

# Noah's Ark

<I, Game, Robot> Monetization Model Design

# Acknowledgement

This monetization model design is based on the the game design planned by zhoumo-creator, the game feature design planned by HopeLightning, the concept art design by 451935154.

Thanks for their creative game design planning and game feature design.

Here is their PRs:

<https://github.com/zhoumo-creator/-I-Game-Robot- game design plan>

<https://github.com/HopeLightning/I-Game-Robot-Game-Feature-Design>

<https://github.com/451935154/MAGIC-ROAMING>

# Background Story

## World Background

- In 2252
- Efficient modular city, key prop called "mobile space"
- The world will be destroyed in 50 years unless living cities are made
- People organized a New City creation team and established a New City--Noah's Ark

## Main Character Background

- Name: P
- 25-year-old automotive engineer with driving excellence
- Loves cars and was poor when he was young
- Developed a prototype robot system, which was rejected by his boss

## Narrative framework

### Target

- Complete the construction of Noah's Ark before the end of the world

### Antagonism

- The car is not just a tool, but also a moving space, whose cells make up New City

- The industrial giants of Old City want to prevent the construction of the new city

### Settle

- The resources of Old City plummeted many times, and Old Cityists wanted to control New City
- Players need to speed up their pace, strengthen their components and build higher hash power

## Storyline

### Call of Duty

- P, let go of your worries and go to New City

### Meet a mentor

- Sage of the Freedom Alliance

### Through obstruction

- In New City, the car is not considered as a tool, but a combat partner

### Tests, partners, enemies

- In different communities of riders, P met many friends



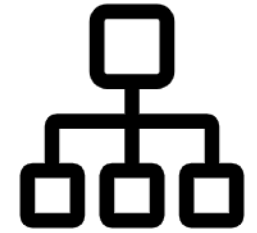
Noah's



Ark

# Monetization Model Design

# N.A's Monetization



Dual-Token  
Economic Model

## Dual-Token Economic Model

Numerical  
Design

We designed a dual-token economy and there are two types of tokens which can be circulated in Noah's Ark system, **NAC(Noah's Ark Coin)** and **NAT(Noah's Ark Token)**.

Evaluation  
Mechanism

**NAC: Utility Token**, the basic currency for transactions in Noah's Ark system. Players acquire **computing power** directly after clearing the stages of maps and the unit of **computing power** is NAC.

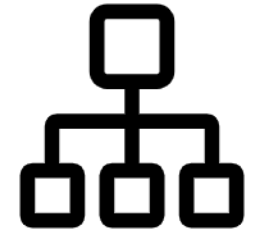
Distribution  
Model of **NAC**

**NAT: Governance Token**, the measurement index of the contribution and achievements every player makes. There are several methods to acquire an NAT and we will introduce it in the Evaluation Mechanism part.

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

# N.A's Monetization



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Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

## Numerical Design——NAC Total Supplies

The initial total quantity of NACs in Noah's Ark system is

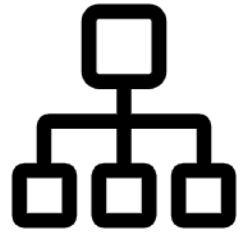
$$X_0 = 10,000,000,000$$

And the quantity of NACs issued additionally every week is denoted as  $Y(n)$ , therefore the quantity of FMC in the  $n$ th week is

$$X(n) = X_0 + \sum_i^n Y(i)$$

$Y(n)$  is used for preventing the inflation of our system and the formula will be introduced in the Inflation part.

# N.A's Monetization



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**Numerical  
Design**

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Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

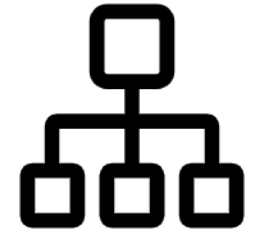
**NAC** Cycle  
Mechanism

## **Numerical Design**——NAC Tokenomics Model

There are **five main subpools** of NAC total supplies. 10% of all, i.e. 1,000,000,000 NACs will be kept for Noah's Ark Team.

- 10% of all, i.e. 1,000,000,000 NACs will be **pre-mined for the return of staking**.
- 10% of all, i.e. 1,000,000,000 NACs will be **used for venture**, including seeds and private ones.
- 1% of all, i.e. 100,000,000 NACs will be **used for IDO**.
- 69% of all, i.e. 6,900,000,000 NACs will be **circulated in Noah's Ark Ecosystem**.

# N.A's Monetization



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Model of **NAC**

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Model of **NAT**

**NAC** Cycle  
Mechanism

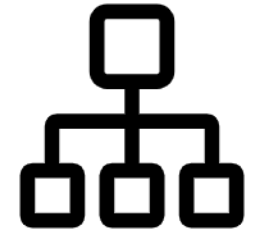
## Numerical Design——NAC Tokenomics Model

The Ecosystem Pool of NAC will be divided into **four smaller parts**.

- 30% of all, i.e. 3,000,000,000 NACs will be mined by **PVE** in the game.
- 20% of all, i.e. 2,000,000,000 NACs will be mined by **PVP** in the game.
- 10% of all, i.e. 1,000,000,000 NACs will be used for **X2E**, i.e. players finish tasks in reality to earn tokens in virtual world.
- 9% of all, i.e. 900,000,000 NACs will be mined by **staking of players' NFT**, i.e. their cars in the game.
- These four parts make up the ecosystem pool, i.e. 69% of total supplies.



# N.A's Monetization



Dual-Token  
Economic Model

**Numerical  
Design**

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Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

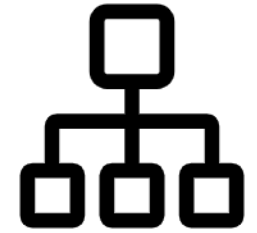
## **Numerical Design**——**NAT Total Supplies**

The structure of NAT pool is very different from the NAC pool, since NAT denotes the contribution of each player and it cannot be mined by worthless behaviors.

In Noah's Ark system, the contribution is defined by two parts—the PVE part and the PVP part, the latter one of which is the main method to acquire NATs.

**The total quantity of NATs in Noah's system is 100, 000, 000 with no additional offerings, 20% of which is for PVE and 80% of which is for PVP.** We will introduce the details of NAT in Distribution Model part and note that NAT is the most important mechanism of Noah's Ark system.

# N.A's Monetization



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Model of **NAC**

Distribution  
Model of **NAT**

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Mechanism

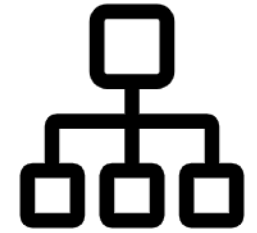
## Evaluation Mechanism—Element

We introduce some basic concepts of Noah's Ark. Firstly, there are four categories of elements to make up a car in the GARAGE:

- **Body, 5 levels** in total, starts from **Level 0**, related to the **Maximum Speed**. The higher the maximum speed upgrade, the faster it will run.
- **Wheel, 5 levels** in total, starts from **Level 0**, related to the **Durability**. The durability refers to the distance a car can travel after repairing. The higher the durability of the car has, the larger area it can be explore in Old City Map.
- **Energy Core, 4 levels** in total, starts from **Level 0**, related to the **Acceleration**. Upgrading the energy core allows you reaching the maximum speed faster.
- **Control Chip, 4 levels** in total, starts from **Level 0**, related to **the ability of bending and cross-country**. It is very practical for drifting and cross country.

Upgrading of elements costs **computing power**, i.e. **NAC**.

# N.A's Monetization



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Model of **NAC**

Distribution  
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**NAC** Cycle  
Mechanism

## Evaluation Mechanism—Data Chip

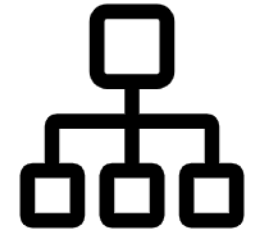
Secondly, data chips are **necessary materials for elements upgrading**. Players need to collect different kinds of data chips in Old City then upgrade their cars' element with specific data chip and NACs.

There are four categories of elements and each of them has five levels, which means the upgrading can be done for 16 times in total. There for we have **16 kinds of data chips** in total.

However, the upgrading processing is not 100% successful every time. Once it fails, the data chip will be **burned** and player need to collect a new one.

In **different Old Cities**, the possibility of acquiring a data chip is **different** as well.

# N.A's Monetization



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Model of **NAC**

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**NAC** Cycle  
Mechanism

## Evaluation Mechanism—PVE(Old City)

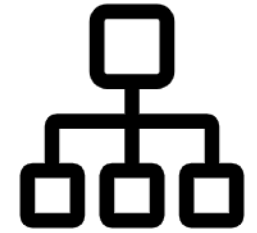
Thirdly, players acquire **computing power(NACs)** and **data chips** when they play the PVE mode in whole **6 Old Cities**. We denote the data chip for upgrading a car's body from Lv0 to Lv1 as B1, and so on. Therefore we have the possibility of acquiring different data chips in different Old City as follows.

| % | B1  | B2 | B3 | B4 | W1  | W2 | W3 | W4 | E1  | E2 | E3 | E4 | C1  | C2 | C3 | C4 |
|---|-----|----|----|----|-----|----|----|----|-----|----|----|----|-----|----|----|----|
| 1 | 100 | 80 | 40 | 20 | 40  | 20 | 10 | 5  | 0   | 0  | 0  | 0  | 0   | 0  | 0  | 0  |
| 2 | 100 | 80 | 40 | 20 | 40  | 20 | 10 | 5  | 0   | 0  | 0  | 0  | 0   | 0  | 0  | 0  |
| 3 | 40  | 20 | 10 | 5  | 100 | 80 | 40 | 20 | 0   | 0  | 0  | 0  | 0   | 0  | 0  | 0  |
| 4 | 40  | 20 | 10 | 5  | 100 | 80 | 40 | 20 | 0   | 0  | 0  | 0  | 0   | 0  | 0  | 0  |
| 5 | 40  | 20 | 10 | 5  | 40  | 20 | 10 | 5  | 100 | 50 | 20 | 10 | 40  | 20 | 10 | 5  |
| 6 | 40  | 20 | 10 | 5  | 40  | 20 | 10 | 5  | 40  | 20 | 10 | 5  | 100 | 50 | 20 | 10 |

There are **6 Old Cities** initially and more will be released later.

We will introduce details of acquiring NACs in Distribution Model.

# N.A's Monetization



Dual-Token  
Economic Model

## Evaluation Mechanism—PVP

Numerical  
Design

Fourthly, players can acquire a lot of NACs and NATs in PVP system and there are 3 PVP modes in total.

Evaluation  
Mechanism

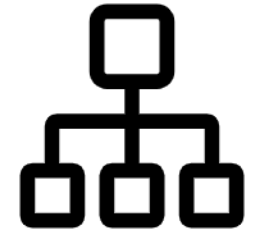
- **Basic Mode:** 1v1, winners acquire more NACs
- **Challenge Mode:** 1v1, winners acquire NATs and the other side's NACs, there is a ranking list of challenge mode and we will introduce it later
- **Entertainment Mode:** all random, just for fun

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

# N.A's Monetization



Dual-Token  
Economic Model

Numerical  
Design

Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

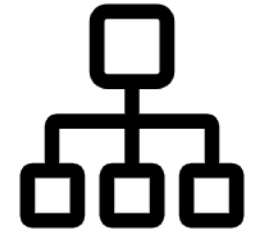
## Evaluation Mechanism—Cars' Score in PVE

Fifthly, we calculate the score of cars in PVE system, which influences the time to finish a city. Basically, the score is the sum of different elements' values but elements have different fitness in different Old Cities and the numerical design is as follows.

|            | City 1 | City 2 | City 3 | City 4 | City 5 | City 6 |
|------------|--------|--------|--------|--------|--------|--------|
| Body       | 150%   | 150%   | 100%   | 100%   | 50%    | 50%    |
| Wheels     | 100%   | 100%   | 150%   | 150%   | 50%    | 50%    |
| Energy C.  | 80%    | 80%    | 80%    | 80%    | 250%   | 100%   |
| Control .C | 80%    | 80%    | 80%    | 80%    | 100%   | 250%   |

Therefore we have the score of a car  $S_1 = V_b f_b + V_w f_w + V_e f_e + V_c f_c$ , where  $V$  denotes the value of an element and  $f$  denotes the fitness in different Old Cities.

# N.A's Monetization



Dual-Token  
Economic Model

## Evaluation Mechanism—Cars' Score in PVP

Numerical  
Design

Evaluation  
Mechanism

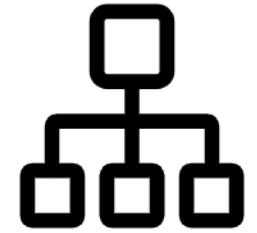
There is only one kind of map for PVP and therefore no mechanism of fitness is applied here. We have the score of a car  $S_2 = V_b + V_w + 2V_e + 2V_c$ , where  $V$  denotes the value of an element .

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

# N.A's Monetization



Numerical  
Design

Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

## Distribution Model of NAC—PoW by PVE

30% of all, i.e. 3,000,000,000 NACs will be mined by **PVE** in the game. We have the quantity of NAC for each run in an Old City is

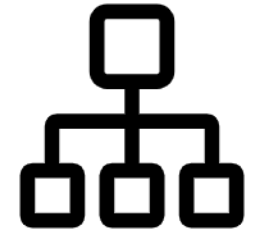
$$N_1(t, m) = (k_1 \cdot \frac{1}{t} + b_1 m) r_1^{-\frac{x}{y}}$$

- $t$  denotes the time a player spent in the city
- $m$  denotes the quantity of goals a player destroys in the city
- $x$  is the NAC mined from the PVE pool and  $y$  denotes remained NAC in the PVE pool, i.e. we have  $x + y = 0.3X(n) = 0.3(X_0 + \sum_i^n Y(i))$
- $k_1, b_1, r_1$  are constant and we can let  $r_1 = 2.5$  initially, as for  $k_1, b_1$

|       | City 1  | City 2  | City 3  | City 4  | City 5    | City6     |
|-------|---------|---------|---------|---------|-----------|-----------|
| $k_1$ | 500,000 | 500,000 | 600,000 | 600,000 | 1,000,000 | 1,000,000 |
| $b_1$ | 50      | 50      | 80      | 80      | 150       | 150       |



# N.A's Monetization



Numerical  
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Evaluation  
Mechanism

Distribution  
Model of **NAC**

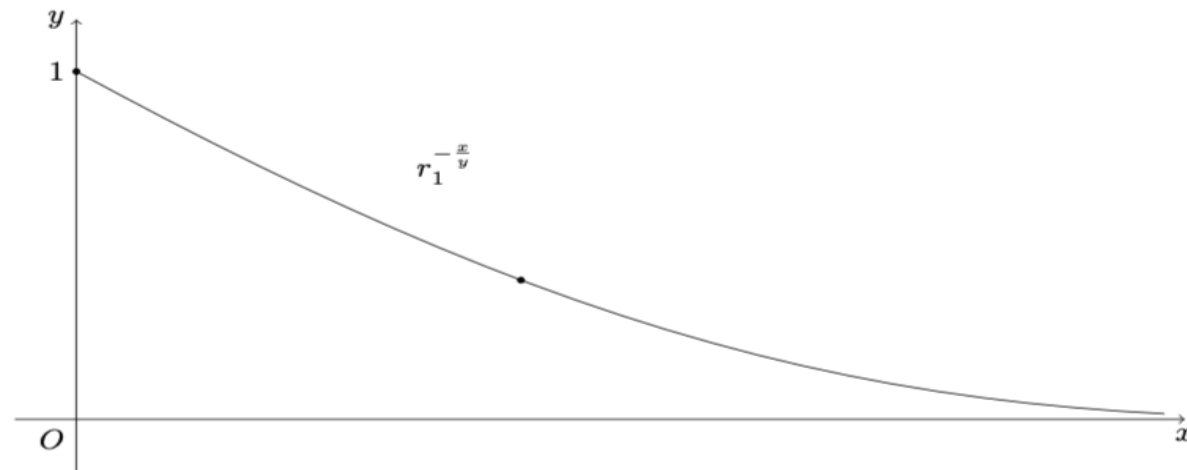
Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

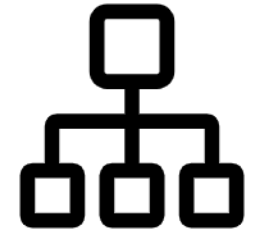
**NAT** Cycle  
Mechanism

## Distribution Model of NAC—PoW by PVE

$r_1^{-\frac{x}{y}}$  means with the mining actions in Noah's Ark system, the remaining NACs will be fewer. The fewer the remaining has, the less speed players mine NACs.



# N.A's Monetization



Numerical  
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Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

## Distribution Model of NAC—PoW by PVP

20% of all, i.e. 2,000,000,000 NACs will be mined by **PVP** in the game. We have the quantity of NAC for each fight is

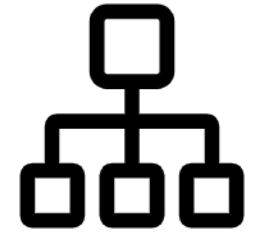
$$E_A = \frac{1}{1 + 10^{(\frac{S_{2B}}{t_B} - \frac{S_{2A}}{t_A})/400}}$$

$$E_B = \frac{1}{1 + 10^{(\frac{S_{2A}}{t_A} - \frac{S_{2B}}{t_B})/400}}$$

where  $S_{2A}$ ,  $S_{2B}$  are their PVP scores,  $t_A$ ,  $t_B$  are their finishing time and  $E_A + E_B = 1$ , and A will acquire  $k_2 E_A$  NAC, B will acquire  $k_2 E_B$ . We set  $k_2 = 10,000$  initially.

Usually the winner will acquire more NACs.

# N.A's Monetization



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Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

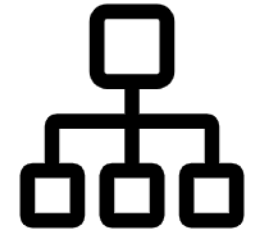
## Distribution Model of NAC—By X2E

10% of all, i.e. 1,000,000,000 NACs will be used for **X2E**.

Players drive their real cars in reality to earn NACs.

One player will earn  $k_3 = 1000$  NACs every mile when they drive. The maximum quantity one can earn is  $k_4 N_2$ , where  $k_4 = 10$  is a constant and  $N_2$  is the quantity of NAT a player holds.

# N.A's Monetization



Numerical  
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Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

## Distribution Model of NAC—By Staking

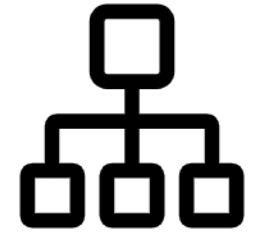
9% of all, i.e. 900,000,000 NACs will be mined by **staking of players' NFT**. Players can stake their cars in old cities automatically. The staking quota is related to the level of Old City and the staking period is related to the quantity of NAT.

Players pay NACs to unlock the slots of staking in Old Cities and each Old City has 3 slots for car staking at most.

The maximum staking period is  $T = k_5 \ln N_2$  where  $k_5 = 0.1$  is a constant and  $N_2$  is the quantity of NAT a player holds.

The interest rate is  $0.05 + 0.05T$ , which means the longer a car is staked, the more returns it will acquire.

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

**Distribution  
Model of NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

Inflation of  
**NAC**

## Distribution Model of NAT—PoW by PVE

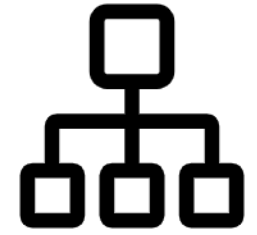
20% of NATs' total supply is for PVE, i.e. 20,000,000.

Every time one player finish a Old City, he will acquire  $1000r_2^n$  NATs.

$r_2 = 0.5$  is a constant and  $n$  is the times this player finished the Old City for.

Therefore we have the more times one finished an Old City, the less NATs he will acquire.

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

Inflation of  
**NAC**

## Distribution Model of NAT——PoW by PVP

80% of NATs' total supply is for PVP, i.e. 80,000,000.

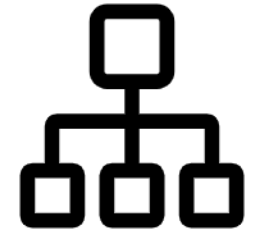
Players only acquire NATs in the challenge mode.

We have

$$E_A = \frac{1}{1 + 10^{(\frac{S_{2B}}{t_B} - \frac{S_{2A}}{t_A})/400}}$$
$$E_B = \frac{1}{1 + 10^{(\frac{S_{2A}}{t_A} - \frac{S_{2B}}{t_B})/400}}$$

- If  $E_A > E_B$ , then A acquires  $k_6 E_A$  NACs and B acquires 0.
- If  $E_A < E_B$ , then B acquires  $k_6 E_B$  NACs and A acquires 0.
- If  $E_A = E_B$ , then no one acquires NACs.
- $k_6 = 500$  initially.

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

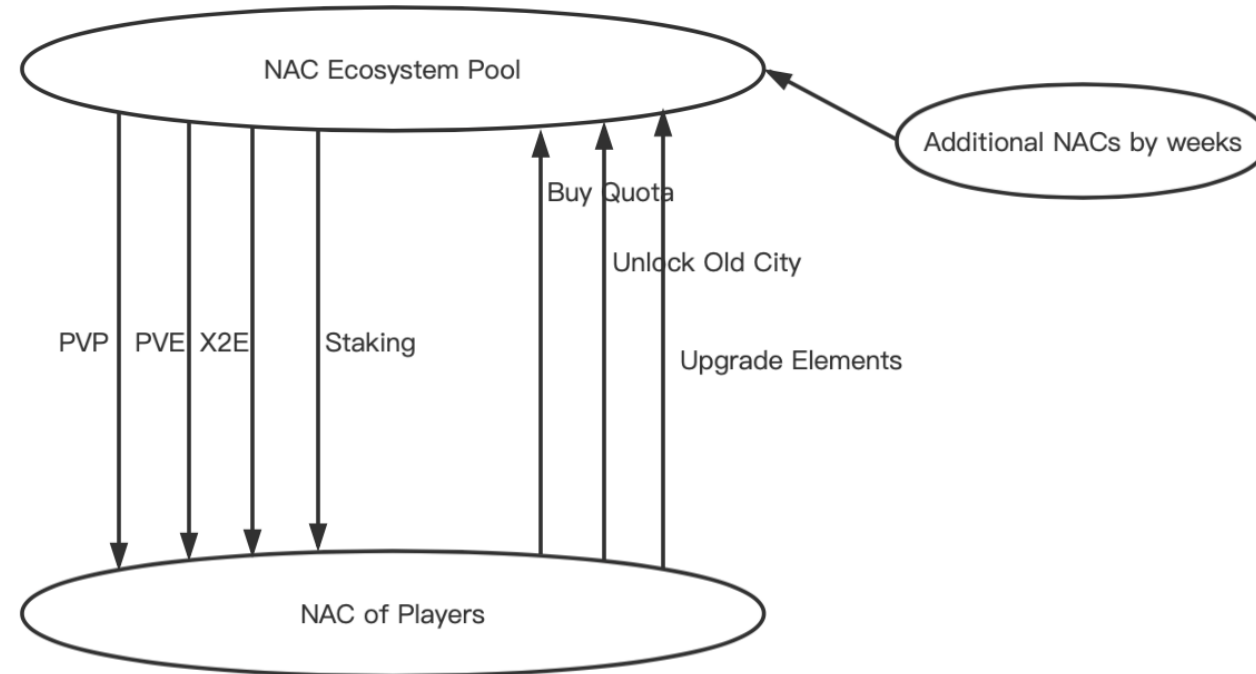
Distribution  
Model of **NAT**

**NAC Cycle  
Mechanism**

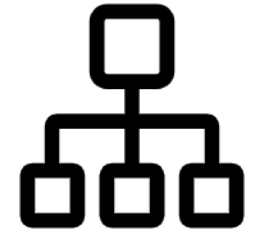
**NAT Cycle  
Mechanism**

Inflation of  
**NAC**

## NAC Cycle Mechanism



# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC Cycle  
Mechanism**

**NAT Cycle  
Mechanism**

Inflation of  
**NAC**

## **NAC Cycle Mechanism—Buying Quota of Cars**

When a user enters this game the first time, he will acquire a car with all four elements of Lv 0. After that, he can buy cars' quota with NACs.

The first quota takes 100,000 NACs and the price of quota increase linearly with the number of car, i.e. the second quota takes 200,000 NACs, the tenth quota takes 1,000,000 NACs.

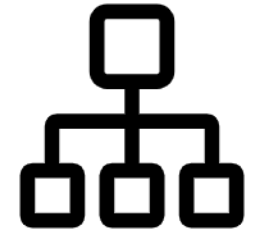
With more cars, players can choose the most suitable one for different Old City.

**These NACs will go back to the ecosystem.**

**By the way, assembling cars through four elements is free.**



# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC Cycle  
Mechanism**

**NAT Cycle  
Mechanism**

Inflation of  
**NAC**

## **NAC Cycle Mechanism—Old City Unlocking**

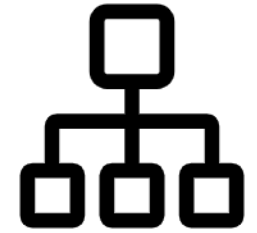
When a user enters this game the first time, he can only enter into Old City 1. He need to unlock these Old Cities via NACs and the price is as follows

| City 1 | City 2  | City 3  | City 4  | City 5    | City 6    |
|--------|---------|---------|---------|-----------|-----------|
| 0      | 100,000 | 300,000 | 300,000 | 1,000,000 | 1,000,000 |

With more Old Cities, players can earn more NACs and acquire different data chips.

**These NACs will go back to the ecosystem.**

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC Cycle  
Mechanism**

**NAT Cycle  
Mechanism**

Inflation of  
**NAC**

## NAC Cycle Mechanism——Car Upgrading

We introduce **the value of four elements**—body, wheels, energy core, control chip, **the cost of upgrading** and **the success probability of upgrading**.

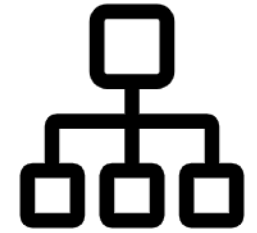
| Body  | Lv 0 | Lv 1 | Lv 2 | Lv3  | Lv4   |
|-------|------|------|------|------|-------|
| Value | 100  | 200  | 400  | 800  | 2000  |
| Cost  | N/A  | 2000 | 4000 | 8000 | 20000 |
| Prob. | N/A  | 0.8  | 0.4  | 0.2  | 0.1   |

| E.C.  | Lv 0 | Lv 1 | Lv 2  | Lv3   | Lv4   |
|-------|------|------|-------|-------|-------|
| Value | 200  | 500  | 1000  | 2000  | 5000  |
| Cost  | N/A  | 5000 | 10000 | 20000 | 50000 |
| Prob. | N/A  | 0.8  | 0.4   | 0.2   | 0.1   |

| Whe.  | Lv 0 | Lv 1 | Lv 2 | Lv3  | Lv4   |
|-------|------|------|------|------|-------|
| Value | 100  | 200  | 400  | 800  | 2000  |
| Cost  | N/A  | 2000 | 4000 | 8000 | 20000 |
| Prob. | N/A  | 0.8  | 0.4  | 0.2  | 0.1   |

| C.C.  | Lv 0 | Lv 1 | Lv 2  | Lv3   | Lv4   |
|-------|------|------|-------|-------|-------|
| Value | 200  | 500  | 1000  | 2000  | 5000  |
| Cost  | N/A  | 5000 | 10000 | 20000 | 50000 |
| Prob. | N/A  | 0.8  | 0.4   | 0.2   | 0.1   |

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC Cycle  
Mechanism**

**NAT Cycle  
Mechanism**

Inflation of  
**NAC**

## **NAC Cycle Mechanism—Robbing by PVP**

Before players enter the challenge mode of PVP, they need to input a number of NAC. After the game, **90% of the total NACs from two players will be given to the winner, 10% will go to the ranking pool.**

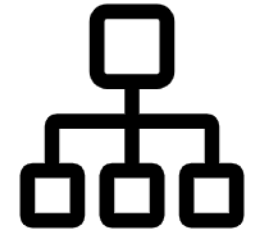
Every time a player wins, he will get 1 mark. And 0.5 mark if it is a dogfall and 0 mark if he loses. This mark of A is denoted by  $S_A$ .

One's ranking mark is  $R_A' = R_A + K(S_A - E_A)$ .

$R_A$  is the ranking mark before this battle and  $K = 30$  is a constant.

**Every week the Top 10 of ranking list will share the ranking pool.**

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

Inflation of  
**NAC**

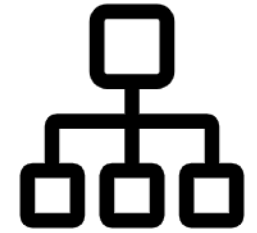
## **NAT Cycle Mechanism**—Renting Cars

Players rent their cars in the transaction platform for those don't have suitable cars.

The renting price is determined by himself.

**The payment is via NAT.**

# N.A's Monetization



- Evaluation Mechanism
- Distribution Model of **NAC**
- Distribution Model of **NAT**
- **NAC** Cycle Mechanism
- **NAT** Cycle Mechanism
- Inflation of **NAC**

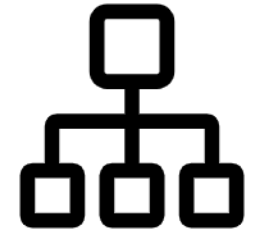
## **NAT Cycle Mechanism—Selling Cars**

Players sell their cars in the transaction platform for those don't have suitable cars.

The price is determined by himself.

**The payment is via NAT.**

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

Inflation of  
**NAC**

## **NAT Cycle Mechanism—Buying via NAC**

Players can buy others' NATs in the transaction platform via NACs.

The initial price is determined by seller.

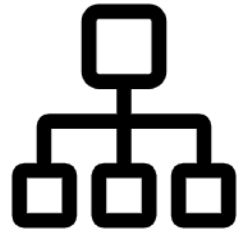
But the actual price is also determined by the amount of NATs which the player holds, i.e. the more he holds, the higher the price is.

Suppose A holds  $n$  NATs from B and the initial price of those NATs is  $p$ .

Then the price of next NAT is  $p \cdot n^{r_3}$ , where  $r_3 = 1.2$  is a constant.

Suppose he wants to buy 10 NATs, then he needs to pay  $p \cdot n^{r_3} + p \cdot (n + 1)^{r_3} + p \cdot (n + 2)^{r_3} + \dots + p \cdot (n + 9)^{r_3}$ .

# N.A's Monetization



Evaluation  
Mechanism

Distribution  
Model of **NAC**

Distribution  
Model of **NAT**

**NAC** Cycle  
Mechanism

**NAT** Cycle  
Mechanism

**Inflation of  
NAC**

## Inflation of NAC

We records the total value of all cars in the  $n$ th week as  $V(n)$ .

Then the additional issuing NACs is  $r_3^{-\frac{x}{y}} \cdot \frac{V(n)-V(n-1)}{V(n-1)}$ .

where  $r_3$  is a constant,  $x$  is the NAC mined from the ecosystem pool and  $y$  denotes remained NAC in the ecosystem pool, i.e. we have  $x + y = X(n) = X_0 + \sum_i^n Y(i)$



Noah's



Ark

Thank you!