BunnyHop: Exploiting The Instruction Prefetcher

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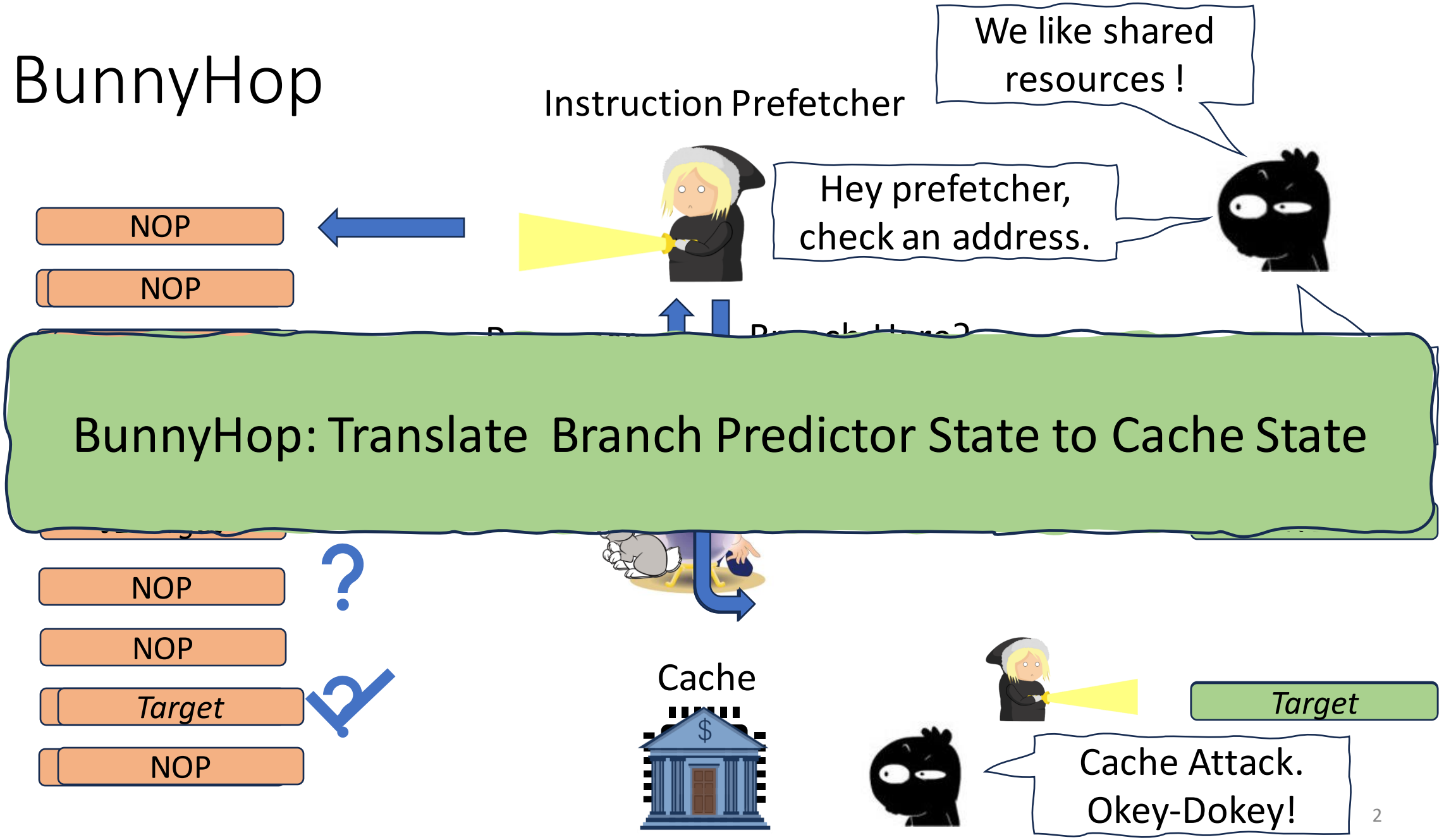
BunnyHop


We like shared resources !
Instruction Prefetcher
Hey prefetcher, check an address.
NOP
NOP
NOP
NOP
Target
NOP
?
BunnyHop: Translate Branch Predictor State to Cache State
Cache
$
Target
Cache Attack. Okey-Dokey!

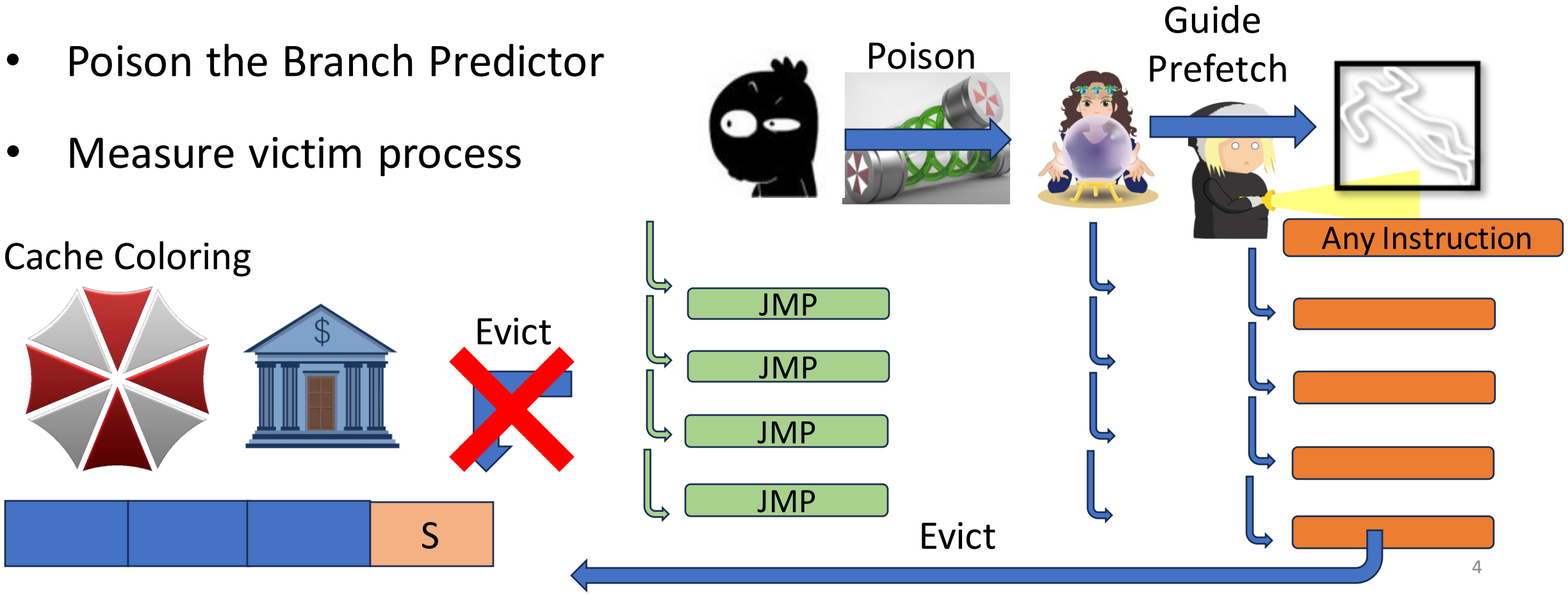
With the Power of BunnyHop

More in the paper!

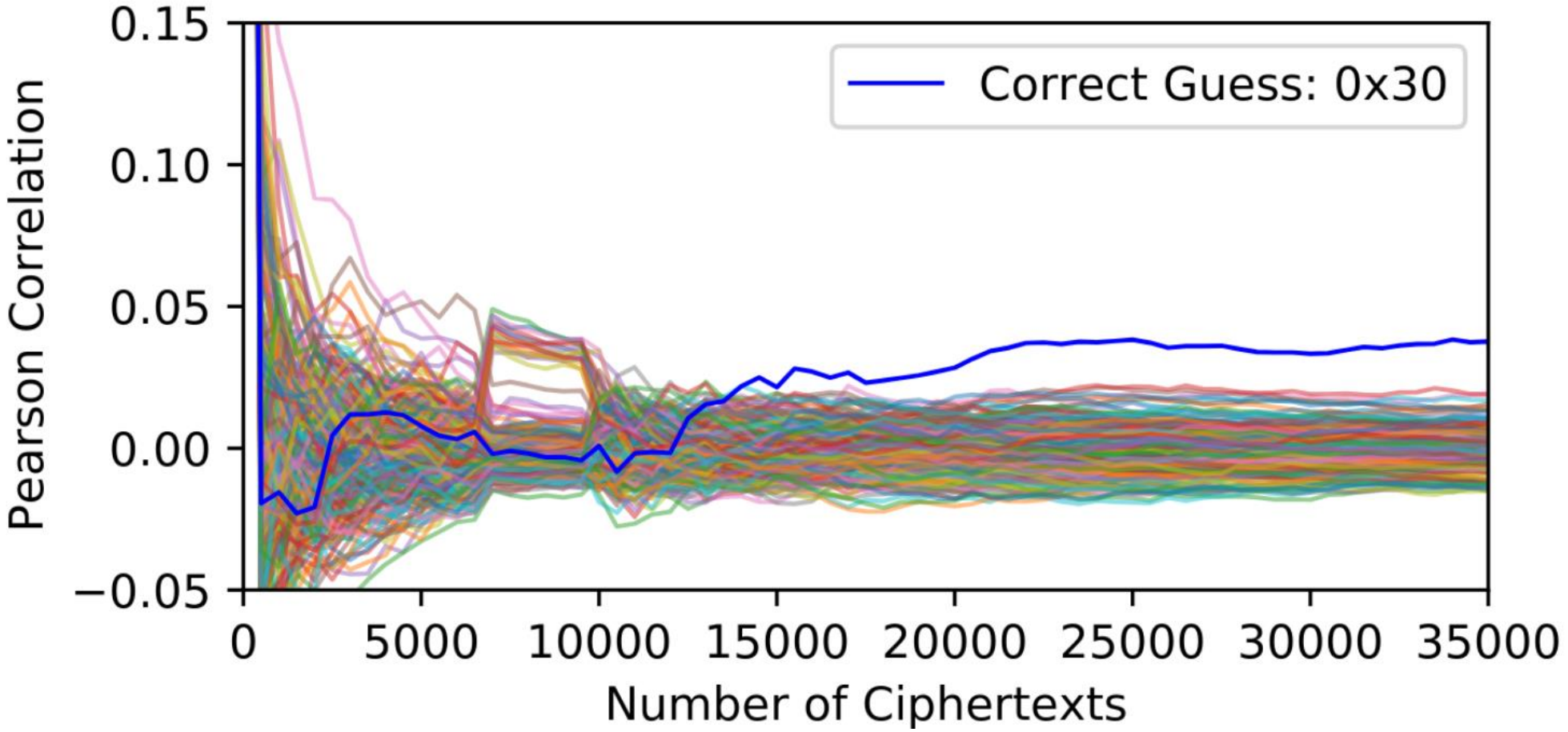
- Reverse Engineer
  - First work on Instruction Prefetcher
  - Branch Target Buffer
    - First work on Replacement Policy
    - First observation of two type branches: Long Branch & Short Branch
- Three Cool Attacks
  - Flush+Reload on Predictor: Learn same thread predictor state
  - Prime+Probe on Predictor: Learn cross-thread predictor state
  - Self-Eviction : Confuse the victim to evict its own data

Self-Eviction: The Resident Evil

- Evict secret-dependent data from cache
- Poison the Branch Predictor
- Measure victim process



Self-Eviction: The case of AES



Summary

- Branch Predictor state can be leaked via cache state
- Reverse Engineer the Instruction Prefetcher
- Reverse Engineer the Branch Target Buffer
- Three attacks on Branch Predictor

Paper

https://github.com/0xADE1A1DE/BunnyHop

Code