# Gacha-Sol: Spin the Capsule on Solana!

A Decentralized Gacha Game with Confidential Transfers

Presented by pupplecat | Solana Enthusiast | May 16, 2025

# The Challenge of Privacy in Gaming

- Traditional gacha games expose reward values, risking user trust.

- Decentralized games need secure, private reward distribution.

- Solana's confidential transfers offer a solution, but are underutilized.

# Gacha-Sol: How It Works

- **Users buy pulls** with public tokens (e.g., USDC).

- **Authority verifies** vault balance with zero-ciphertext proofs.

- **Rewards are withdrawn** confidentially and transferred to users.

## Tech Stack

- Solana, Anchor 0.31.1, SPL Token 2022, Rust

- Next.js, Tailwind CSS for UI

**Unique Feature**: Hybrid CT approach (confidential deposit + public flow)

# Under the Hood

- **Smart Contract**:
  - Instructions: `buy_pull`, `open_pull`
  - State: `Pull`, `GameConfig`
- **UI**:
  - Home, Pull List (grid, pagination), Pull Card (modal)
- **Challenges**:
  - Managed transaction size (e.g., 2574 bytes)
  - Handling encryption keys
- **Testing**: Rust tests with `cargo test`, devnet deployment

## Code Snippet: `buy_pull`

```
pub fn buy_pull(ctx: Context<BuyPull>, params: BuyPullParams)
  → Result<()> {
    let pull = &mut ctx.accounts.pull;
    pull.buyer = *ctx.accounts.buyer.key;
    // ... (token transfer logic)
    Ok(())
}
```

# Live Demo: Spin the Capsule!

1. **Connect Wallet & Get Tokens**:
   https://faucet.circle.com/
2. **Browse Pulls**: Show page 3 of 4, filter options
3. **Buy a Pull**: Trigger confirmation modal, complete purchase
4. **Open Pull**: Reveal reward (e.g., Pull #8)
- **Website**: https://gacha-sol-app.vercel.app/
- **Contract**:

   ```
   GaChaWso1g5y2Rby6pwLSRxezyoxtbaMDyb5sqwYvNC
   ```

## Gacha-Sol: Spin the Capsule!

How to Play

Total Pulls: 22                                Your Balance: 32.000 USDC

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**🎰 🎟️ Pull #10**              🧑‍🦰 27qJonS8... ⬈
Reward: 🔐 NUZ2Qi9GQkRTQW1uN08w...
Bought

**🎰 🎟️ Pull #9**               🧑‍🦰 EK1t8bLP... ⬈
Reward: 🔐 Y29CcHlsZHUwMkoxQzRr...
Available    Buy

**🎰 🎟️ Pull #8**               🧑‍🦰 5Rqr7D9B... ⬈
Reward: 🔐 M01ESFIzbENFWXF2dUxi...
Available    Buy

**🎰 🎟️ Pull #7**               🧑‍🦰 5S2X6Urq... ⬈
Reward: 🪙 3.615 tokens
Claimed

**🎰 🎟️ Pull #6**               🧑‍🦰 BzuMbFb2... ⬈
Reward: 🔐 ZUFqQ0xnTzRkQjB0S2tL...
Available    Buy

**🎰 🎟️ Pull #5**               🧑‍🦰 AjgYxNZ8... ⬈
Reward: 🔐 MUU1dDMxTGY3TWlEcGFq...
Available    Buy

# Achievements and Future

- **Achievements**:
  - Supports unlimited pulls using PDAs, with successful devnet transactions
  - Polished UI with animations and privacy features
  - Confidentially verifies reward vault balance using zero-ciphertext proofs
- **Potential**:
  - Scale to a full game
  - Inspire privacy-focused dApps
- **Future Work**:
  - Enhancement for user-initiated open pull
  - Mainnet deployment
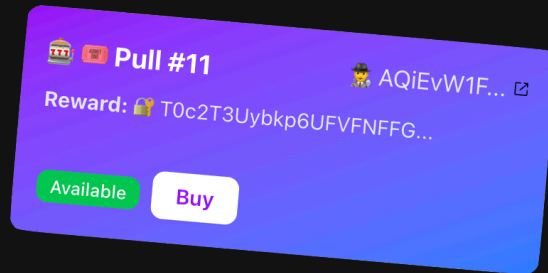
# Wrap-Up & Questions

- **Summary**: Gacha-Sol blends fun and privacy on Solana!

- **Call to Action**: Open-source under MIT License, feedback welcome

- **Q&A Invite**: Any questions? I'm happy to dive deeper!

Thank you for watching!