

A pixel art background featuring a dark purple sky. At the top center is a white cloud. To its right is a yellow sun partially obscured by another white cloud. On the left side, there are two white stars and a green four-leaf clover. The text 'PG Byte' is centered in a white, pixelated font.

PG Byte

A pixel art background featuring a dark purple sky. On the left side, there is a white cloud and a white mouse cursor arrow pointing towards the center. The text 'HOPE PROJECT' is centered in a large, green, pixelated font.

HOPE PROJECT

7-8 November 2025

A green pixelated banner at the bottom left corner with the word 'Canva' in a white, cursive font.

Canva



<https://arxiv.org/html/2411.17009v1>



CLIENT

SERVER

k

$v1$

$v2$

$E_k(v1)$

+

$E_k(v2)$

=

$E_k(v1+v2)=E_k(m)$

CLIENT

SERVER

I

$E_k(I)$ $E_k(m)$

$$E_k(m) * E_k(I) \\ =$$

$E_k(m')$



$$E_k(m+I) = E_k(m')$$

CLIENT

SERVER

g

f

$g(Ek(m))$

$f(Ek(m))$

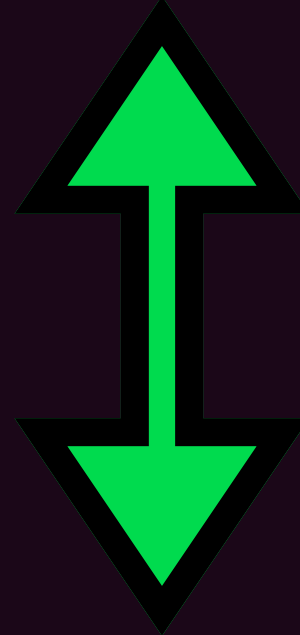
$g(f(Ek(m)))$

$=$

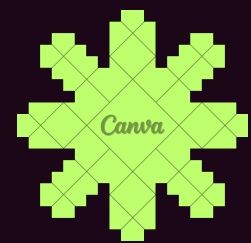
$f(g(Ek(m)))$

$$\text{speed}(Ek(m)) = Ek(\text{speed}(m))$$


$$\text{speed}(\text{Ek}(\text{m})) < \text{speed}(\text{Ek}(\text{m}'))$$



$$\text{speed}(\text{m}) < \text{speed}(\text{m}')$$



CLIENT

CLIENT

SERVER

CLIENT

CLIENT



```
jbenack23@Think-E15Gen4: ~/Documenti/Informatica/competitions/...
jbenack23@Think-E15G... x jbenack23@Think-E15G... x jbenack23@Think-E15G... x
jbenack23@Think-E15Gen4:~/Documenti/Informatica/competitions/IXH25/venv/src$ cd
../src && ../bin/python3 PoC.py
    ---Init Phase ---
- Creating Blockchain...
- Creating wallets...
. Done. The balance of a wallet is 10.0XPF.
- Creating keys for digital signatures.
[Client Signature Key]: eff3670a05024b4daff0d8ce307f1ce29f266579acbce95eaefb3ab8
8524e4118bba48e05493a65fffb82e92a7d9dddc4b13faef1c3ca3d3000c87deaa0407a26.
[Server Signature Key]: 916928788e7bba9be34f90162eba488590413e6f74fa2f1375e7b399
d7e9278d32de4749a3b581569e250c931d89ae48343b2958733f0cae256820af75a63b7a.
    ---Handshake Phase ---
- Client generated iV: [472, 271, 454, 257, 304, 340, 67, 219, 482, 297].
- Client encrypted its iV and sent it to the client.
- Server generated iV: [816, 938, 747, 55, 108, 826, 228, 805, 442, 340].
- Client encrypted its iV and sent it to the client.
- Car speed is: 63.92651080758446.
[DEBUG] t1: [1288, 1209, 1201, 312, 412, 1166, 295, 1024, 924, 637].
[DEBUG] t2: [1288, 1209, 1201, 312, 412, 1166, 295, 1024, 924, 637].
> Both Client & Server now have the same iV for the user's car.
    ---Training Phase ---
- Client "c1" requested a training.
- Server generated a train vector and sends it to client.
Mined block 2, hash: 000fa38431a2f4d2fca481aae400fd9e82e3e9929fbe105ad8724e28b10
fff8f, nonce: 11164
The speed of the car now is: 47.29444458167491.
[DEBUG] t1: [1294, 1222, 1201, 326, 414, 1154, 309, 1005, 922, 637].
[DEBUG] t2: [1294, 1222, 1201, 326, 414, 1154, 309, 1005, 922, 637].
> Training has been completed correctly.
```




Thanks!

