MARCO MARTINOLI
10 - 05 - 2022

Some properties

- Merkle tree provides integrity
- New Merkle trees generated at regular intervals
- VRF prevents enumeration

SIDE-CHANNEL
ANALYSIS

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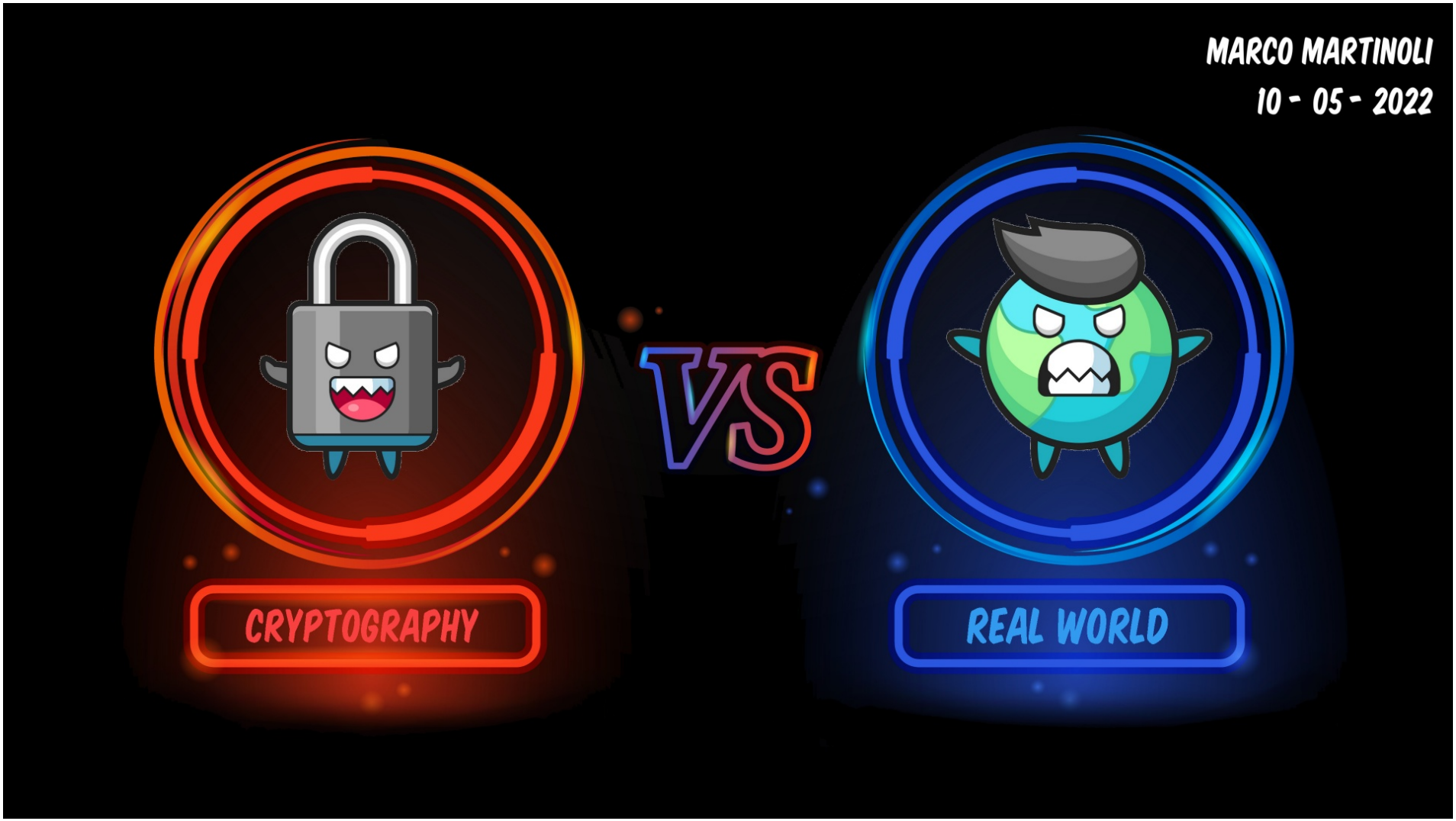
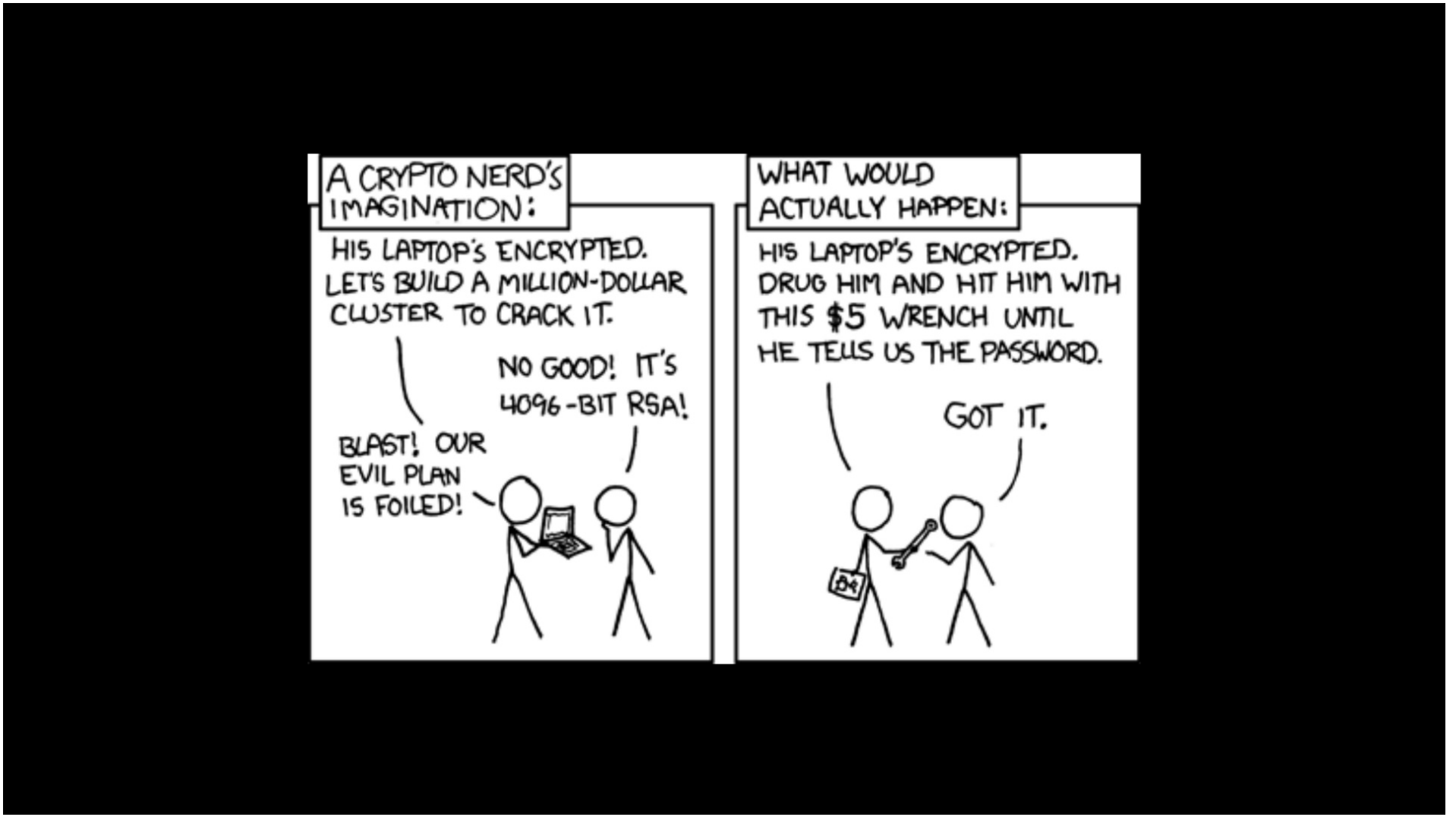

MARCO MARTINOLI
10 - 05 - 2022
VS
CRYPTOGRAPHY
REAL WORLD


A CRYPTO NERD'S IMAGINATION:
HIS LAPTOP'S ENCRYPTED. LET'S BUILD A MILLION-DOLLAR CLUSTER TO CRACK IT.
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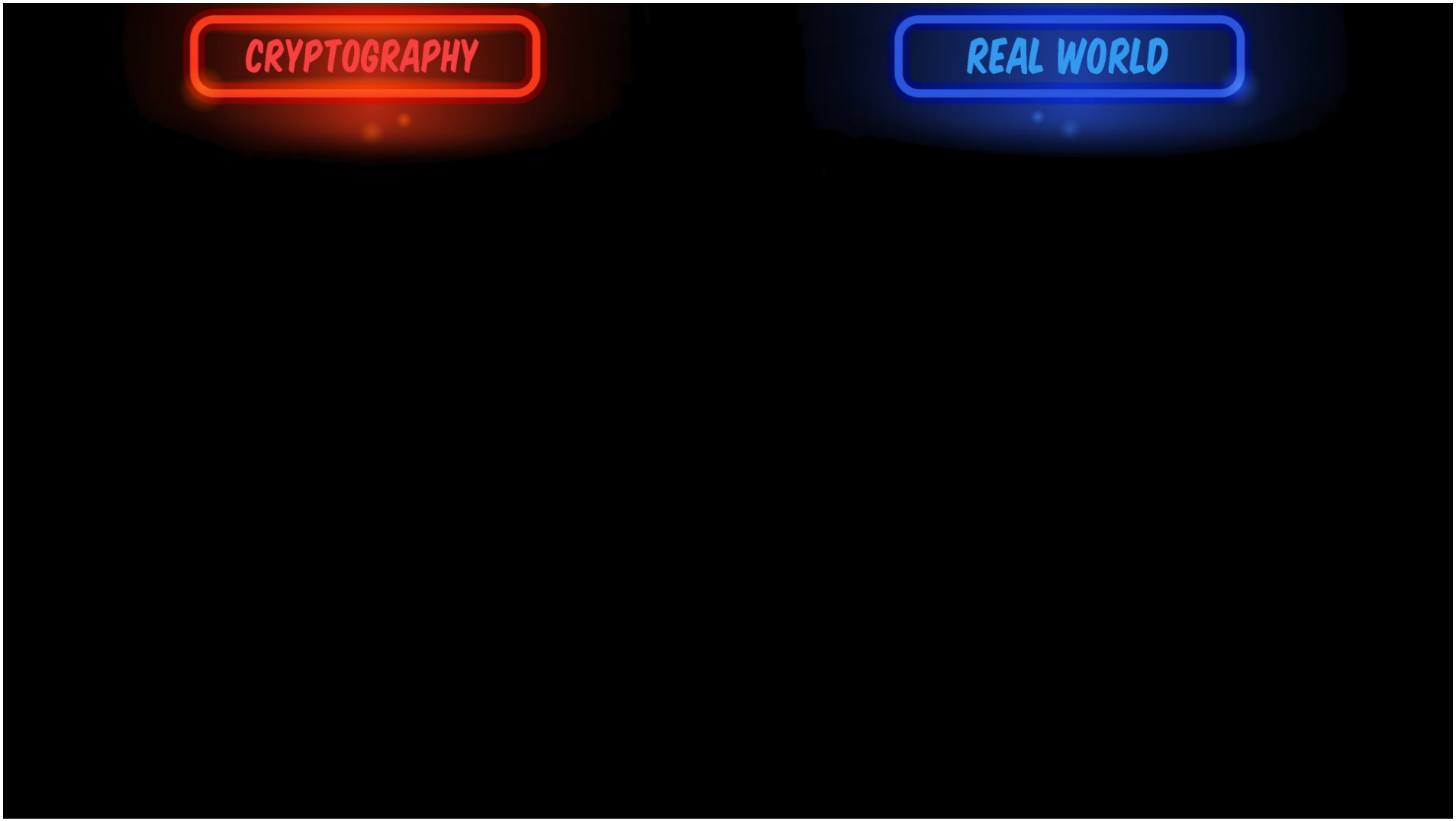
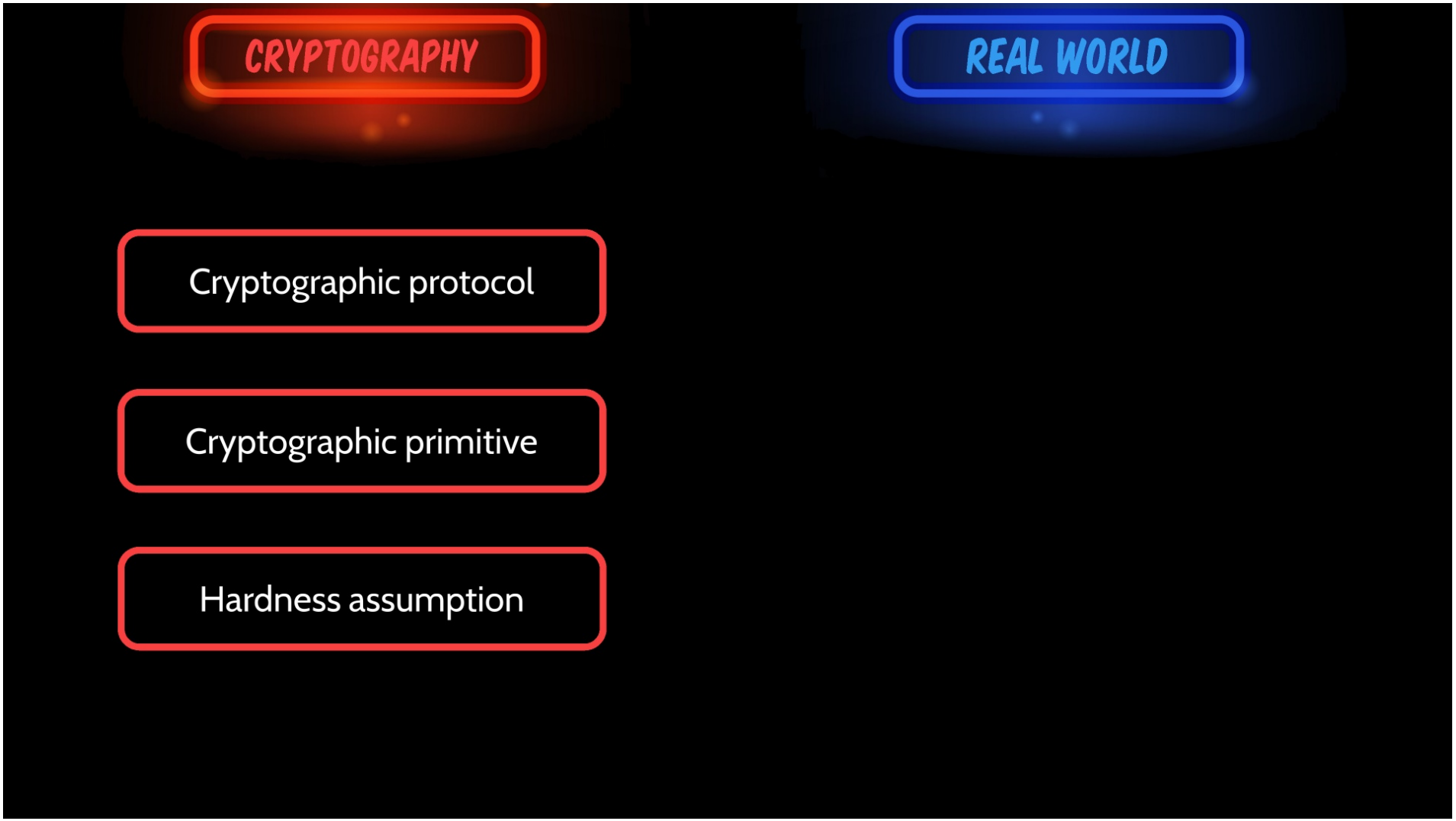
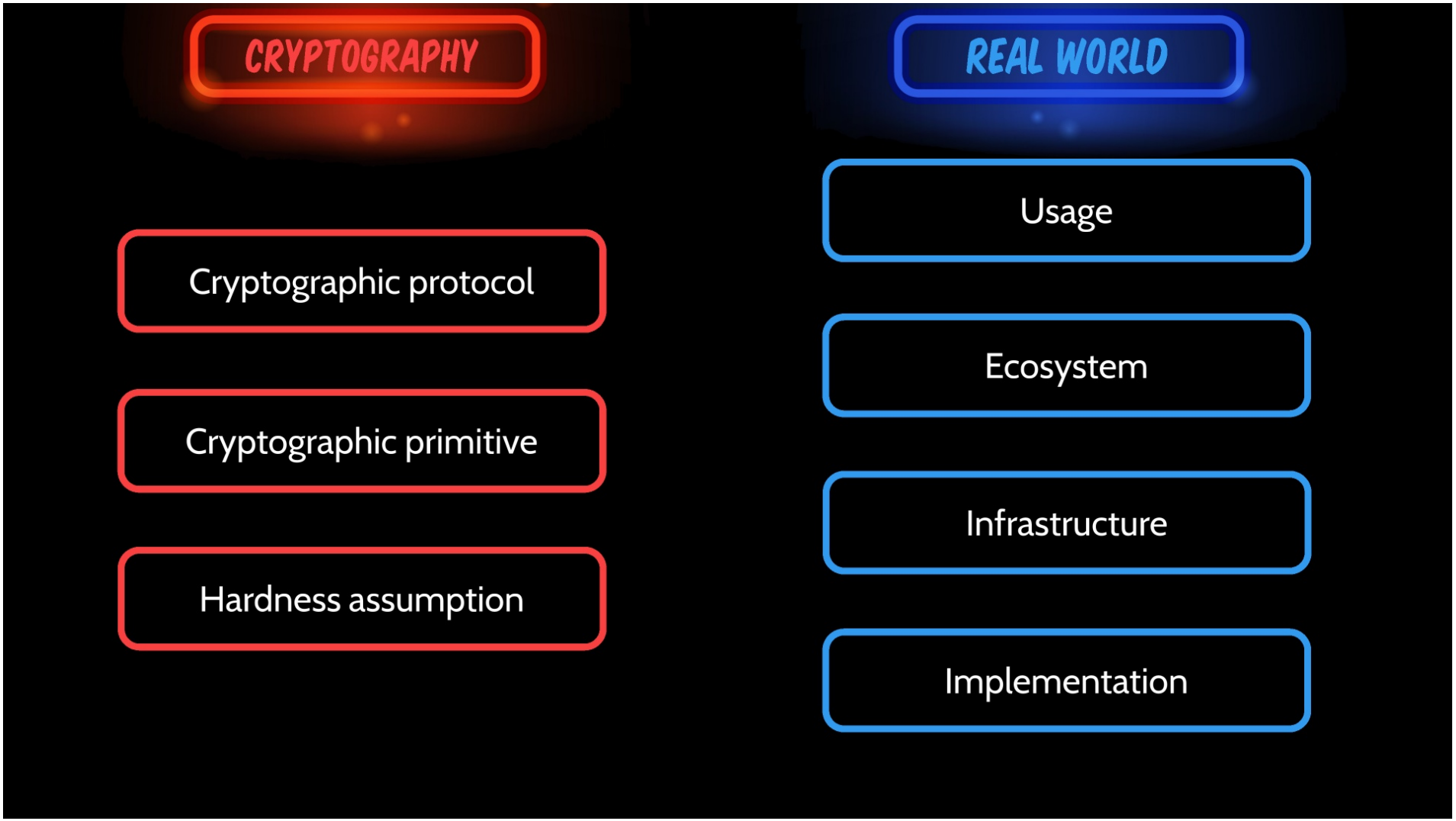

CRYPTOGRAPHY
REAL WORLD


CRYPTOGRAPHY
REAL WORLD
Cryptographic protocol
Cryptographic primitive
Hardness assumption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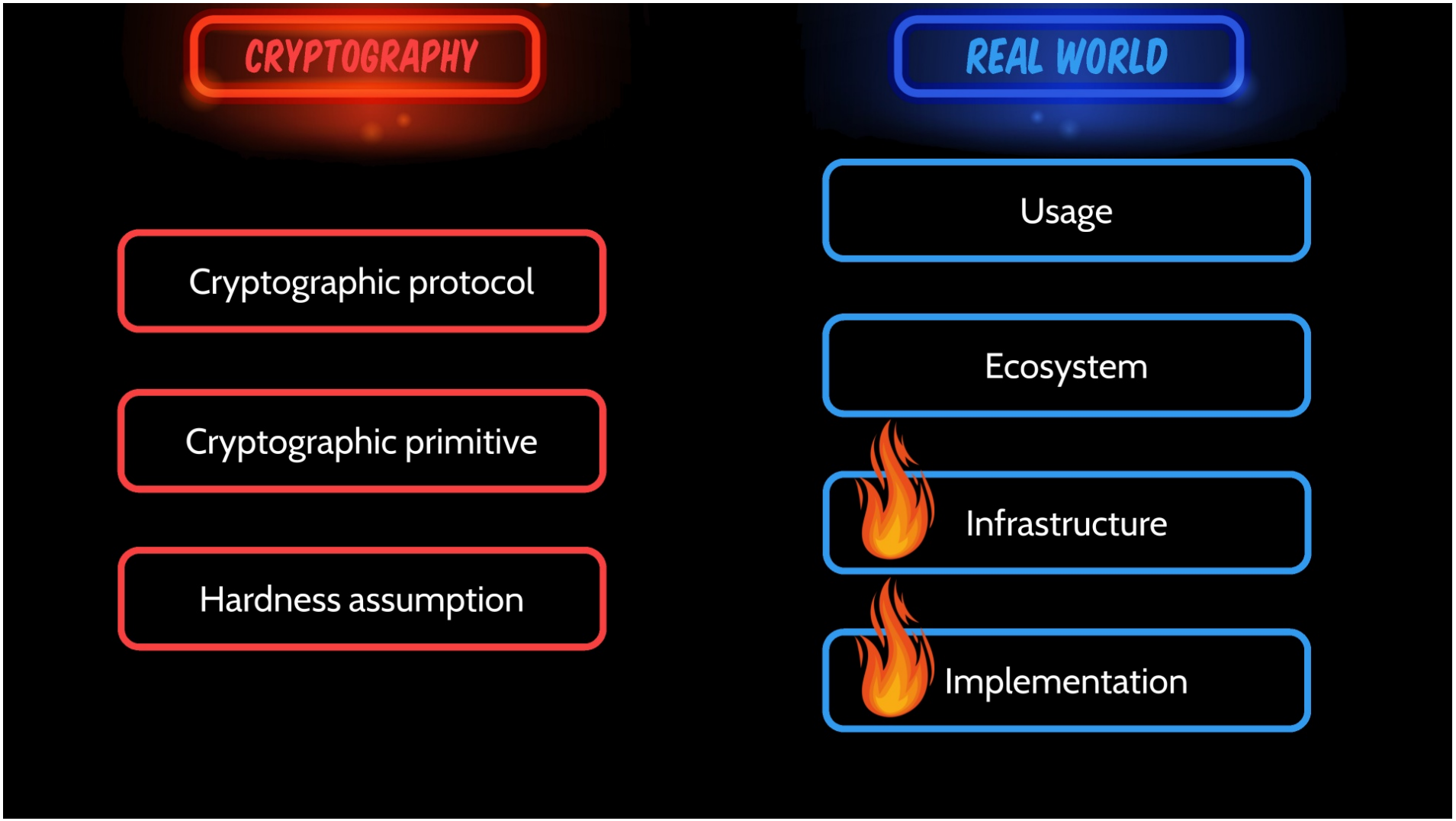
Usage
Ecosystem
Infrastructure
Implementation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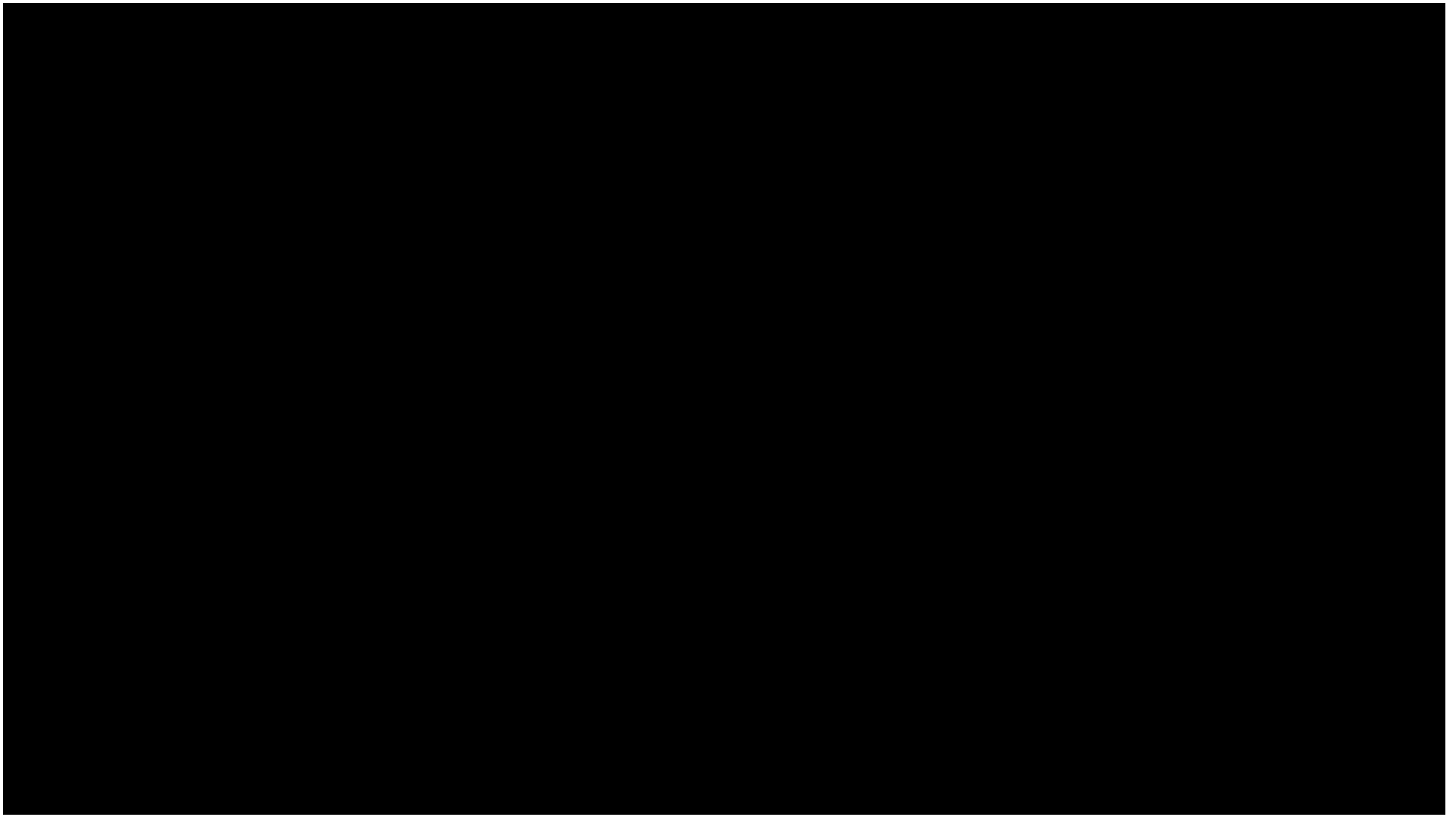
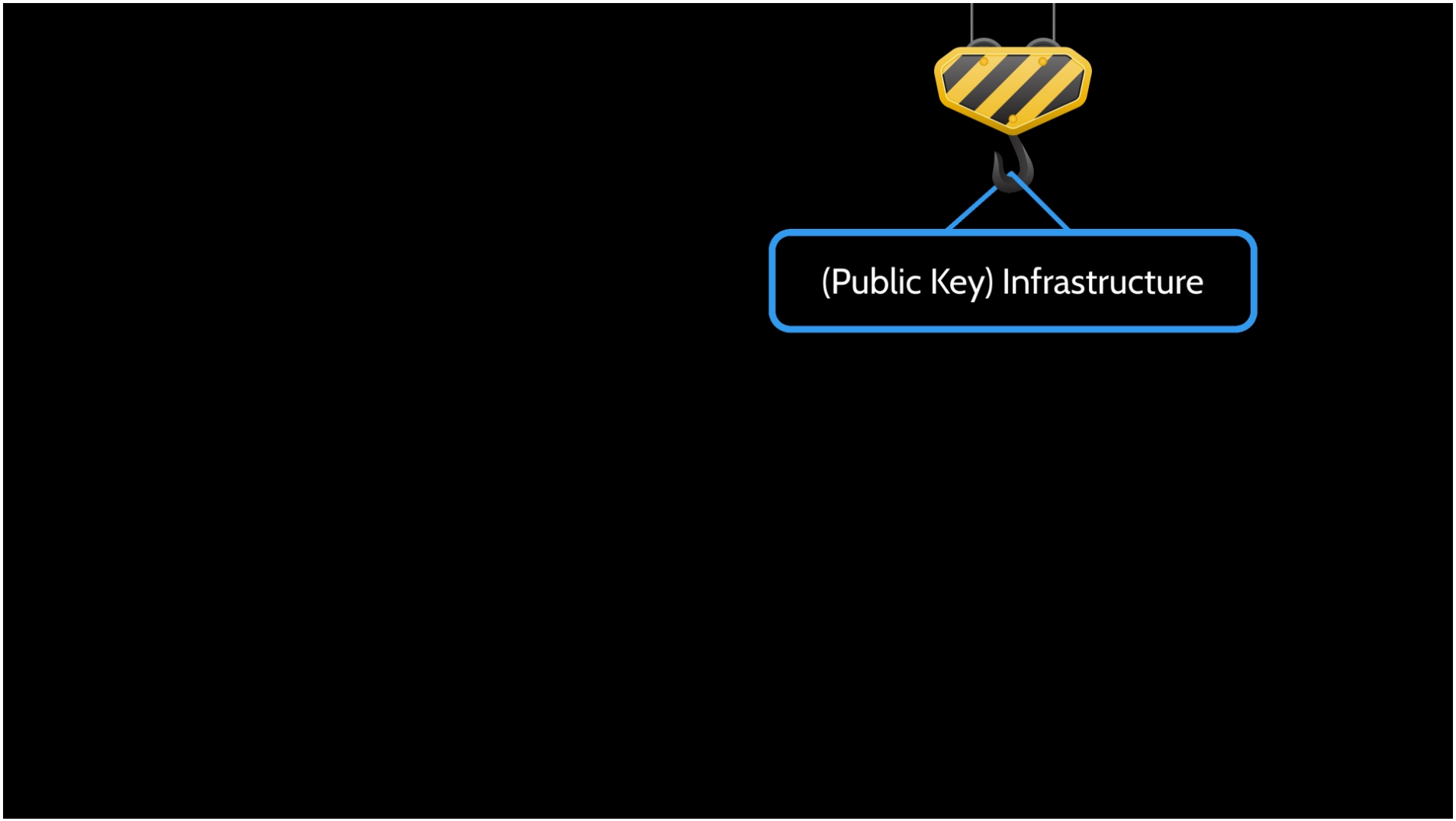
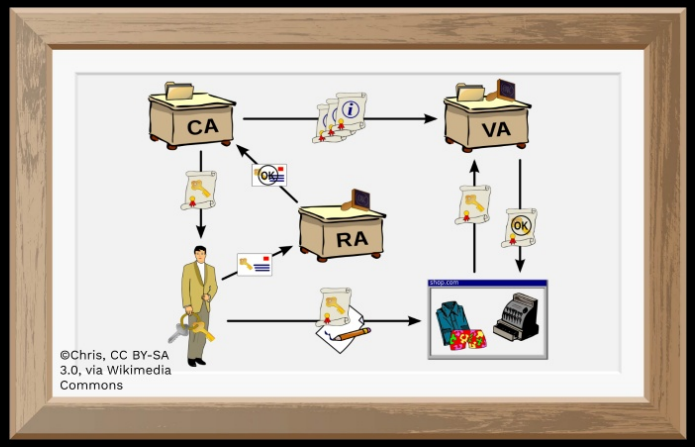



(Public Key) Infrastructure


CA
VA
RA
OK
OK
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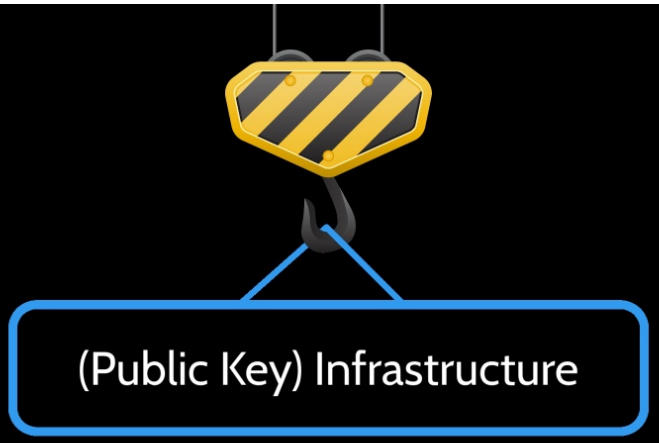
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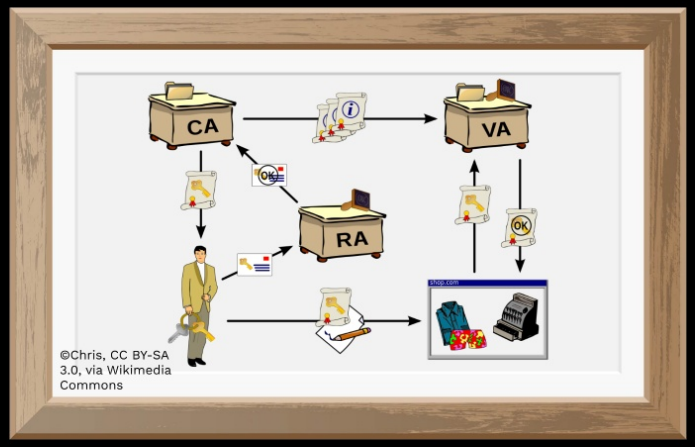
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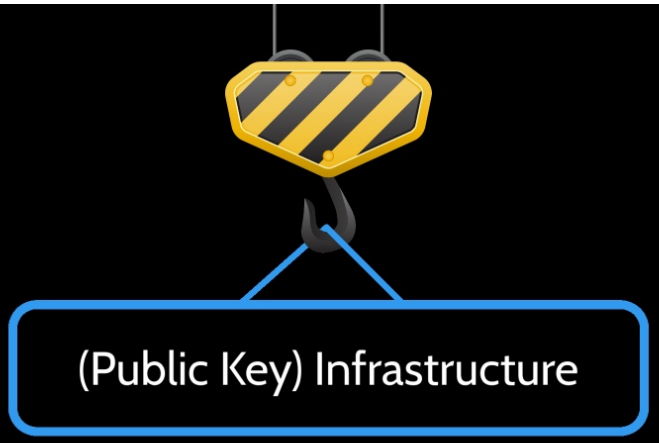
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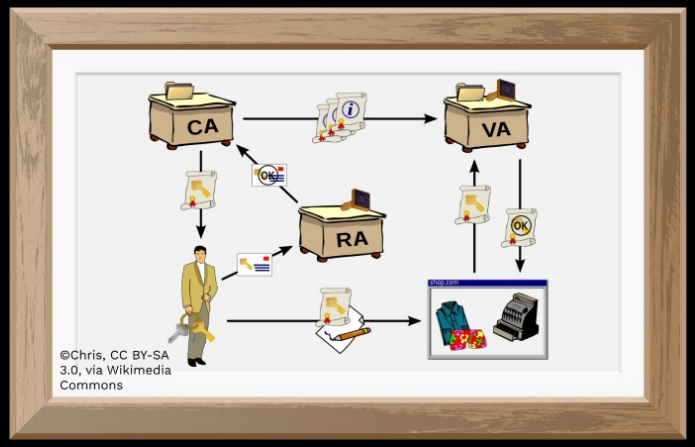
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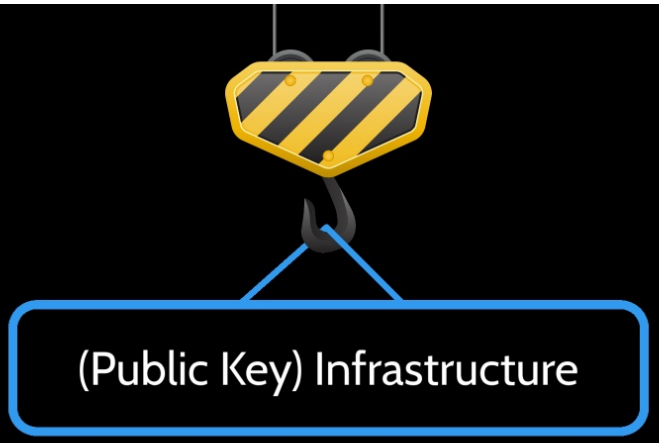
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37892 01378 89347 34299
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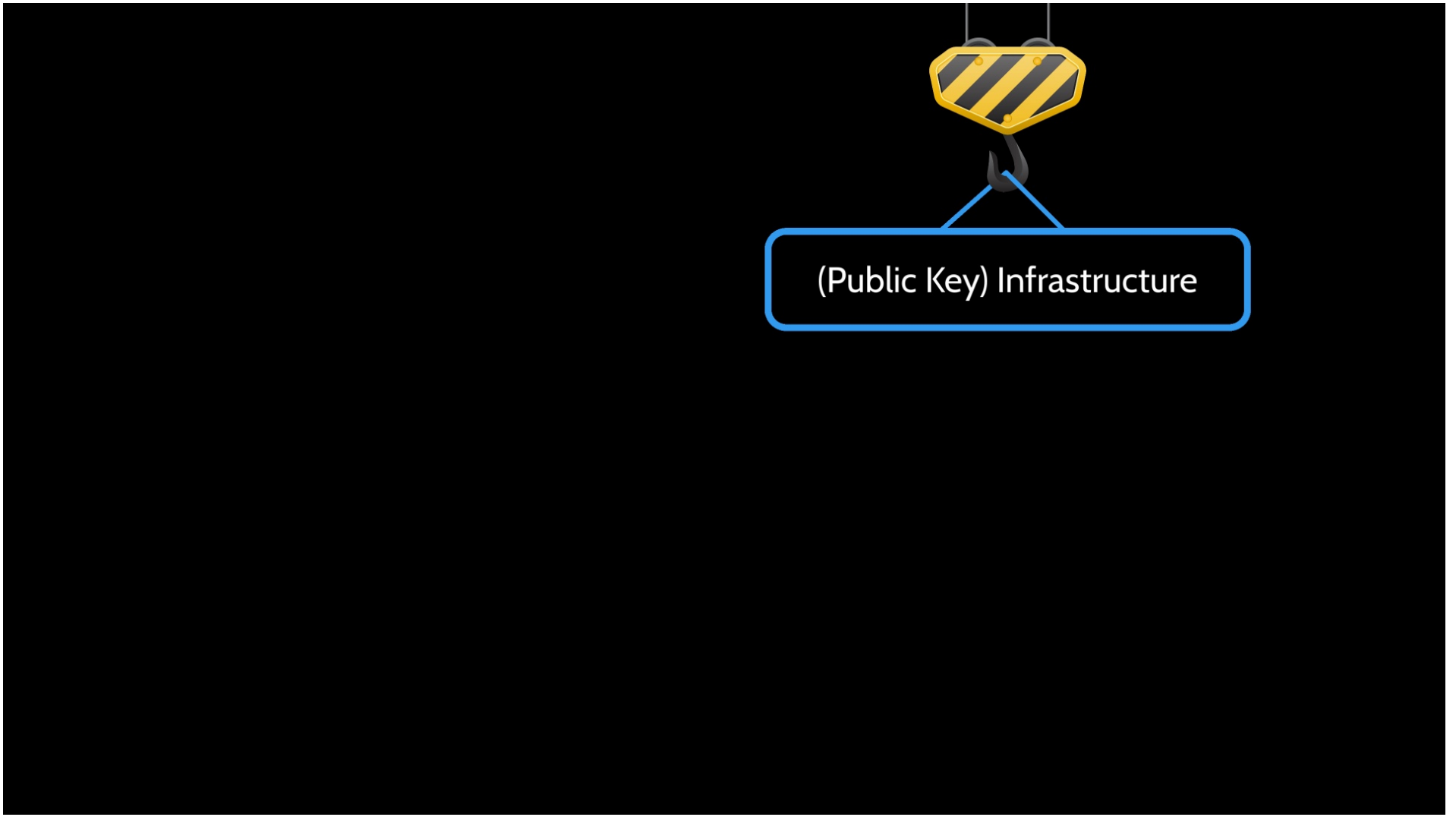
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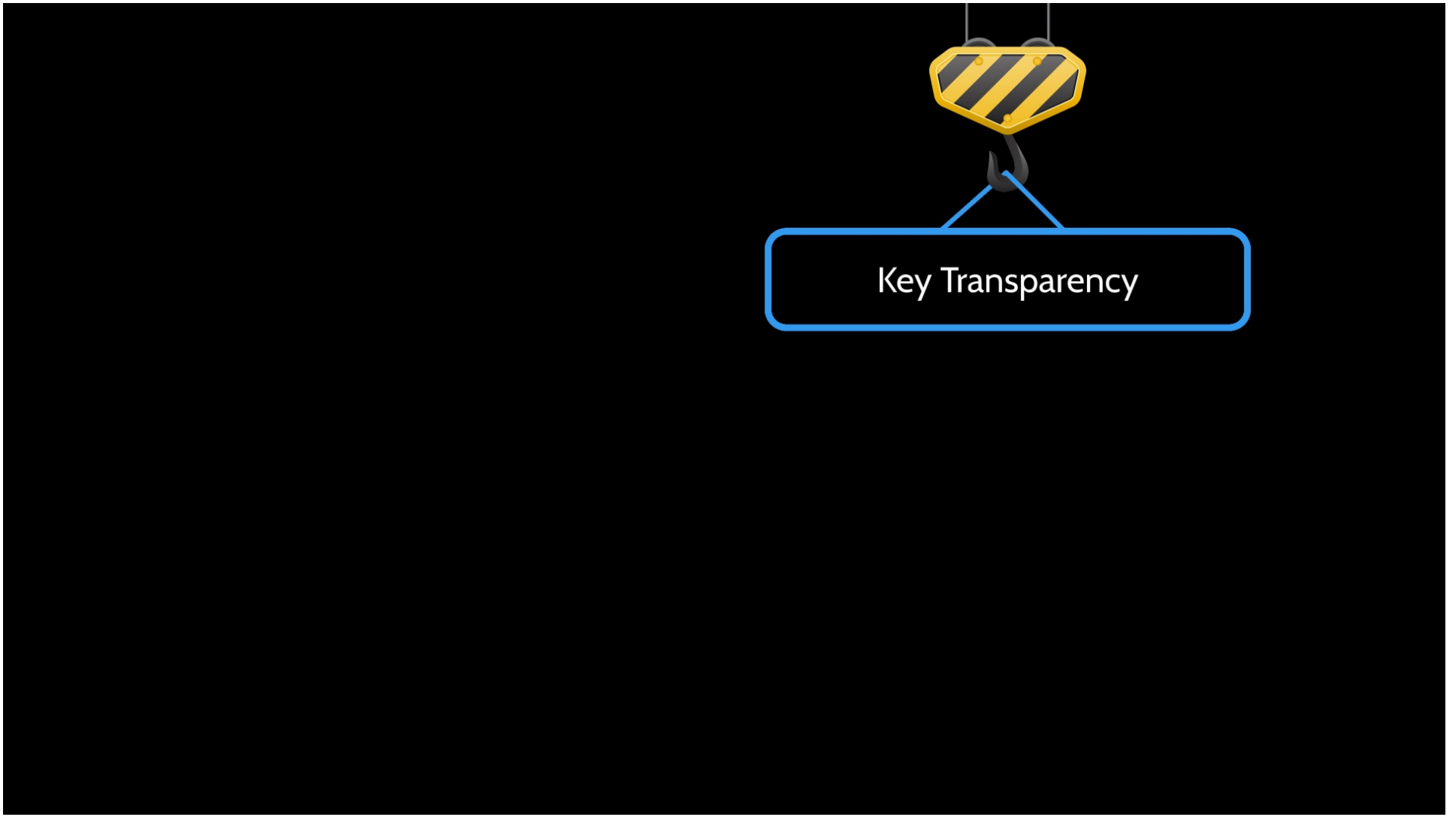
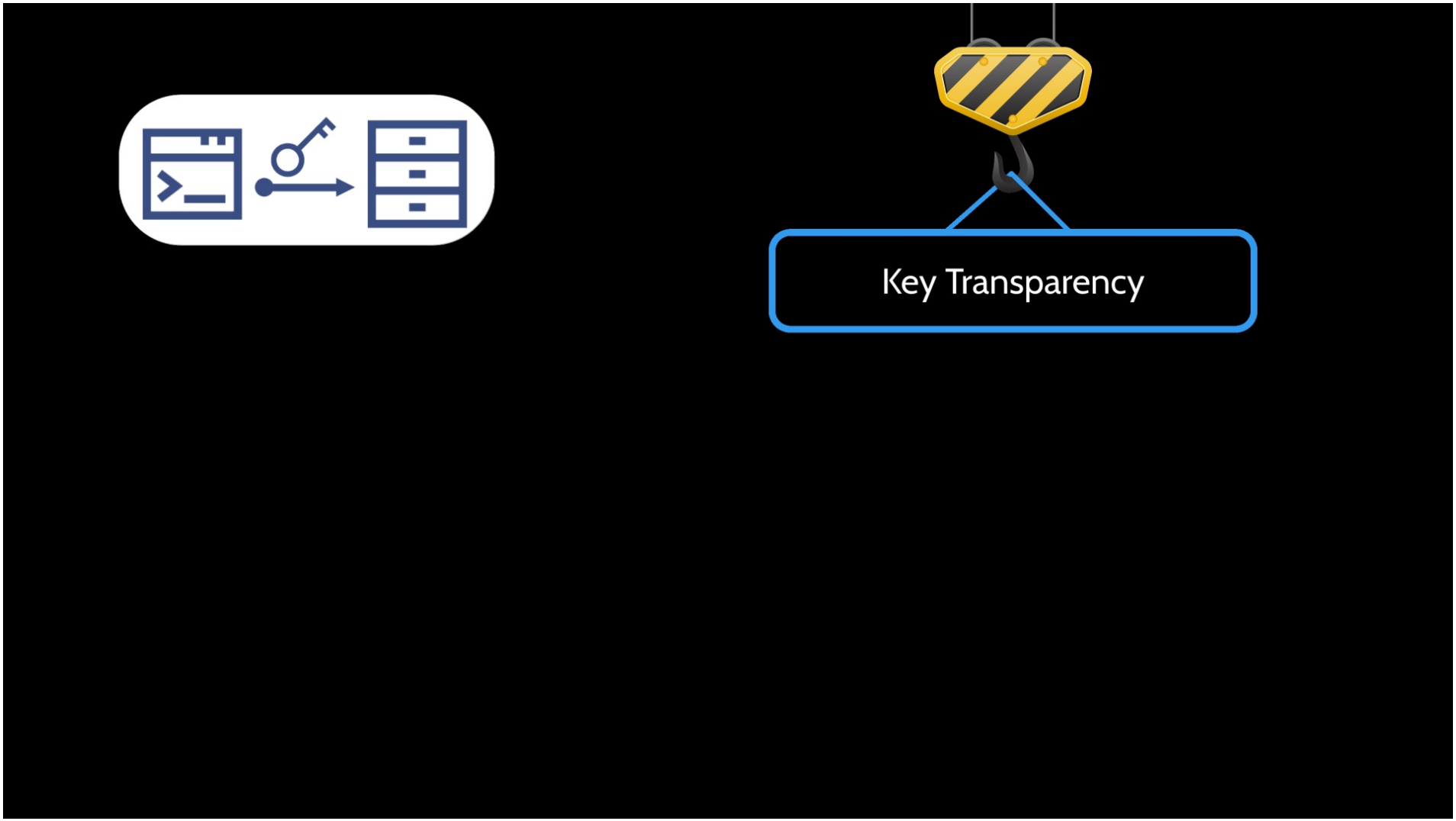

Key Transparency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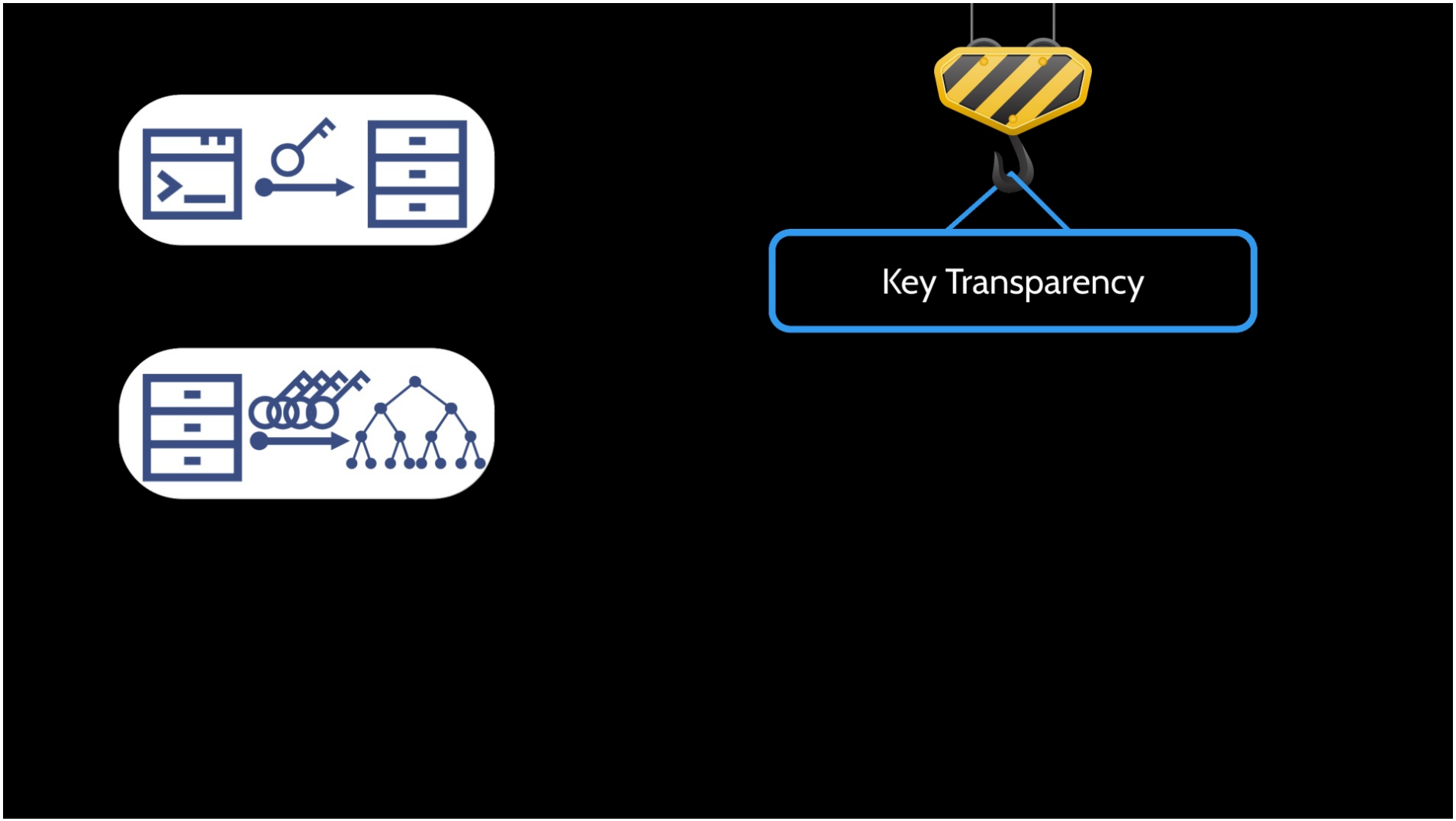
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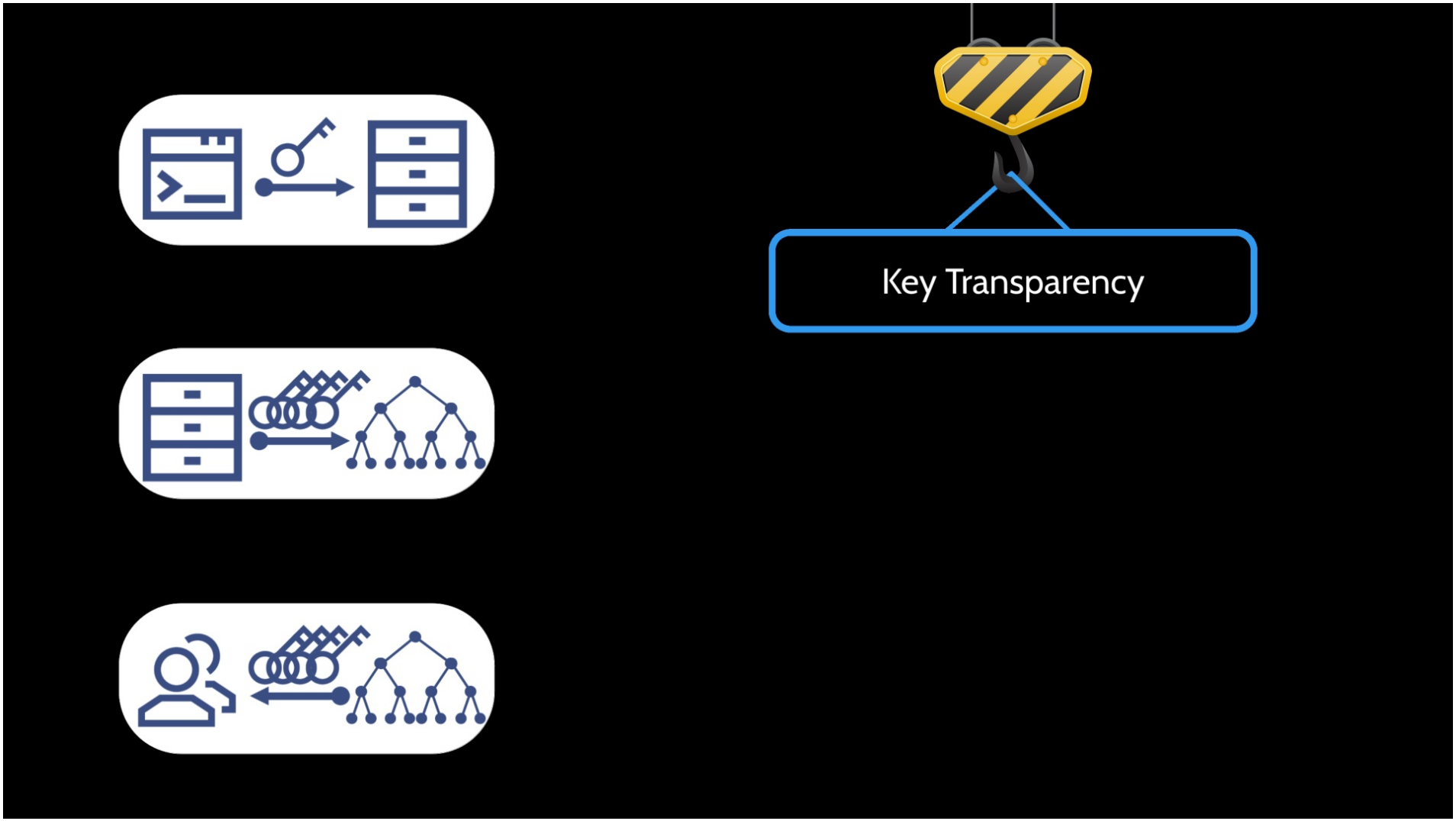
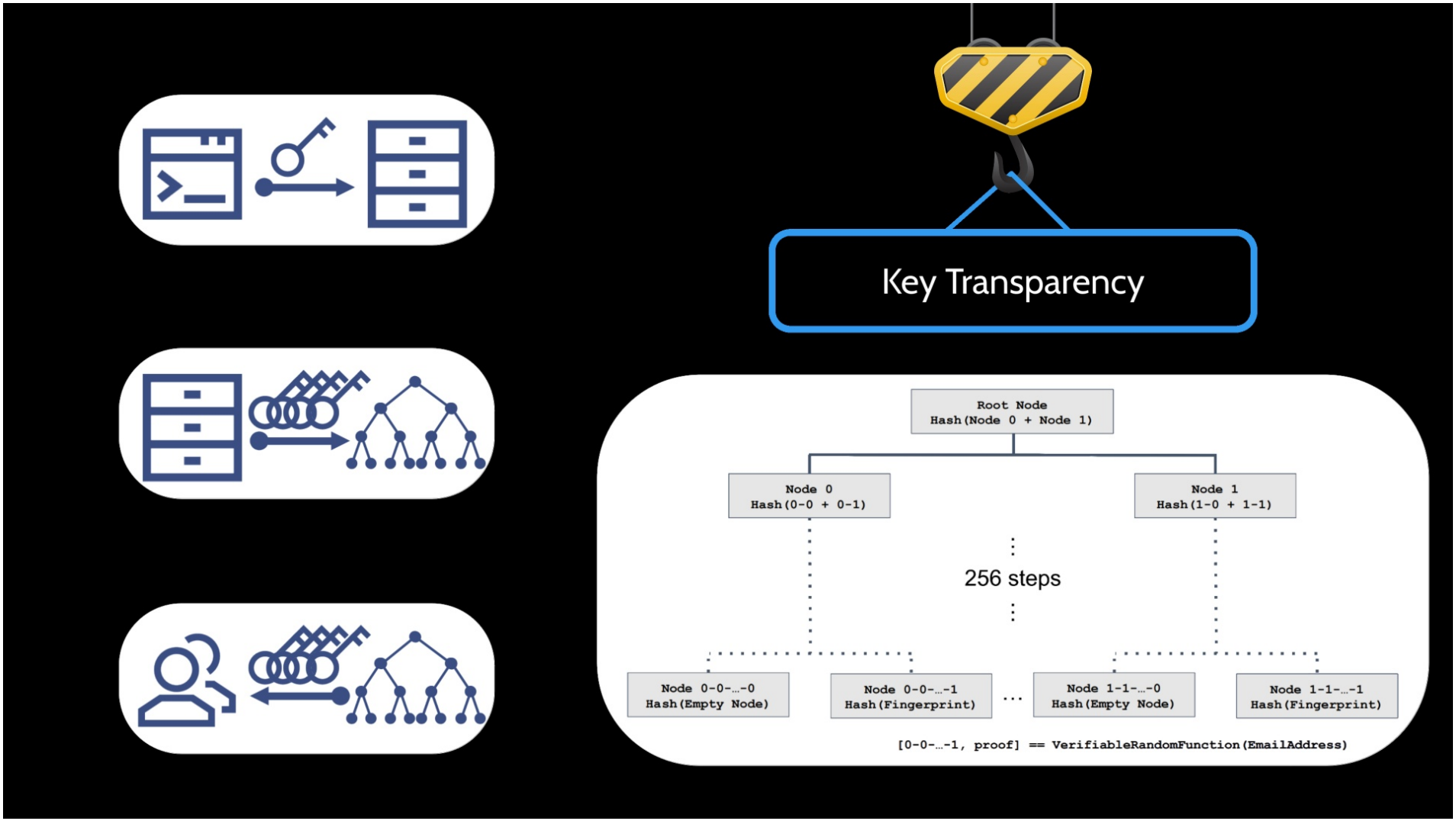
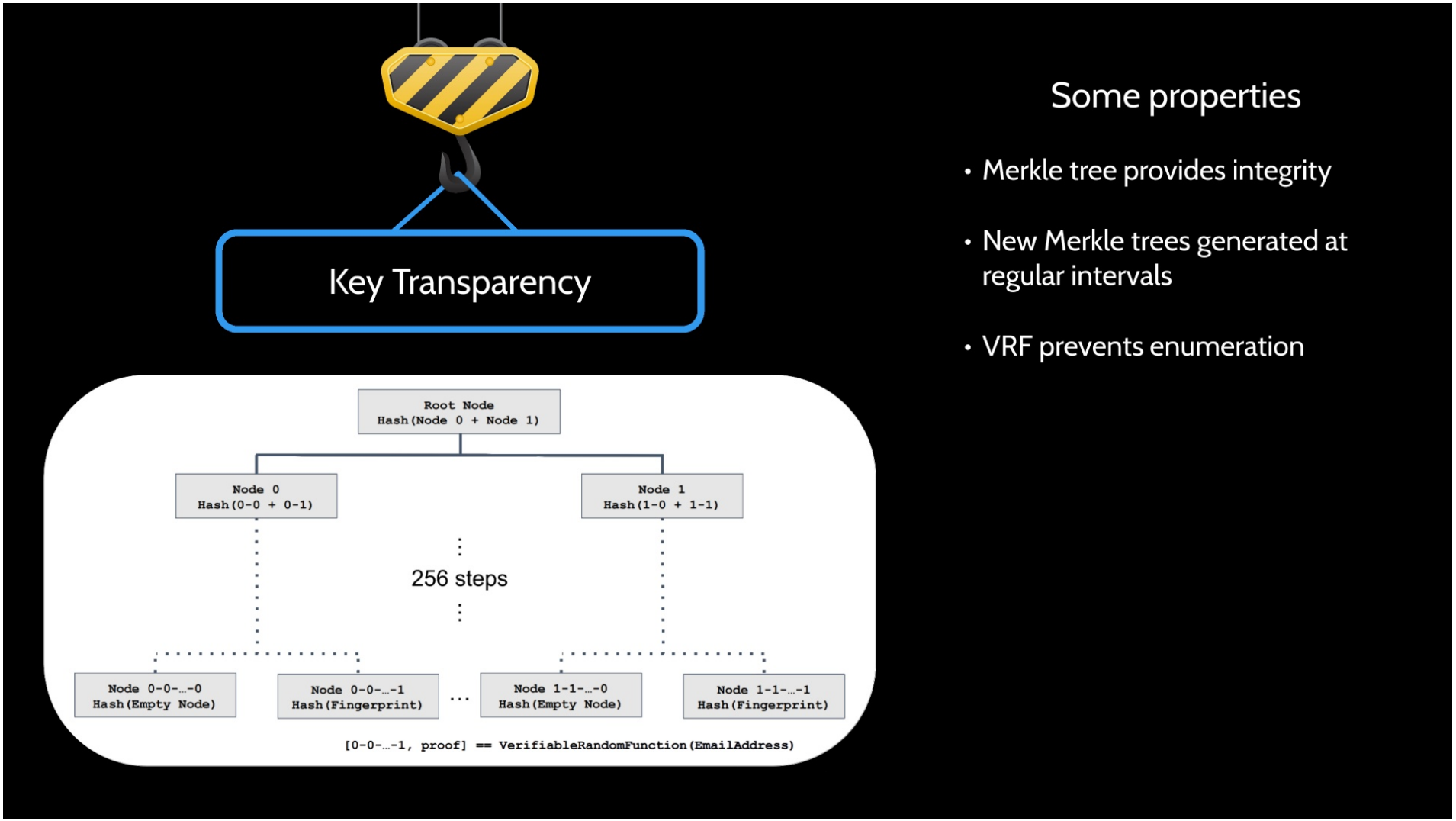

Key Transparency


Key Transparency
Root Node
Hash(Node 0 + Node 1)
Node 0
Hash(0-0 + 0-1)
Node 1
Hash(1-0 + 1-1)
256 steps
Node 0-0-…-0
Hash(Empty Node)
Node 0-0-…-1
Hash(Fingerprint)
Node 1-1-…-0
Hash(Empty Node)
Node 1-1-…-1
Hash(Fingerprint)
[0-0-…-1, proof] == VerifiableRandomFunction(EmailAddress)



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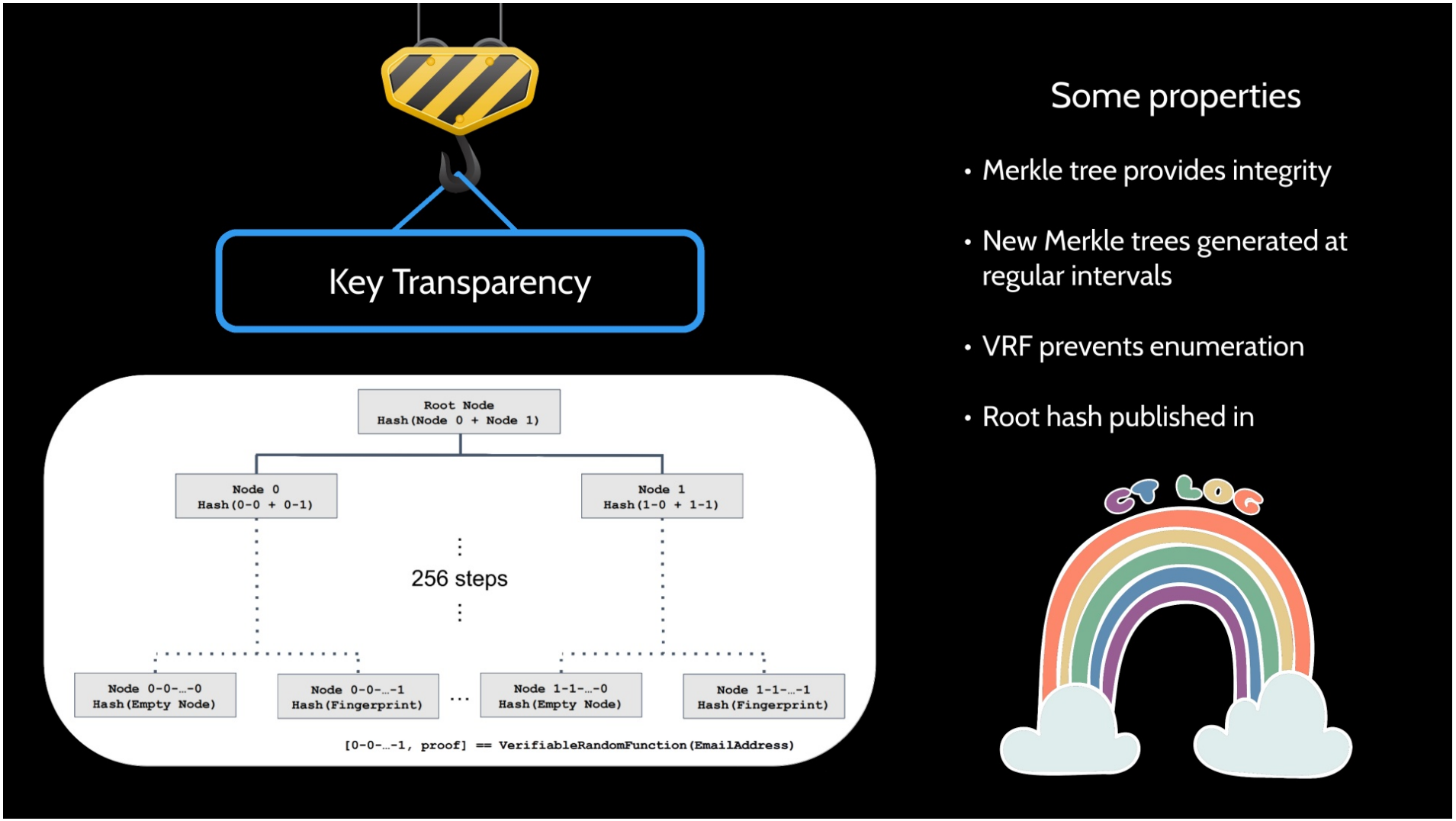
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Node 0
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Some properties
• Merkle tree provides integrity
• New Merkle trees generated at regular intervals
• VRF prevents enumeration
• Root hash published in
CT LOG


SIDE-CHANNEL
ANALYSIS


SIDE-CHANNEL
ANALYSIS


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ANALYSIS


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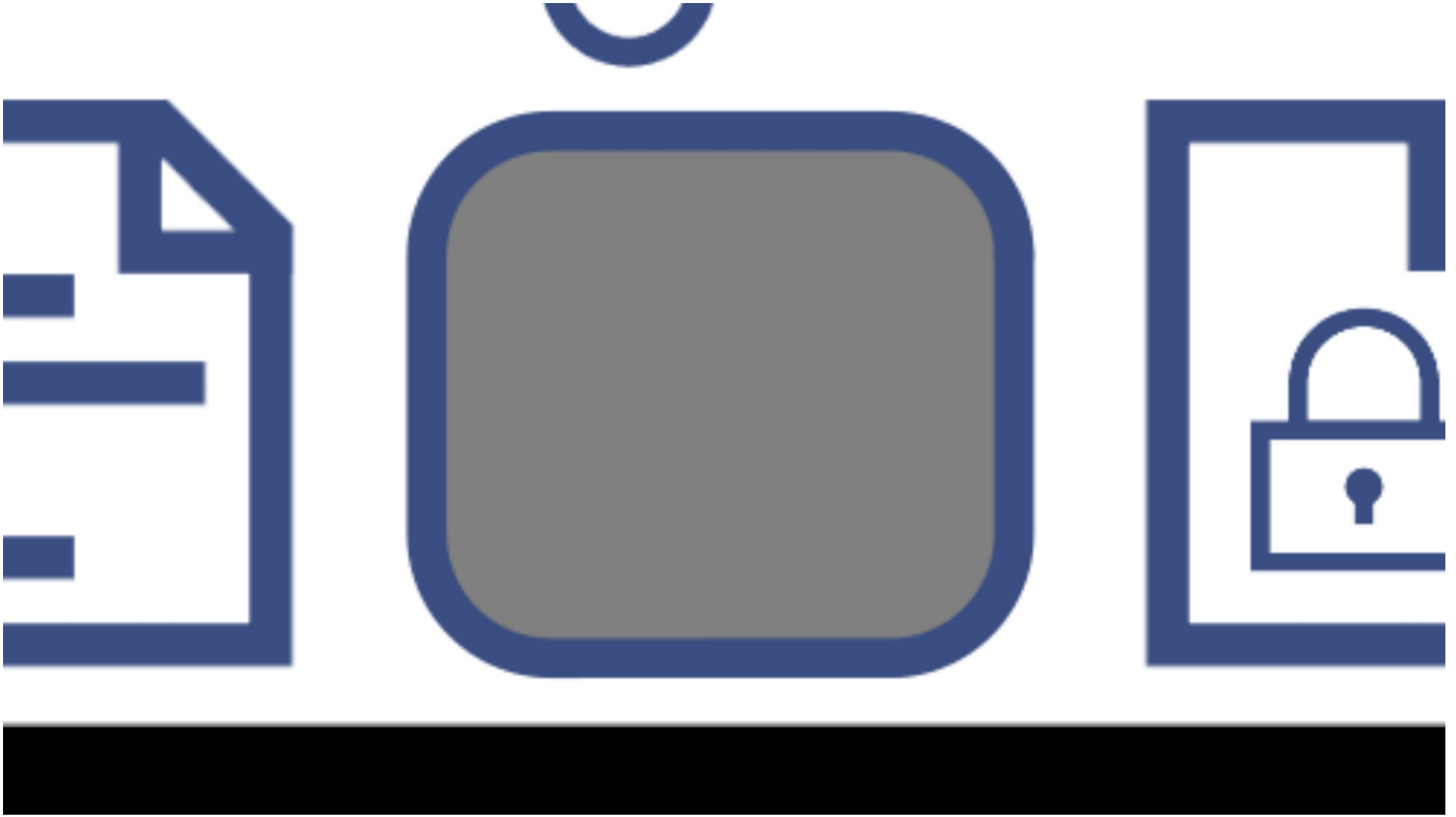
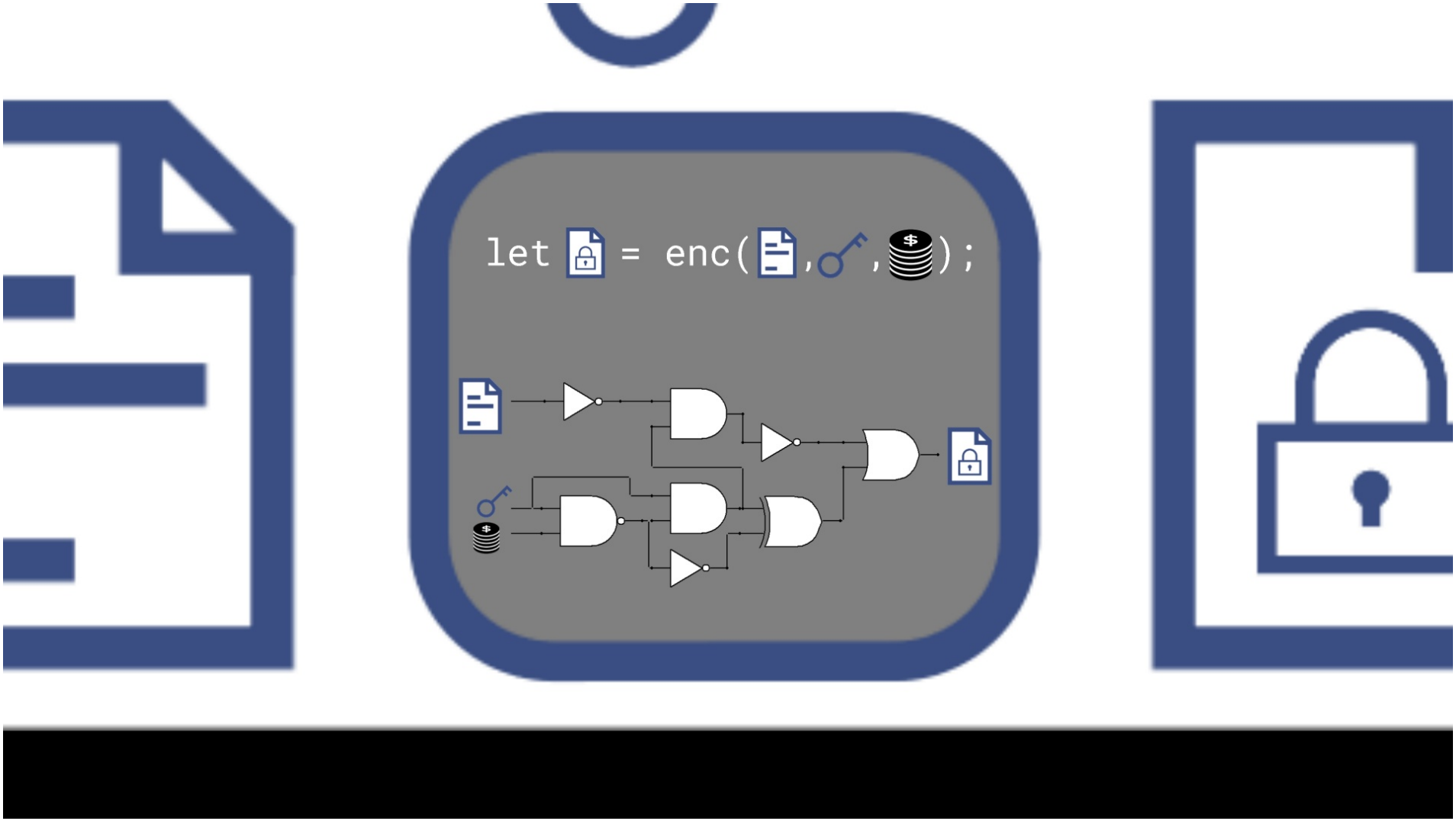


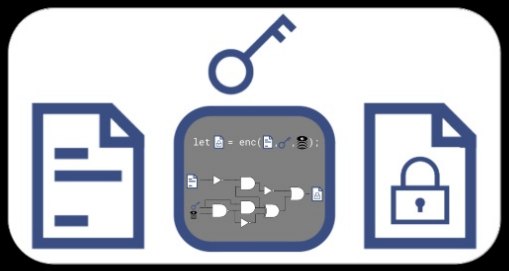

let = enc(, ,);

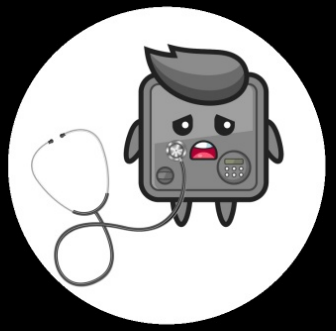

SIDE-CHANNEL
ANALYSIS

```
const strCompare = (str1, str2) => {
  if (str1.length !== str2.length) {
    return false;
  }

  for(let i = 0; i < str1.length; i++) {
    if (str1[i] !== str2[i]) {
      return false;
    }
  }

  return true;
};
```





SIDE-CHANNEL

ANALYSIS

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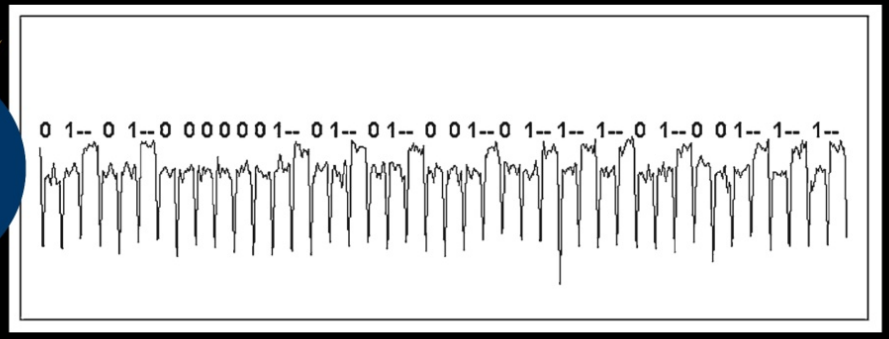
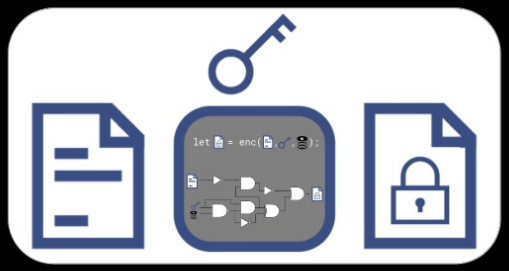
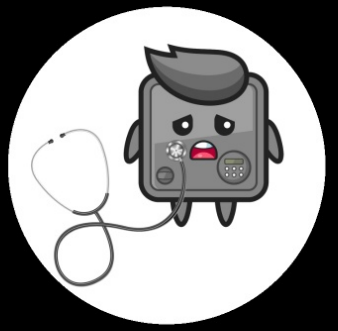


Introduction to Differential Power Analysis
Journal of Cryptographic Engineering, April 2011
P. Kocher, J. Jaffe, B. Jun, P. Rohatgi





SIDE-CHANNEL

ANALYSIS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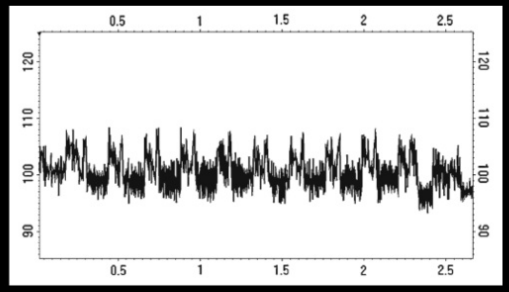
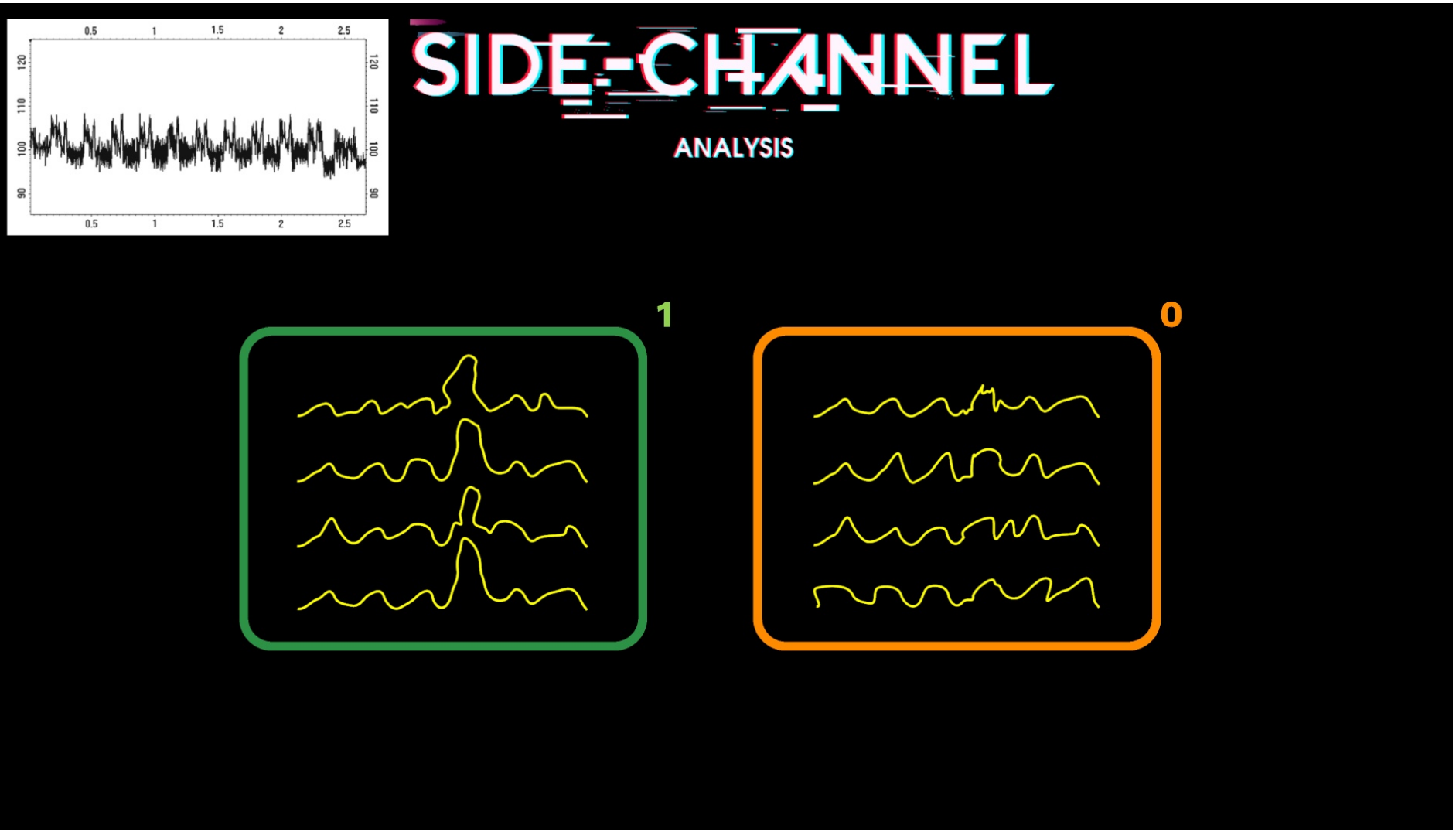


SIDE-CHANNEL

ANALYSIS


SIDE-CHANNEL
ANALYSIS
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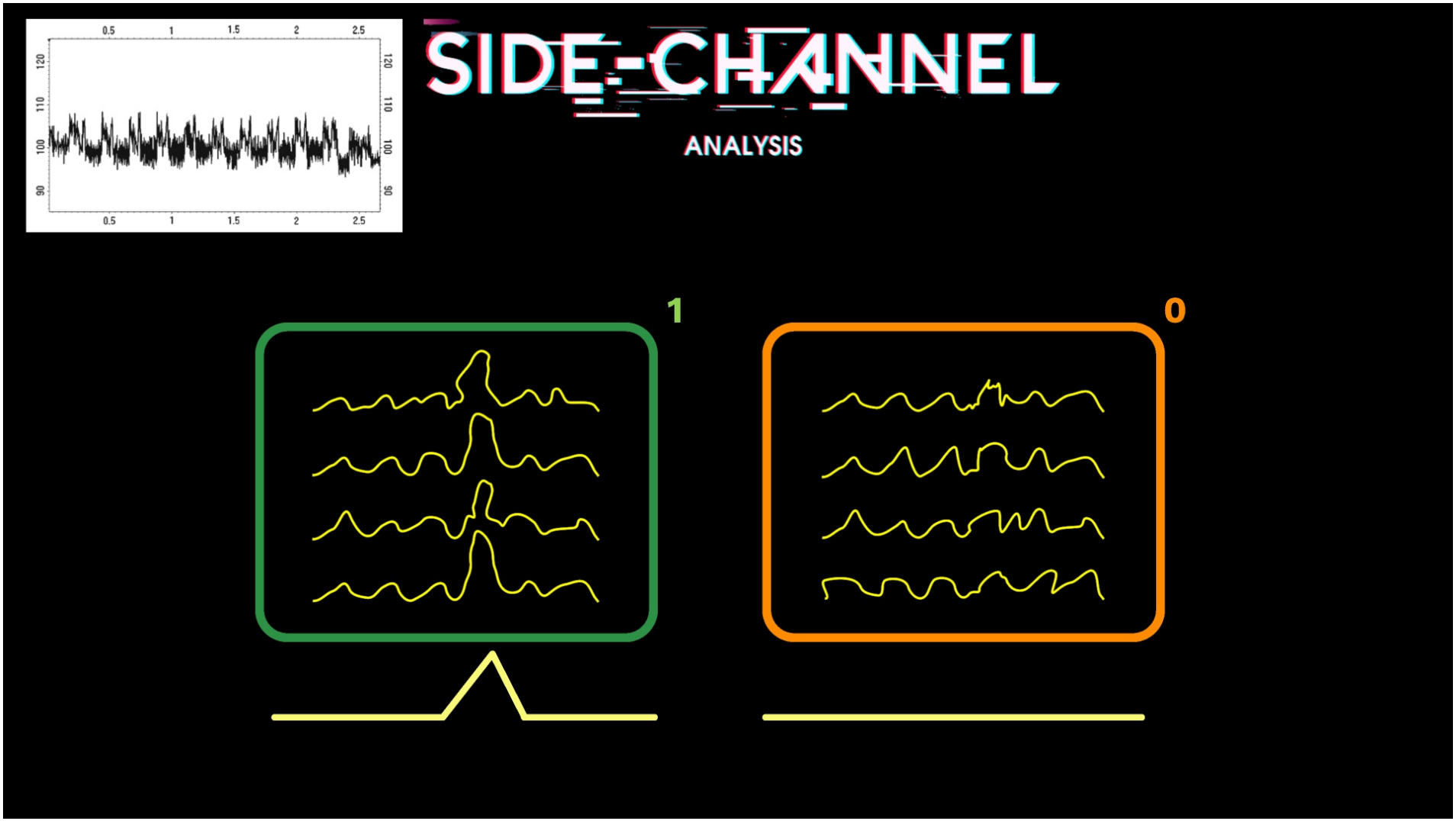
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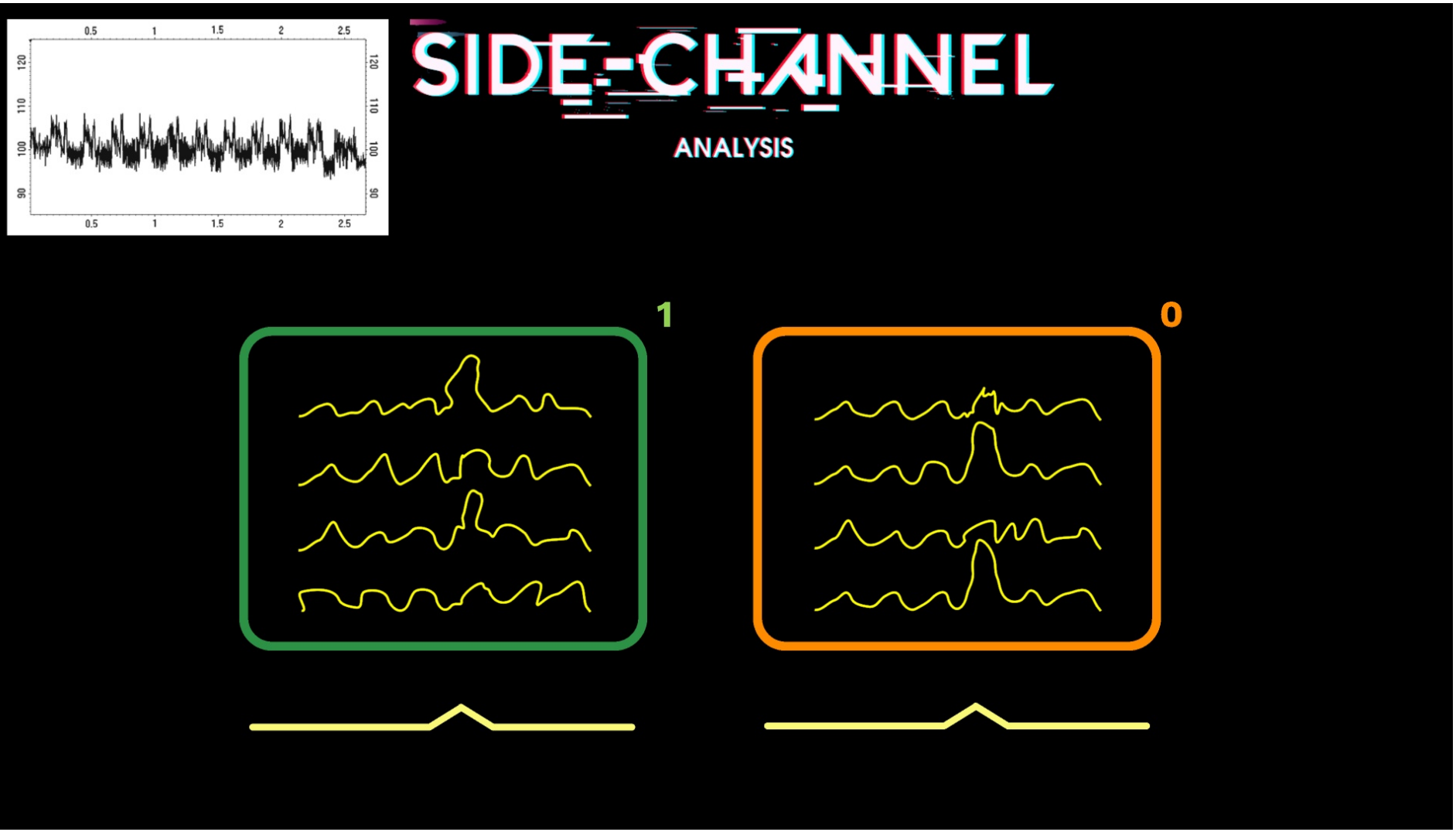
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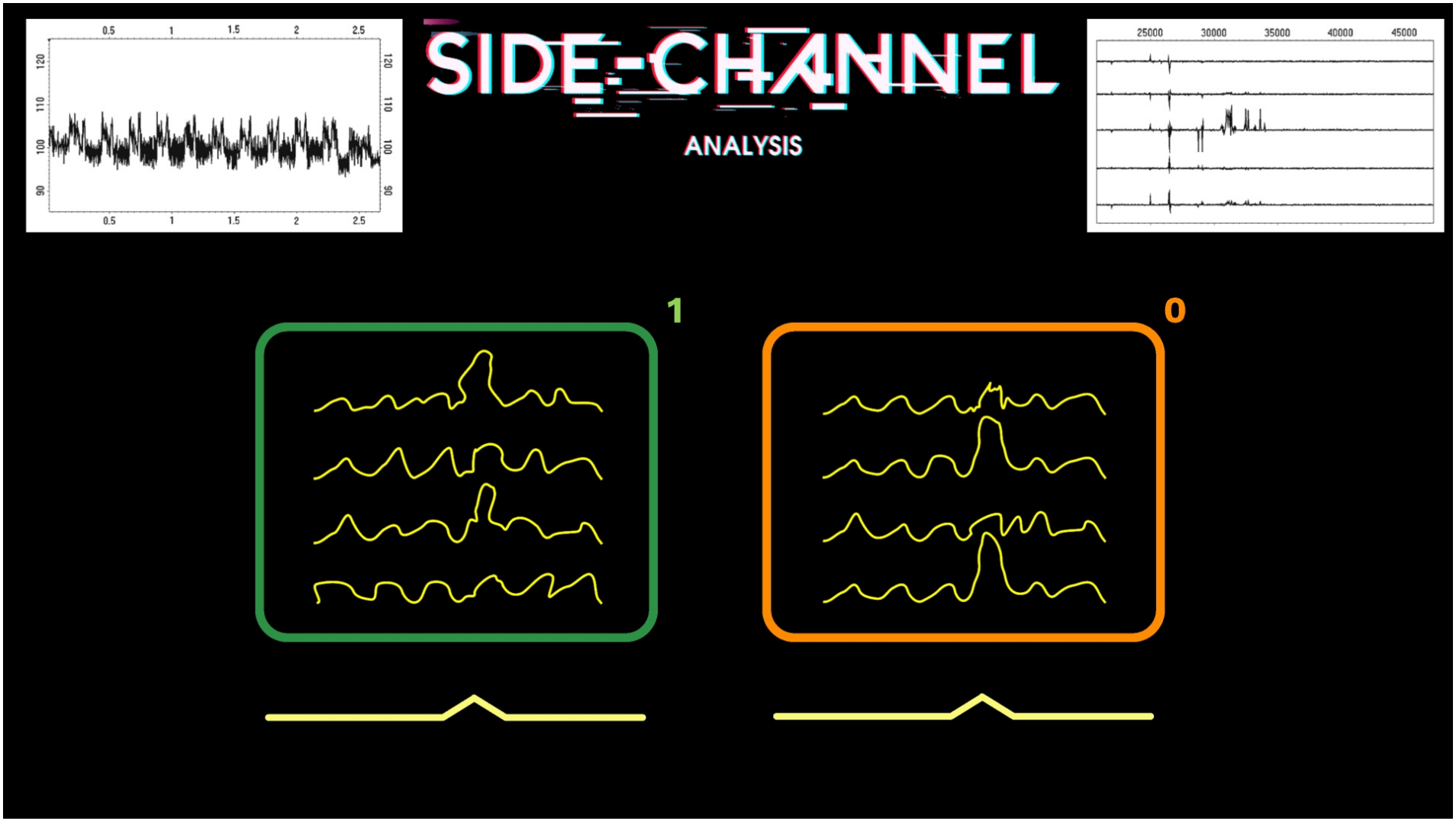
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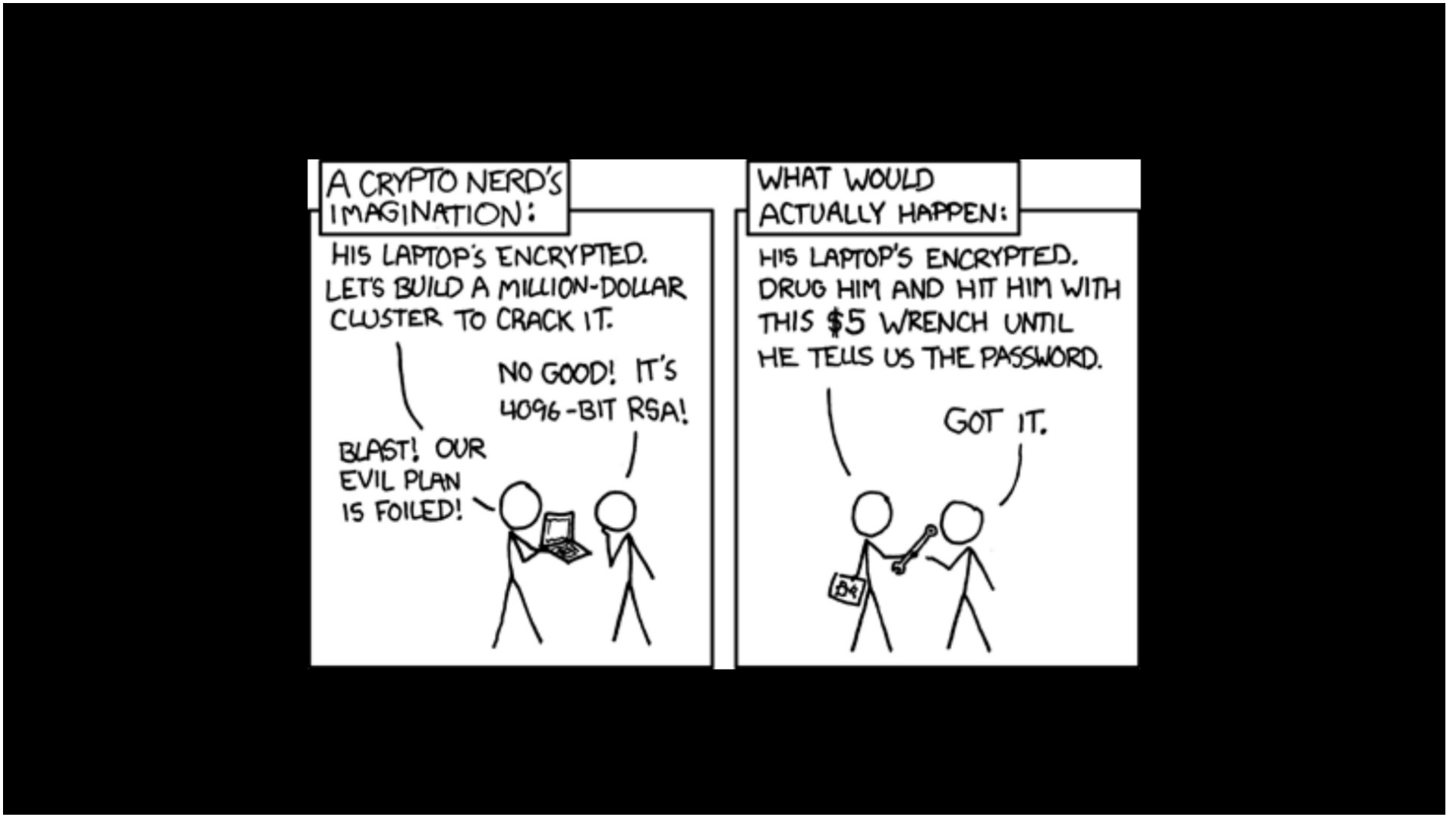
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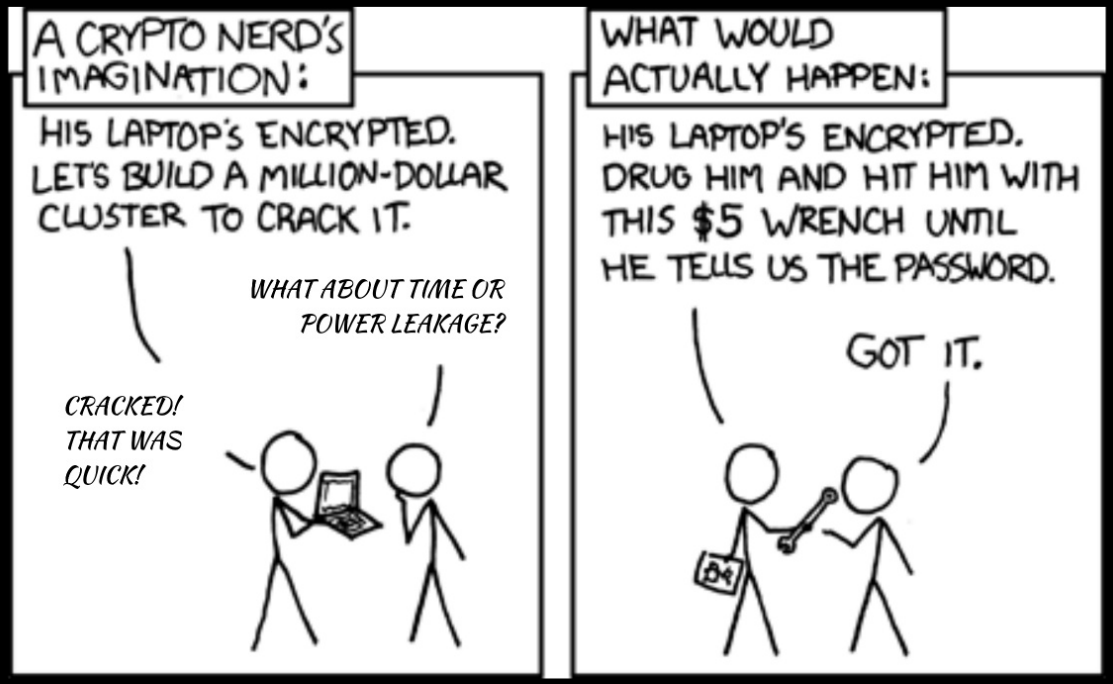
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WHAT ABOUT TIME OR POWER LEAKAGE?
CRACKED! THAT WAS QUICK!
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MARCO MARTINOLI
10 - 05 - 2022

VS

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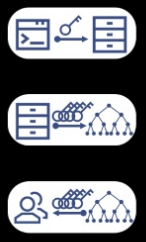

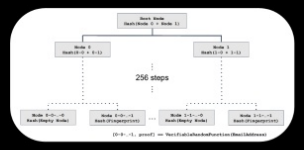

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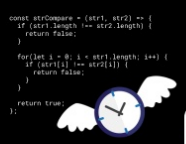
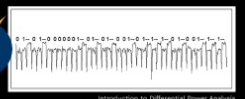
- Root hash published in





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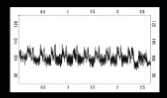
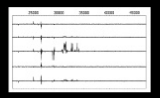
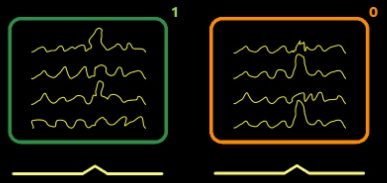


SIDE-CHANNEL
ANALYSIS





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