White Paper: PopShotSol – A Solana-Powered Arcade FPS Game

Executive Summary

PopShotSol is a free-to-play, ad-free, browser-based first-person shooter (FPS) game built on the Solana blockchain, offering players the chance to win real $SOL rewards through a 10% token supply giveaway. Developed by the PopShotSol team, the game delivers a fast-paced arcade experience where players aim to "pop" popcats within a 2-minute window to earn points, compete on a global leaderboard, and engage with a dynamic meme coin feed powered by the Dexscreener API. Featuring multi-kill streaks, special enemies, and a retro aesthetic with WebGL effects, PopShotSol combines traditional gaming mechanics with blockchain innovation. This white paper provides a detailed overview of the game’s design, technical implementation, target audience, and unique features, showcasing its potential to redefine casual gaming in the blockchain era.

Introduction

The gaming industry has seen rapid evolution with the integration of blockchain technology, enabling new models for player engagement and rewards. PopShotSol emerges as a pioneer in this space, blending the accessibility of a browser-based FPS with the incentivization of cryptocurrency rewards on the Solana blockchain. Launched by the PopShotSol team, the game offers a seamless, ad-free experience that appeals to both casual gamers and crypto enthusiasts. This white paper aims to provide a comprehensive understanding of PopShotSol, detailing its gameplay, technical architecture, and community-driven features, while highlighting its role in the growing ecosystem of blockchain gaming.

Purpose of the White Paper

This document aims to:

Provide an in-depth overview of PopShotSol’s gameplay, features, and blockchain integration.

Highlight the technical implementation and performance optimizations.

Identify the target audience and their engagement with the game.

Showcase the game’s unique selling points and community impact.

Game Overview: PopShotSol

Gameplay Mechanics

PopShotSol is a 2-minute arcade-style FPS designed for quick, engaging play sessions. The core objective is to "pop" popcats that spawn on the screen, earning points based on the type of popcat:

Normal Popcats: 1 point each.

Bonus Popcats: 5 points each, spawning with a 20% probability.

Special Enemies: 10 points each, spawning with a 5% probability, defined in a special-enemies.json file with unique weights and images.

Key Gameplay Elements

Time Limit: Each game lasts 120 seconds, with a HUD displaying the score, time left, and high score.

Spawn Mechanics:

Popcats spawn in batches, with batch sizes increasing from 1–2 to 3–4 as the game progresses (based on a desktop/mobile resolution check).

Spawn intervals decrease from 2000ms to 1000ms in 50ms increments every 10 seconds, increasing difficulty.

After 30 seconds, popcats can spawn with random movement (50% chance), moving at speeds between 0.5 and 2 pixels per frame.

Multi-Kill Streaks:

Players can achieve multi-kill streaks within a 100ms window.

Double kills (x2) trigger a green "x2" text and doublekill.mp3, triple kills (x3) show blue "x3" text and triplekill.mp3, and quad kills or higher (x4+) display red "xN" text with quadkill.mp3.

Impact Effects: Clicking a popcat triggers one of eight random impact GIFs, using an object pool for performance.

Cheat Detection:

Tracks click counts vs. spawn counts to detect impossible scores.

Ensures game duration is between 115–125 seconds to prevent time manipulation.

Validates that scores align with clicks (minimum 1 point per click, maximum 10 points per click for special enemies).

Visual and Audio Features

PopShotSol delivers a visually and audibly immersive experience:

WebGL Rendering:

Utilizes WebGL with custom shaders for a retro arcade aesthetic.

Effects include chromatic aberration, scanlines, noise, vignette, and a superellipse mask.

Background Videos:

Cycles through 15 background videos (e.g., gamebg1.mp4 to gamebg15.mp4) every 30 seconds, ensuring visual variety.

Offscreen Canvas:

A 2D offscreen canvas renders popcats and HUD elements before being passed to WebGL for final effects.

Audio:

Background music (background.mp3) loops throughout the game.

A "pop" sound (pop.mp3) plays when a popcat is clicked.

Multi-kill sound effects enhance the excitement of streak achievements.

Blockchain Integration

PopShotSol leverages the Solana blockchain to integrate cryptocurrency rewards and real-time market data:

$SOL Rewards:

PopShot allocates 10 % of the total $SHOT supply—106 million tokens—to a perpetual prize pool. Rewards are distributed every second Friday, immediately after an on-chain snapshot of the verified leaderboard.

- How to qualify: Submit a ranked score through the in-game flow and link a valid Solana wallet address before the snapshot is taken.
- Payout structure: The pool is performance-weighted: the higher your rank, the larger your share, with the top three positions receiving the biggest multipliers and allocations tapering down through the rest of the top ten.
- Dynamic rewards: Percentages and bonus multipliers can shift from one bi-weekly cycle to the next to keep the competition fresh. Seasonal events, limited-time challenges, and community-voted modes (e.g., “Head-Shot Week” or the “Tesla Browser Cup”) may redirect extra tokens to themed contests.
- Transparency: All snapshots and disbursements are handled automatically via Famous Fox Federation’s token-distributor contract, ensuring provable, tamper-proof payouts on Solana.

This flexible, on-chain system keeps rewards competitive, transparent, and adaptable to new events every cycle.

The USD value of the prize pool is displayed using Dexscreener API data, fetched from https://api.dexscreener.com/latest/dex/pairs/solana/2m3dtdsl4dwyrowmn77njhbw2wajffwyjst1tmucv5sc and updated every 10 seconds when viewing the rewards section.

Meme Coin Feed:

Displays a feed of "pump" tokens sourced from Dexscreener, showing token icons, symbols, and market caps (formatted as $K or $M).

Cards are clickable, linking to the token’s Dexscreener page.

Server-side caching (fetch_tokens.php) ensures Dexscreener API calls are limited to once per minute, with clients refreshing from the server every 30 seconds.

Leaderboard:

Players can submit their scores along with a Solana address, competing on a global leaderboard.

Backend scripts (submit.php, get_leaderboard.php) handle submissions and retrieval, with limits on submissions per hour to prevent abuse.

Responsive Design:

Optimized for desktop and mobile (landscape mode recommended).

Adjusts popcat sizes (10% of canvas width on desktop, 15% on mobile) and font sizes for readability.

Includes a mobile orientation warning to ensure landscape mode for optimal play.

Performance Optimizations:

Object pools for impact effects and multi-kill text to reduce DOM overhead.

Offscreen canvas for 2D rendering before WebGL processing.

Touch event handlers prevent double-tap zoom on mobile devices.

Backend

PHP Scripts:

submit.php: Handles score submissions, enforcing cheat detection and submission limits.

get_leaderboard.php: Retrieves and displays the global leaderboard, with emoji rankings (, ,) for top players.

fetch_tokens.php: Caches Dexscreener API data, refreshing every 60 seconds to limit API calls to once per minute across all users.

Caching: Stores token data in tokens_cache.json, ensuring efficient data sharing and minimal API load.

Assets

Images: Includes popcat images (popcat-desktop.png, popcat-mobile.png, bonus-popcat-desktop.png, bonus-popcat-mobile.png), special enemy images (from special-enemies.json), and impact GIFs (impact1.gif to impact8.gif).

Audio: Background music, pop sound, and multi-kill sounds.

Videos: 15 background videos for dynamic visuals.

Unique Selling Points

Free and Ad-Free: No cost to play, with no ads, ensuring a seamless experience.

Blockchain Rewards: Real $SOL prizes attract players interested in cryptocurrency.

Dynamic Gameplay: Multi-kill streaks, moving popcats, and special enemies keep gameplay engaging.

Community Features:

Global leaderboard fosters competition.

Meme coin feed adds a layer of crypto market engagement.

Accessibility: Browser-based with no downloads required, playable on both desktop and mobile.

Target Audience

PopShotSol appeals to a diverse player base:

Casual Gamers: Players seeking quick, fun gaming sessions, drawn by the 2-minute rounds and arcade-style gameplay.

FPS Enthusiasts: Fans of shooter games who enjoy the challenge of hitting moving targets and achieving high scores.

Blockchain and Crypto Enthusiasts:

Players interested in earning $SOL rewards through gameplay.

Meme coin traders and investors engaged by the Dexscreener-powered feed.

Competitive Players: Leaderboard-focused individuals motivated by global rankings and community recognition.

Social Media Users: Players active on platforms like Twitter (e.g., @popshotsol
), where the game has been promoted, such as through shoutouts to Gamefi Corner.

The game’s casual yet competitive nature, combined with its blockchain integration, makes it appealing to both traditional gamers and the growing crypto-gaming community.

Community Impact

PopShotSol has already fostered a sense of community through its features:

Leaderboard Engagement: Players actively compete for top spots, submitting scores with their Solana addresses, creating a competitive yet communal atmosphere.

Social Media Presence: The @popshotsol

Twitter account has engaged players, with mentions like the Gamefi Corner shoutout highlighting the game’s appeal in the crypto-gaming space.

Meme Coin Feed Interaction: The feed encourages discussions around trending "pump" tokens, bridging gaming with crypto market trends.

Giveaway Popup: A one-time popup informs players of the $SOL giveaway, driving initial engagement and excitement.

Technical Details

Performance Optimizations

Object Pooling: Reuses DOM elements for impact effects and multi-kill text, minimizing performance overhead.

WebGL Efficiency: Combines 2D rendering on an offscreen canvas with WebGL shaders for final effects, balancing visual quality and performance.

API Rate Limiting:

Server-side caching in fetch_tokens.php ensures Dexscreener API calls are limited to once per minute.

Clients fetch from the server every 30 seconds, ensuring fresh data without overloading the API.

Responsive Design

Mobile Support:

Adjusts popcat sizes and HUD elements for smaller screens.

Includes touch event handlers to prevent double-tap zoom.

Displays an orientation warning if the device is in portrait mode.

Desktop Optimization:

Larger popcat sizes and higher spawn rates for a more dynamic experience.

Supports higher resolution for WebGL rendering.

File Structure

Frontend:

game.js: Core game logic, rendering, and API interactions.

assets/: Contains images, audio files, and background videos.

Backend:

submit.php: Score submission handling.

get_leaderboard.php: Leaderboard retrieval.

fetch_tokens.php: Dexscreener API caching.

tokens_cache.json: Stores cached token data.

Future Potential

PopShotSol has significant potential for growth and expansion:

Feature Additions:

New popcat types or power-ups to enhance gameplay variety.

Daily or weekly challenges with bonus $SOL rewards to increase retention.

Community Growth:

Expanded social media campaigns to attract more players.

Integration with Discord for real-time leaderboard updates and community events.

Technical Enhancements:

In-memory caching (e.g., Redis) to further optimize server performance for high user volumes.

Additional WebGL effects or background themes to refresh the visual experience.

Conclusion

PopShotSol stands at the intersection of casual gaming and blockchain innovation, offering a free, ad-free FPS experience that rewards players with real $SOL prizes. Its engaging mechanics, such as multi-kill streaks, moving popcats, and special enemies, combined with a retro aesthetic and community-driven features like a global leaderboard and meme coin feed, make it a standout title in the blockchain gaming space. By leveraging the Solana blockchain for rewards and the Dexscreener API for real-time market data, PopShotSol provides a unique blend of entertainment and financial incentive. This white paper has outlined the game’s design, technical implementation, and community impact, positioning PopShotSol as a leader in the evolving landscape of crypto-integrated gaming.

Appendices

Appendix A: Gameplay Flow

Start Screen: Players see a giveaway popup (once per session) and can choose to play, view the leaderboard, or access the info section.

Gameplay:

120-second session begins.

Popcats spawn in increasing batches, with moving popcats after 30 seconds.

Players click/tap popcats to earn points, aiming for multi-kill streaks.

End Screen:

Displays final score and high score.

Players can submit scores with a Solana address, retweet their score, or play again (page reload).

Appendix B: Blockchain Integration Details

$SOL Giveaway: 106 million tokens, with USD value updated every 10 seconds using Dexscreener API.

Meme Coin Feed:

Fetches "pump" tokens via fetch_tokens.php.

Cards display token icon, symbol, and market cap (e.g., $500K or $1.5M), linking to Dexscreener pages.

Leaderboard: Supports emoji rankings (for 1st, for 2nd, for 3rd) and enforces submission limits.