SYNACKTIV
DIGITAL SECURITY

With Machoc and Victorious Weapons

Using CFG hashing for the lazy reverser

Présenté le : 13 / 02 / 2020

Pour : Bière Sécu - Lyon

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Introduction

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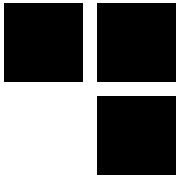
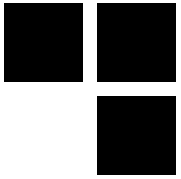




With Machoc

What is Machoc?

- First generation pokemon
- *It can hurl around 100 adult humans before it gets tired*
- Not really the subject of this talk

What REALLY is Machoc?

CFG hashing algorithm

- Original idea by Stefan Le Berre (*Heurs*)
- Designed for helping during malware analysis @ *ANSSI*
- Presented at *SSTIC* in 2016

Objectives

- Fast to calculate
- Resistant to small changes, (recompilation, C&C update, ...)
- *Le reste marche pas, donc on se sort les doigts et on le code*

Control Flow Graph

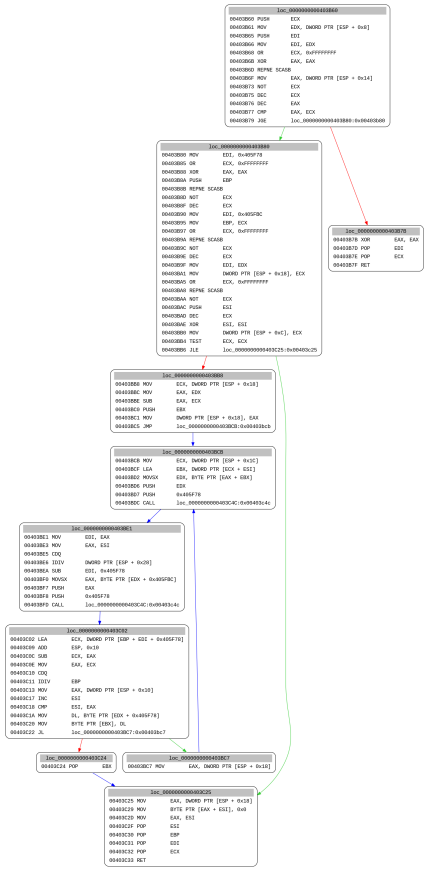


Figure: Typical CFG

Calculation - step 1

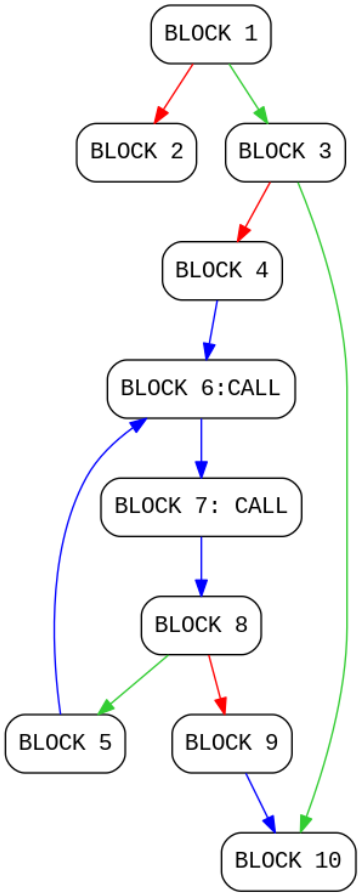


Figure: Simplified CFG

Calculation - step 2

Graph translation

For each block:

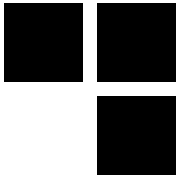
- Number of the block, and destination blocks
- Call instruction
- Example: `1:2,3;` or `7:c,5,9;`

Hashing

- Murmurhash of the graph string

Generalization

- Calculate for each function of the binary
- Concatenation of all tuples (`addr`, `hash`)



and Victorious Weapons

Clusterization

Calculation

- Calculate a jaquard distance between the machoc hashes of two samples
- If > 0.8, it's a match!
- Group samples by links

Identified problems

- Some hashes must be blacklisted (ex: empty functions)
- Some false positives otherwise

Clusterization: APT1 example

Datasets

APT1 archive from *ContagioDump*

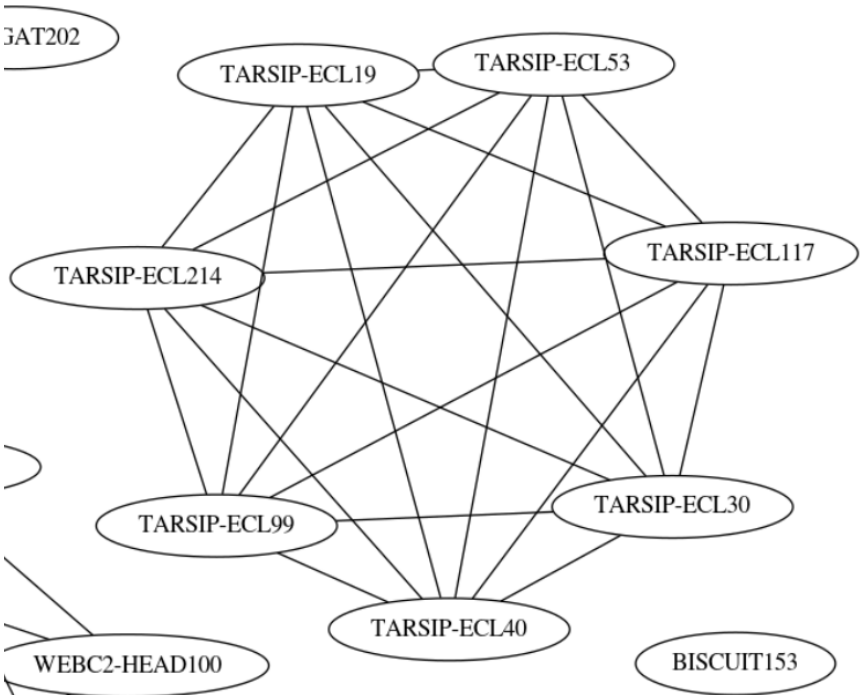


Figure: APT1 Clusterization: TARSIP

Bindiffing

Identifying unchanged functions

- If two functions have the same signature, they are probably the same
- This behavior can also be used as a malware signature (eg unique function, etc)

Identifying changed functions

- Function 1 same hash == unchanged
- Function 2 different hash == changed
- Function 3 same hash == unchanged

=> Function 2 has probably changed

Bindiffing: WEBC2-HEAD

Samples

- One sample fully reversed
- One similar sample not reverse

Results

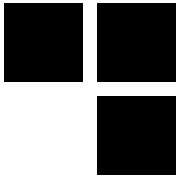
- 3 functions renamed with a direct match
- 3 functions renamed with an indirect matched
- The new sample is almost entirely reversed!

Conclusion

Conclusion

- Machoc is cool
- Can be used in different contexts
- Complementary to other heuristics / tools
- According to twitter, I'm not the only one to use it

Bibliography



- Machoc original article
  `https://www.sstic.org/2016/presentation/demarche_d_analyse_collaborative_de_codes_malveillants/`
- Machoc spec `https://github.com/ANSSI-FR/polichombr/blob/dev/docs/MACHOC_HASH.md`
- Title inspiration
  `https://www.youtube.com/watch?v=IyH0ub0gDbg`
- Possible use case
  `https://googleprojectzero.blogspot.com/2018/12/searching-statically-linked-vulnerable.html`

AVEZ-VOUS DES QUESTIONS?

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