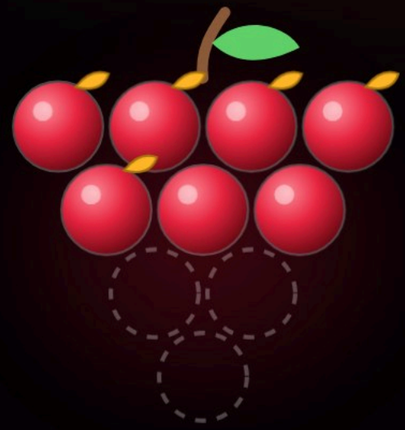
Live on Bitcoin Cash mainnet · BCH BLAZE 2026, Mainnet Track

Bunch

Buy together,
or get paid for trying.

Group buying where a Bitcoin Cash covenant holds the money.



Try it now

bunch-cash.pages.dev

The problem

Group deals die before they start

1st

Nobody wants to go first

Early joiners carry all the risk that the group never fills, so everyone waits and the deal dies.

1 person

Someone must hold the money

Whoever collects for a group order has to be trusted to refund it if it falls through.

~42%

Deal sites are expensive

A 2011 analysis of Groupon merchant agreements put Groupon's share at about 42% of revenue.

Research summary, docs/11_ECONOMICS_RESEARCH.md

The solution

A contract holds every buyer's money

Buyers join with one tap



Money sits in a covenant,
not with the shop, not with us

Group fills

The shop is paid automatically. Your receipt NFT is your pickup voucher.

Group misses

Everyone is refunded automatically, and early joiners get a bonus paid by the shop.

Demo

Join, watch it fill, see the payout

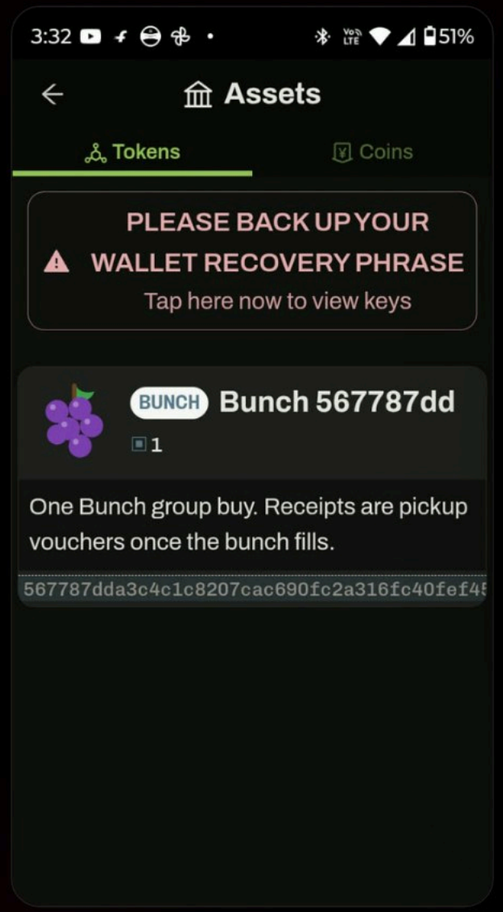


1. Open the Judge Bunch: 2 seats, 1 taken.
2. Tap Join, scan with Selene, Paytaca or Cashonize, approve once.
3. The grapes fill and the open page broadcasts the shop's payout itself.

No account. No backend.
One signature.

Proof: it works on mainnet

A real phone wallet, a real payout



Join, signed in Selene	34ddd25c…b609	30,000-sat seat + receipt NFT
Payout, sent by the page	93ce7f3b…0910	shop 63,451 · fee exactly 1,200 (2%)

node scripts/.evidence.tmp.mjs

```
~/Bunch $ node scripts/.evidence.tmp.mjs
server bch.imaginary.cash  mainnet tip 978461

Selene join (WizardConnect)
txid 34ddd25c3adf94dd7eaf1a03f964771f1221911bfd6ddc29a5a7e34347ffb609
confirmations 2  size 1500 bytes  inputs 2
  out 0     6100 sats  bitcoincash:rvz3wremuvnyrxj62nuq5fy9d4g693xzuv3m9ptus05f8d35y8dcwscghslk9  token 567787dda3c4… nft minting
  out 1    30000 sats  bitcoincash:r0kaysul8ces0fuusr9cqgpekvp47ucdj9c25mtwt8undq6jr99pj4s8gt7ay  token 567787dda3c4… nft none
  out 2     1000 sats  bitcoincash:zqwt8cte539cajau8w7rtthlz2hzm69ppq0kakd0xv  token 567787dda3c4… nft none
  out 3     2450 sats  bitcoincash:qqwt8cte539cajau8w7rtthlz2hzm69ppqguwgrfel  no token

keyless complete
```

Selene names the receipt "Bunch 567787dd" with our icon, read from the BCMR registry we publish at genesis.

How it works

Two covenants, no server

`join`	**buyer, 1 signature.** state + coins → state′, seat (= price), receipt NFT
`complete`	**anyone, keyless.** state + every seat → shop, exact 2% fee
`refund`	**anyone, after deadline.** every buyer gets price, early seats + bonus
`leave`	**buyer spends receipt.** full refund before it fills
`accept`	**shop spends key NFT.** take a smaller group, early joiners rebated
`escape`	**anyone, after grace.** every seat goes home even if the site is gone

The bunch lives in the link. Every parameter is in `/b#v1.…`; any browser rebuilds the contract addresses and reads state from Electrum.

Every open page is a settlement bot. Duplicate broadcasts are harmless; the contract decides who gets paid.

Authority comes from spending NFTs, because WizardConnect has no message signing.

Static site on Cloudflare Pages. One stateless function serves wallet metadata.

The economics

The bonus makes joining a no-lose choice

Dominant assurance contract

Pay contributors if the campaign fails and contributing becomes a dominant strategy.

Tabarrok (1998), Public Choice 96

Early-only bonuses work

Refund bonuses raised campaign success by 50% or more; early-only bonuses work as well and pay out less.

Cason, Tabarrok & Zubrickas (2021), Games and Economic Behavior 129

The bonus is a quality signal

Good projects offered bonuses far more often, and backers noticed.

Cason, Tabarrok & Zubrickas (2025), Management Science 71(7)

A live count sells

Telling later buyers how many joined increases purchases.

Hu, Shi & Wu (2013), Management Science

Campaign success with refund bonuses

+50%

or more

"refund bonuses can increase the rate of campaign success by 50% or more"

Abstract, Cason, Tabarrok & Zubrickas, Games and Economic Behavior 129 (2021)

The research, from the source

Published research you can check

Early refund bonuses increase successful crowdfunding

Timothy Cason, *Alexander Tabarrok* and *Robertas Zubrickas*

Games and Economic Behavior, 2021, vol. 129, issue C, 78-95

Abstract: The assurance contract mechanism is often used to crowdfund public goods. This mechanism has weak implementation properties that can lead to miscoordination and failure to produce socially valuable projects. To encourage early contributions, we extend the assurance contract mechanism with refund bonuses rewarded only to early contributors in the event of fundraising failure. The experimental results show that our proposed solution is very effective in inducing early cooperation and increasing fundraising success. Limiting refund bonuses to early contributors works as well as offering refund bonuses to all potential contributors, while also reducing the amount of bonuses paid. We find that refund bonuses can increase the rate of campaign success by 50% or more. Moreover, we find that even taking into account campaign failures, refund bonuses can be financially self-sustainable suggesting the real world value of extending assurance contracts with refund bonuses.

Early refund bonuses increase successful crowdfunding · Games and Economic ...

Signaling Quality: How Refund Bonuses Can Overcome Information Asymmetries in Crowdfunding

Timothy Cason, *Alexander Tabarrok* and *Robertas Zubrickas*

Management Science, 2025, vol. 71, issue 7, 5933-5947

Abstract: Crowdfunding can suffer from information asymmetry, leaving some investors disappointed with low-quality projects, whereas other high-quality projects remain unfunded. We show that refund bonuses, which provide investors a payment if a fundraising campaign is unsuccessful, can signal project quality and help overcome the market failure in crowdfunding. Because strong projects have a lower risk of bonus payout, entrepreneurs with strong projects are more likely to offer bonuses. This signals high quality to investors, and due to their updated beliefs, this drives investment toward such projects. An experiment provides supporting empirical evidence for the benefits of this signaling solution to the problems of information asymmetry in crowdfunding.

Refund bonuses signal quality · Management Science 71(7) (2025)

Enhancing fundraising with refund bonuses

Timothy Cason and *Robertas Zubrickas*

Games and Economic Behavior, 2017, vol. 101, issue C, 218-233

Abstract: The provision point mechanism as a method of funding threshold public goods is extended with refund bonuses. Each contributor not only has his contribution refunded in the case of insufficient contributions but also receives a refund bonus proportional to his proposed contribution. As long as the refund bonus pool does not exceed the net value of the public good, in equilibrium the public good is always provided and refund bonuses are never distributed. In this paper, we empirically investigate this extension of the provision point mechanism in a laboratory experiment by testing its properties on allocative and distributive efficiency, equilibrium coordination, and invariance to information distribution. Individuals respond to the incentives induced by refund bonuses as predicted, but systematic deviations exist that are consistent with quantal response equilibrium. Since this simple mechanism has considerable practical potential especially in crowdfunding, these promising initial results call for further experimental work.

Enhancing fundraising with refund bonuses · Games and Economic Behavior 101 ...

Computer Science > Software Engineering

[Submitted on 17 Jan 2025]

Metamorphic Testing for Smart Contract Validation:A Case Study of Ethereum-Based Crowdfunding Contracts

Irving Jared Villanueva, Madhusudan Srinivasan, Faqeer Ur Rehman

Blockchain smart contracts play a crucial role in automating and securing agreements in diverse domains such as finance, healthcare, and supply chains. Despite their critical applications, testing these contracts often receives less attention than their development, leaving significant risks due to the immutability of smart contracts post-deployment. A key challenge in the testing of smart contracts is the oracle problem, where the exact expected outcomes are not well defined, complicating systematic testing efforts.

Metamorphic Testing (MT) addresses the oracle problem by using Metamorphic Relations (MRs) to validate smart contracts. MRs define how output should change relative to specific input modifications, determining whether the tests pass or fail. In this work, we apply MT to test an Ethereum-based crowdfunding smart contract, focusing on core functionalities such as state transitions and donation tracking.

Metamorphic testing of a crowdfunding contract · arXiv 2501.09955 (2025)

What is new

What Bitcoin Cash makes possible

Assurance contract as a covenant

The bonus pool is locked at creation, so the promise to early joiners is enforced by consensus.

Keyless settlement

No bot, no server, no key. Whoever has the page open settles; the contract fixes every payout.

NFT receipts as vouchers

Shown by name in wallets via BCMR; the shop checks a pickup code against the chain.

Exact payouts (F1)

Fee and refund outputs must be exact, so a broadcaster cannot shift money between outputs.

Early rebate survives (D1)

If the shop accepts a smaller group, early joiners still get their bonus as a rebate.

Sub-cent fees, instant 0-conf

Joining costs under a cent in fees; the counter moves the moment you approve.

Security and quality

Every rule has a test that breaks it

131

contract tests on the real BCH VM, 111 of them single-change attacks

115/130

mutants killed; every survivor explained

56

app tests: builders, signing, property and metamorphic

34/34

live-site checks incl. accessibility on desktop and phone

Internal testing and review only. No third-party audit (SECURITY.md).

```
PASS  accept: rebate carries an NFT (rejected)
PASS  accept: rebates paid in the wrong seat order (rejected)
PASS  accept: extra rebate for a non-early seat (rejected)
PASS  accept: rebate outputs dropped when bonusEach = 0 is faked by the merchant (rejected)
PASS  complete+ miner fee exactly maxFee
PASS  complete: miner fee one sat over maxFee (rejected)
PASS  refund+ miner fee exactly maxFee
PASS  refund: miner fee one sat over maxFee (rejected)
PASS  accept+ miner fee exactly maxFee
PASS  accept: miner fee one sat over maxFee (rejected)
PASS  reclaim+ miner fee exactly maxFee
PASS  reclaim: miner fee one sat over maxFee (rejected)
PASS  escape+ miner fee exactly maxFee
PASS  escape: miner fee one sat over maxFee (rejected)
PASS  join: seat overpaid by 1 sat (rejected)
PASS  seat: withState spent without the state thread (rejected)
PASS  seat: withState beside a fake minting NFT of another category (rejected)

131 passed, 0 failed
[exit status 0]
```

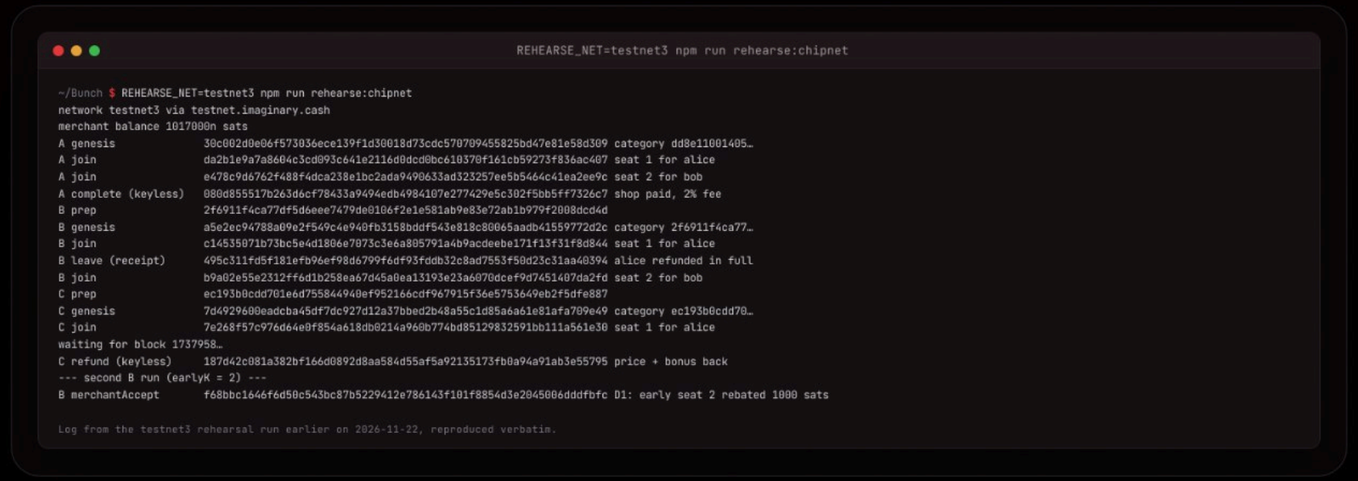
```
✓ refund > returns every seat plus the bonus for early seats after the deadline  3962ms
✓ refund > is rejected by the contract before the deadline  1848ms
✓ refund > refunds an empty bunch (pool back to the merchant)  1326ms
✓ leave > returns the seat money to the buyer and lowers the count  4308ms
✓ merchantAccept (D1) > pays the shop and gives each early joiner their bonus as a rebate  4513ms
✓ escape and reclaim > after graceEnd a seat goes home and the pool returns to the shop  3049ms
✓ token donation (EMBER card) > sends fungible tokens and returns token change, fees from plain coins  537ms
✓ BCMR metadata > genesis commits to the registry the Pages Function serves, byte for byte  532ms
✓ review fixes > a wallet with just price + receipt + real fee can join (no 3,000-sat slack demanded; ~1.5 kB fee)  1642ms
✓ review fixes > settlement classification ignores non-settlement txs and tells refunds from completions  5206ms
✓ settlement lookup > a dust send to the state address after settlement does not hide the outcome  4152ms

Test Files  6 passed (6)
     Tests  56 passed (56)
  Start at  15:37:17
  Duration  99.08s (transform 2.64s, setup 0ms, collect 14.93s, tests 192.17s, environment 13ms, prepare 4.26s)

[exit status 0]
```

Every path, on chain

Fill, leave, refund and accept all ran for real



Testnet3 runs the same consensus rules as mainnet. The app's own transaction builders ran every path:

- ✓ Fill → shop paid, exact 2% fee
- ✓ Leave → buyer refunded in full
- ✓ Deadline → keyless refund + bonus
- ✓ Shop accepts fewer → early rebate (D1)

All txids: docs/EVIDENCE.md

Business

2% only when the group fills

Revenue

A platform fee written into the contract: 2% when a bunch fills, nothing when it doesn't. No custody, so no float and no refund desk.

Customers

Cafés, bookshops, farm boxes, merch pre-orders and meetups that want guaranteed demand before they discount.

Growth

A fuller bunch is every buyer's discount, so buyers share the link. Team purchase grew Pinduoduo the same way.

Costs: static hosting and public Electrum servers. No servers hold money, so there is nothing to scale but the page. Today: live on mainnet with demo bunches; no paying shops yet.

Roadmap

What comes next

Next

Leader flow: start a bunch with friends

Public shop history page

Prices

Stable dollar prices (PUSD)

Tiered prices that drop as more join

Scale

Lanes for big bunches

Pay-per-pickup release

Reach

XO templates

More languages

Team and ask

Live on mainnet, ready for shops



Arpit Singh

Founder · smart contracts, app and tests

Ask: **try the Judge Bunch**, vote with EMBER2026, and introduce us to shops that want group orders without holding anyone's money.

github.com/LSUDOKO · github.com/LSUDOKO/Bunch

App

Code

EMBER2026 donations