Stacking

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Abstract—This document discusses the proposal of stacking strategy with fair reward distribution.

Keywords—Stacking, coin

I. INTRODUCTION

THIS document focus on Stacking coin and receives reward problem.
The Stack event begins with fixed pool size and stacking time. How to deal with fairy things?
- (1) The reward should be fixed at stacking time and maybe grow up in the future.
- (2) The sooner stacking is, the more reward the stacker gets.
- (3) The longer stacking is, the more reward the stacker gets.

II. FAIR STRATEGY

A. Idea

Deal with (1), depend on fixed pool size and stacking time, we get a fixed total reward per second.

Deal with (2), the fixed reward per second need variable with stacking time by percent, we get a total bonus to accumulate offset between fixed total reward per second and user fixed reward per second with stacking time variable.

Deal with (3), the user bonus reward is the percent keep time per total stacking time multi total bonus.

B. Implementation

Setup for event
A = Pool size = Total amount (fixed)
T = Total stacking time (fixed)
ST = Start time (fixed)

At time = 0
SC = Stacked coins at zero = 0
R = Remaining size = A – stacked coins = 1000
FB = Total fixed bonus = 0 (collect from time = 0 to user stacking time)
TBS = Total bonus by second
BA = Bonus amount
TR = Total reward per second = A / T
TKT = Total keep time

By user
ust = user stacking time = 0
uwt = user unstacking/withdraw time = now
ukt = user keep time = uwt - ust

Context: If a user stack X coins at st
- up = User percent stacked coins = X / A
- ufr = User fixed reward = up * TR

- TKT = TKT + ukt
- R = R – X
- FB = FB + ufr * ust
- urs = User reward by second = ufr * (1 – ust/T)
- ubo = User bonus offset by second = ufr – urs
- TBS = TBS + ubo * ukt
- BA = TBS + FB
- ubs = User bonus by second in lifetime = ukt / TKT * ubo
- utr = User total reward in lifetime = urs * ukt + ubs

III. EXAMPLES

Assume:
- **A = 1000**
- **T = 100**
- **ST = 0**
- SC = 0
- R = 1000
- FB = 0
- TR = A / T = 10
- TKT = 0

Case 1
A user stack 10 coin at time = 0 and withdraw at pool end = T
X = 10
ust = 0
uwt = T = 100
ukt = uwt - ust = 100 – 0 = 100

up = X / A = 10 / 1000 = 1%
ufr = up * TR = 1% * 10 = 0.1
TKT = TKT + ukt = 0 + 100 = 100
R = R – X = 1000 – 10 = 990
FB = FB + ufr * ust = 0 + 0.1 * 0 = 0
urs = ufr * (1 – ust/T) = 0.1 * (1 – 0/100) = 0.1
ubo = ufr – urs = 0.1 – 0.1 = 0
TBS = TBS + ubo * ukt = 0 + 0 * 100 = 0
BA = TBS + FB = 0 + 0 = 0
ubs = ukt / TKT * BA = 100 / 100 * 0 = 0 lifetime
utr = urs * ukt + ubs = 0.1*100 + 0 = 10 lifetime
⇨ Assume 100 users stack 10 coin (pool size = 1000) at the same time ust = 0 => At the end, 10 users get total 10 * 100 = 1000 coins = pool size => Correct

Case 2
User1 stack 100 coin at time = 0 and withdraw at T
User2 tack 900 coin at time = 10 and withdraw at T

For User1
X = 100
ust = 0
uwt = T = 100
ukt = uwt - ust = 100 – 0 = 100

up = X / A = 10 / 1000 = 10%
ufr = up * TR = 10% * 10 = 1

TKT = TKT + ukt = 0 + 100 = 100
R = R – X = 1000 – 100 = 900
FB = FB + ufr * ust = 0 + 1 * 0 = 0
urs = ufr * (1 – ust/T) = 1 * (1 – 0/100) = 1
ubo = ufr – urs = 1 – 1 = 0
TBS = TBS + ubo * ukt = 0 + 0 * 100 = 0
BA = TBS + FB = 0 + 0 = 0
ubs = ukt / TKT * BA = 100 / 100 * 0 = 0
utr = **urs * ukt** + ubs = 1 + 0 = 1

For User2
X = 900
ust = 10
uwt = T = 100
ukt = uwt - ust = 100 – 10 = 90

up = X / A = 10 / 1000 = 90%
ufr = up * TR = 90% * 10 = 9
TKT = TKT + ukt = 100 + 90 = 190
R = R – X = 900 – 900 = 0
FB = FB + ufr * ust = 0 + 9 * 10 = 90
urs = ufr * (1 – ust/T) = 9 * (1 – 10/100) = 8.1
ubo = ufr – urs = 9 – 8.1 = 0.9
TBS = TBS + ubo * ukt = 0.9 * 90 = 81
BA = TBS + FB = 81 + 90 = 171
ubs = ukt / TKT * BA = 90 / 190 * 171 = 81 lifetime
utr = **urs * ukt** + ubs = 8.1*90 + 81= 729 + 81 = 810 lifetime

* Note: after user 2 join, the TKT & FB change so final reward of user1 will be change when query latest reward corresponding:
 - Latest TKT = 190
 - Latest FB = 90
 - Latest TBS = 81
 - Latest BA = 171
User1 update:
 - ubs = ukt / TKT * BA = 100 / 190 * 171 = 90 lifetime
 - utr = **urs * ukt** + ubs = 1*100 + 90 = 190 lifetime

Total A = 1000 by 2 users (1 and 2) = 810 + 190 = 1000 = A => Correct

By **ukt** will increase by second and the final ratio to it.

IV. Limitation

This strategy requires all stacker lock their assets to end of event. Deal with complex case that user withdraws in middle.
 - Update pool size and remaining to new value after stacker withdraws = A – stacker's reward
 - Update TKT, FB, TBS, BA by minus the withdrawal stacker