ACCELERATING VIRUS SCANNING WITH GPU

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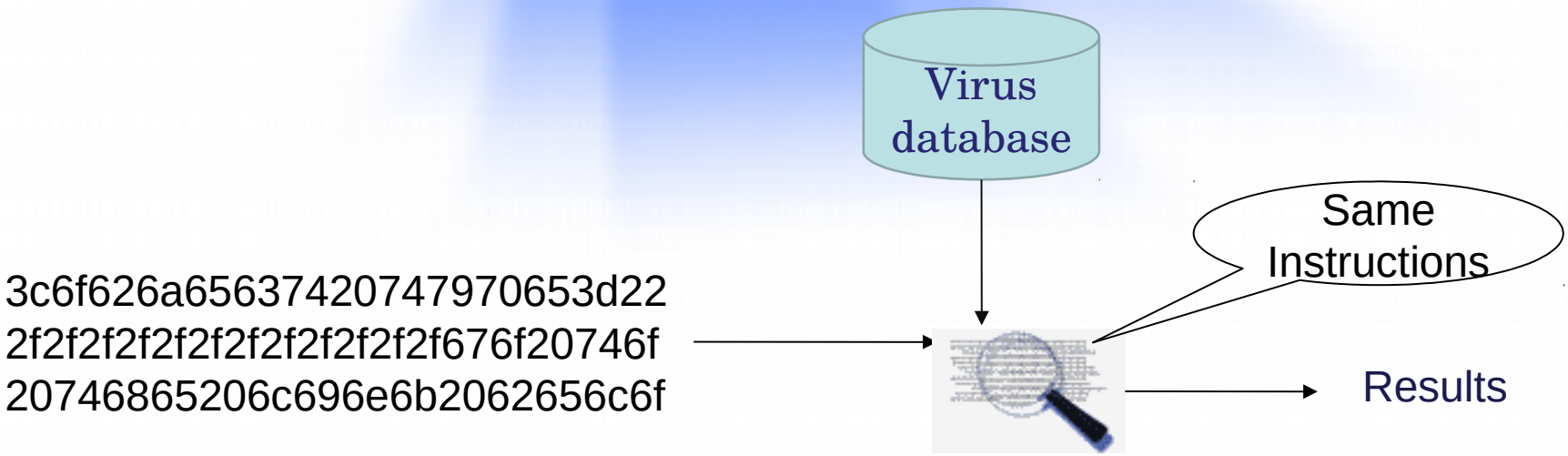
Motivation


Virus database
Same Instructions
3c6f626a6563742074797065 3d22
2f2f2f2f2f2f2f2f2f2f2f2f2f676f20746f
20746865206c696e6b2062656c6f
Results

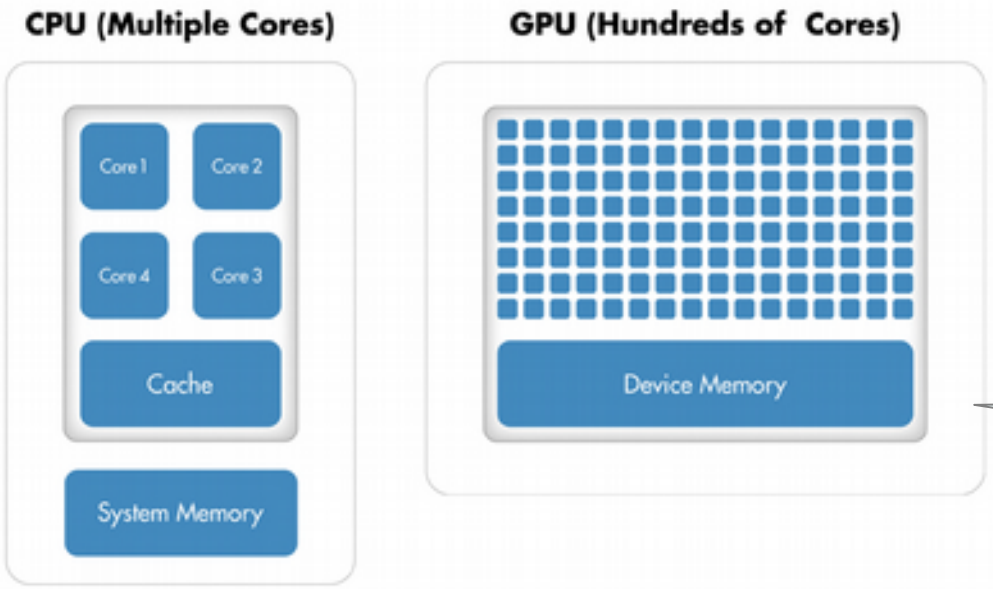

ATTACK VIRUS..?

CPU vs. GPU

Normally scanning in CPU
Speed up scanning through GPU

NVIDIA
CUDA
C/C++

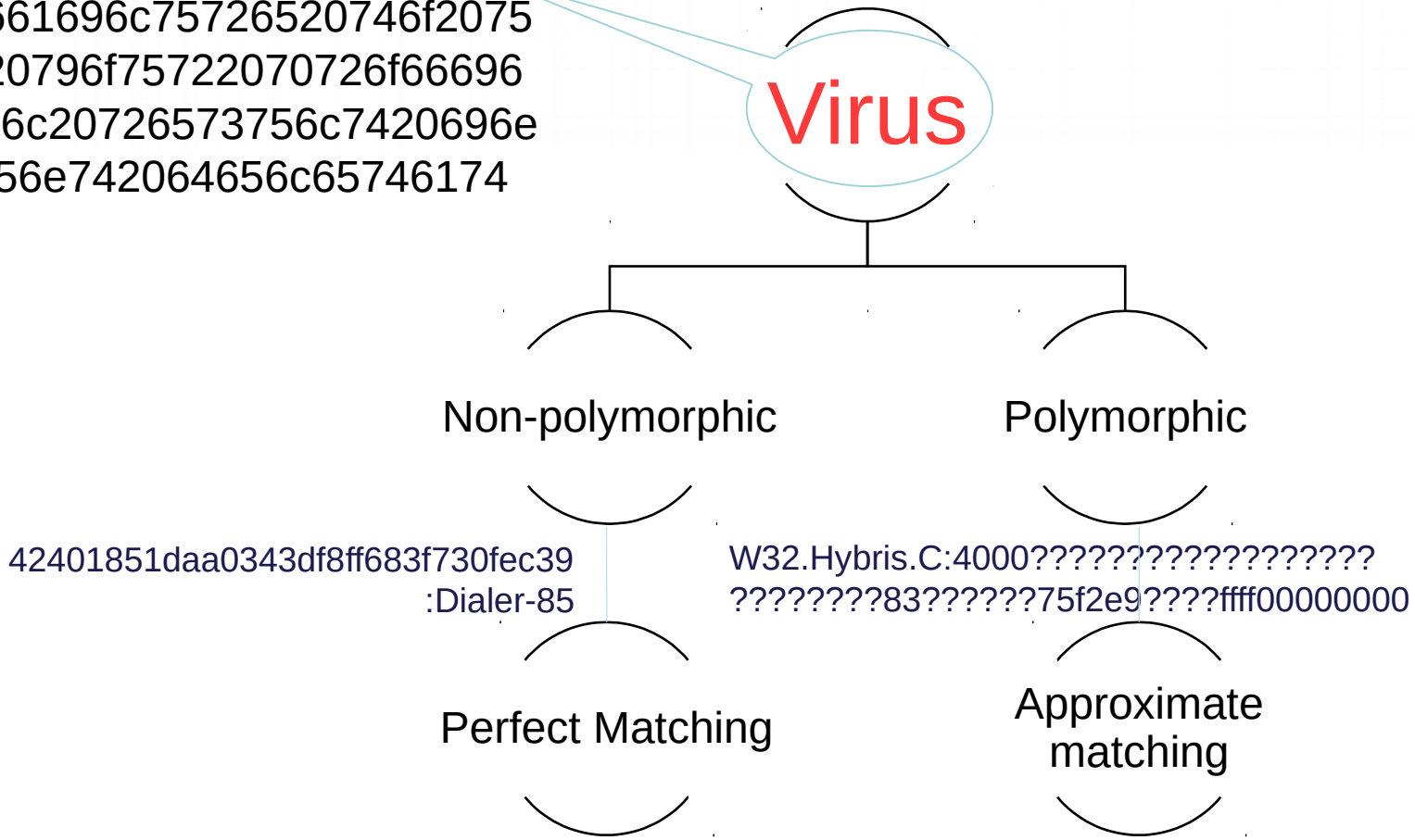
CPU vs GPU



- SIMD Architecture
- Can use for general purpose calculations
- Number of cores is higher than CPU
- Number of threads is higher than CPU

Virus Patterns

3c6f626a6563742074797065 3d222f2f2f
2f2f2f2f2f2f2f2f2f676f20746f2074686520
6c696e6b2062656c6f7720746f2075706
4617465 20796f7572206163636f756e74
20696e6666661696c75726520746f2075
706461746520796f7572207072 6f66696
c652077696c6c20726573756c7420696e
206163636f756e742064656c65746174



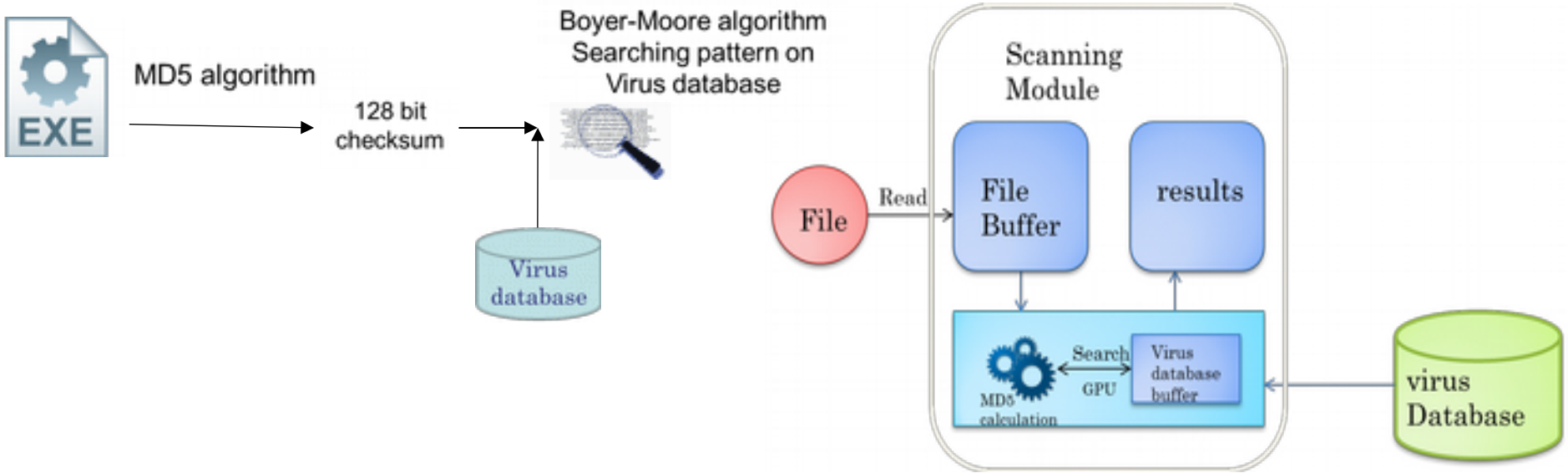
Perfect pattern matching

Non-polymorphic Virus pattern

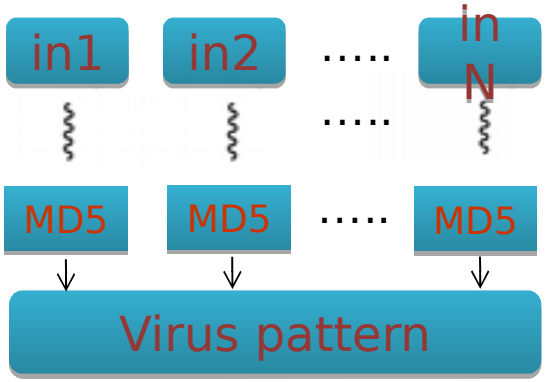
42401851daa0343df8ff683f730fec39

- MD5 Algorithm
- Boyer-Moore Algorithm

Fast string searching Algorithm



Parallelism for Boyer-Moore

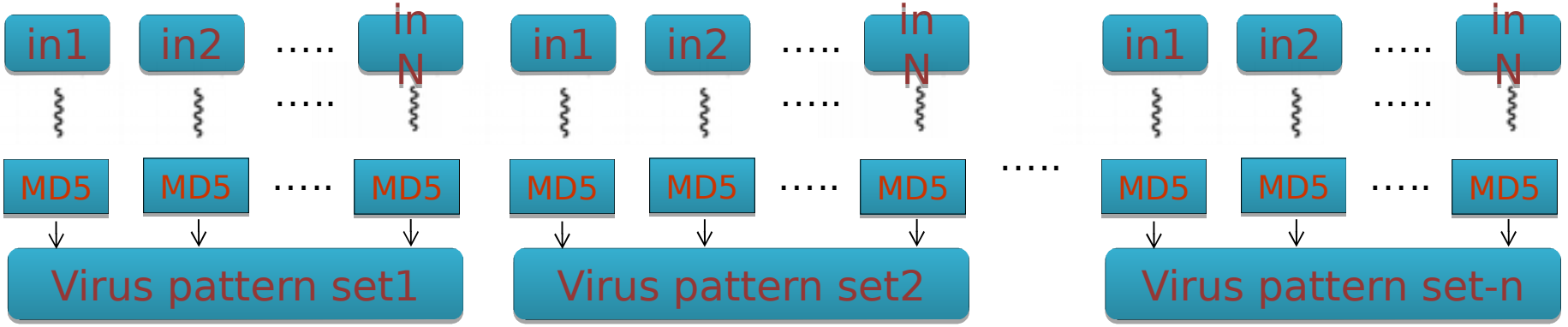


In1 - Input 1

- Thread

MD5 - MD5 Calculation

Method1: Parallelism with number of inputs



Method2: Parallelism with number of inputs + divided pattern sets

Approximate pattern matching

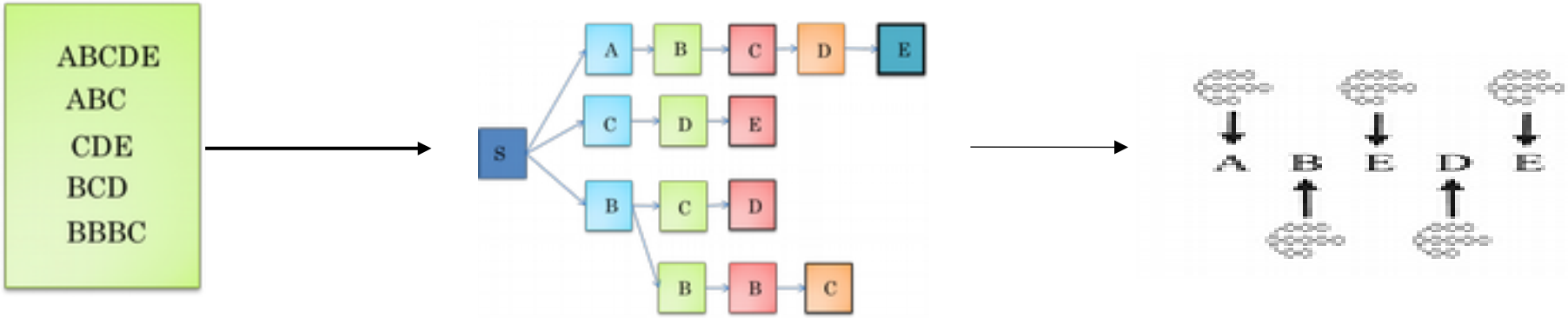
Polymorphic Virus pattern

4000??????????????????????????
83???????75f2e9????ffff00000000

- Aho-Corasick algorithm
- PFAC Library

Aho-Corasick algorithm implemented for GPU

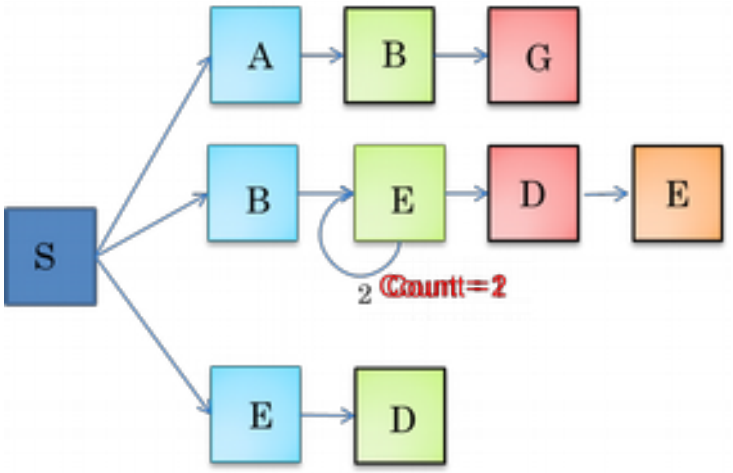
Normally how PFAC works:



Approximate pattern matching

?	Fixed number of Wild character
{-n}	0 – n number of wild characters
{m-n}	m – n number of wild characters

AB
ABG
ED
BE??DE



B E P Q D E

Conclusion

- Implemented Boyer-Moore & MD5 algorithm in CPU & GPU
- Changed PFAC implementation from perfect p attern matching to approximate pattern matchi ng
- Performance analysis for both algorithms is in progress

Thank You