨
- Session: Phase 1 Foundation - Electron Setup & Basic UI 🚀
- Session: Auto-Bundle Preview, TFA Module Integration, and Safety Nets 🚀🎮 (Today)
- Vision
- Phase 1–3 Recap (Concise Run-Down)
- 12-Hour Sprint Recap — November 6–7, 2025 (AEST)
- Cursy AI Path (v3)
- Team Realtime (v2.5→v3)
- V3 — Cursy AI (Our Model) and Team Realtime Suite
- Why build “Cursy AI”
- Team Realtime: Screenshare, Whiteboard, Telepresence (IDE-native)
- Phased plan