1+1 !=2

in malwaring scanning

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In this presentation

- Potentials and pitfalls of aggregating multiple antimalware products

- Overcoming the pitfalls
  - ✓ Drawing upon our experience (Metascan with 8 ~ 24 AVs)

Metascan/Metascan-Online

OPSWAT

- Metascan

AVG eset Quick Heal VirusBuster

GFI ca CLAMWIN NORMAN

- Metascan-Online

F-PROT Emsisoft

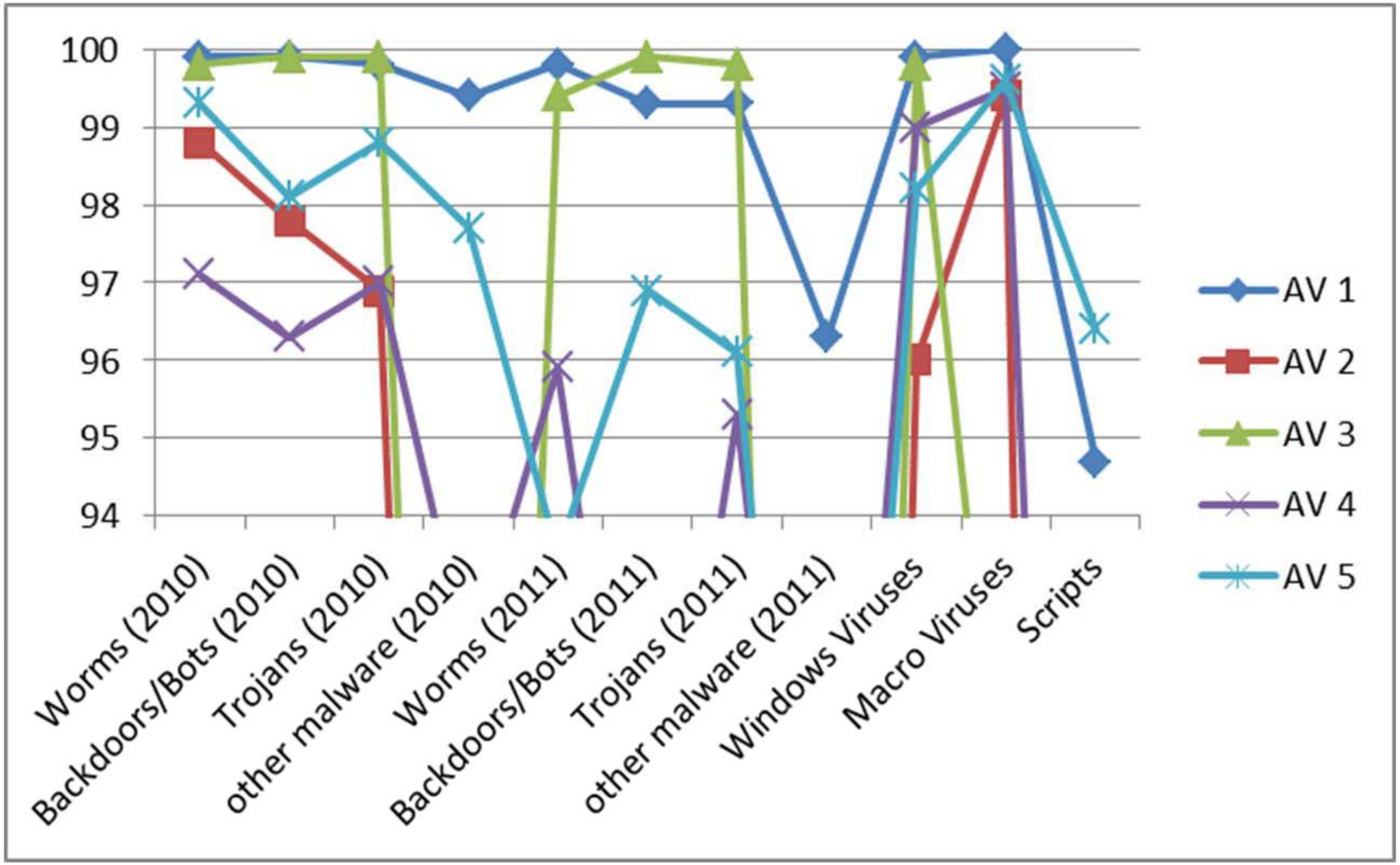
SOPHOS Symantec. FORTINET

KINGSOFT avast! BULLGUARD

McAfee F-Secure

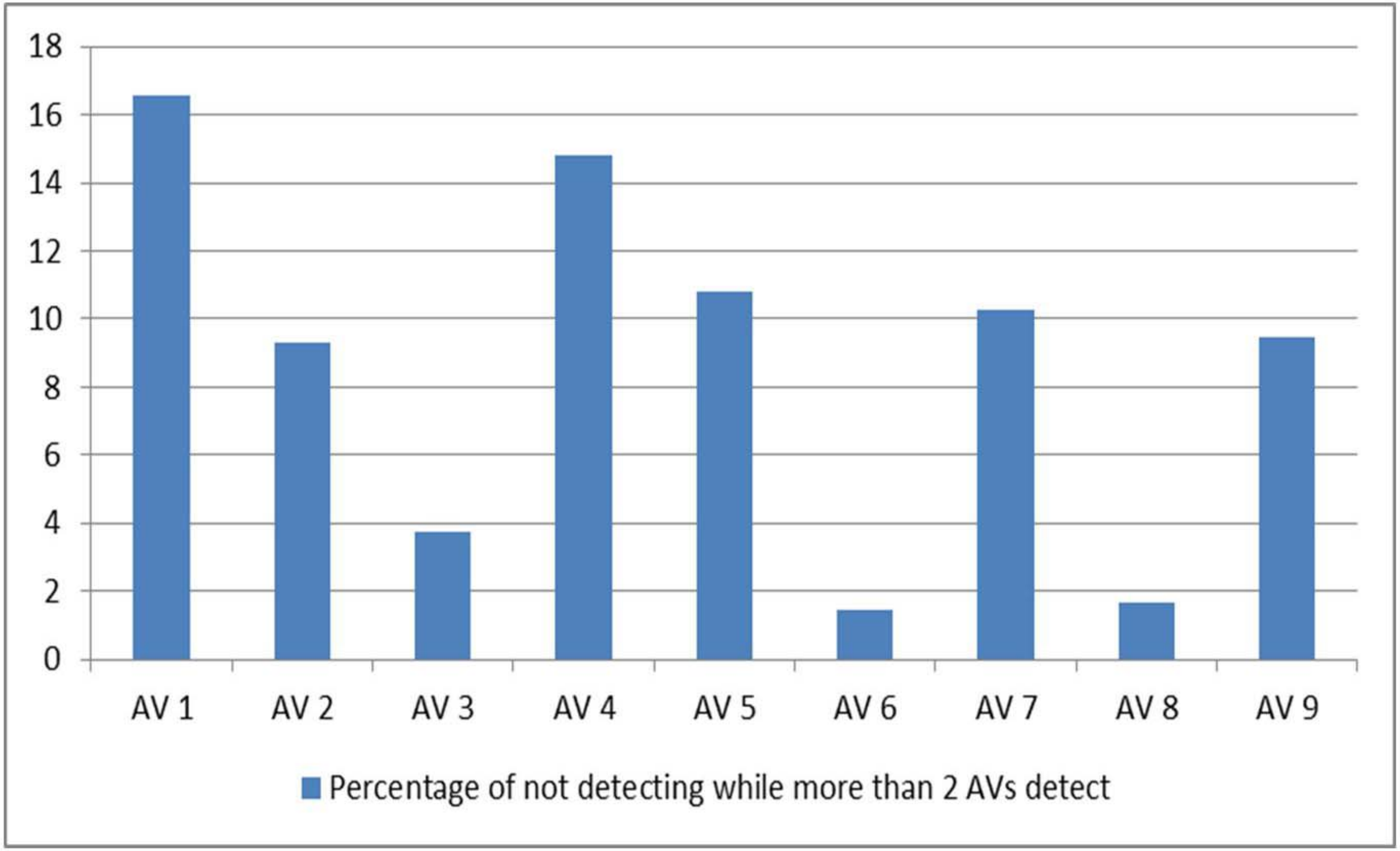
Why Multi-scanning

No AV shows 100% detection



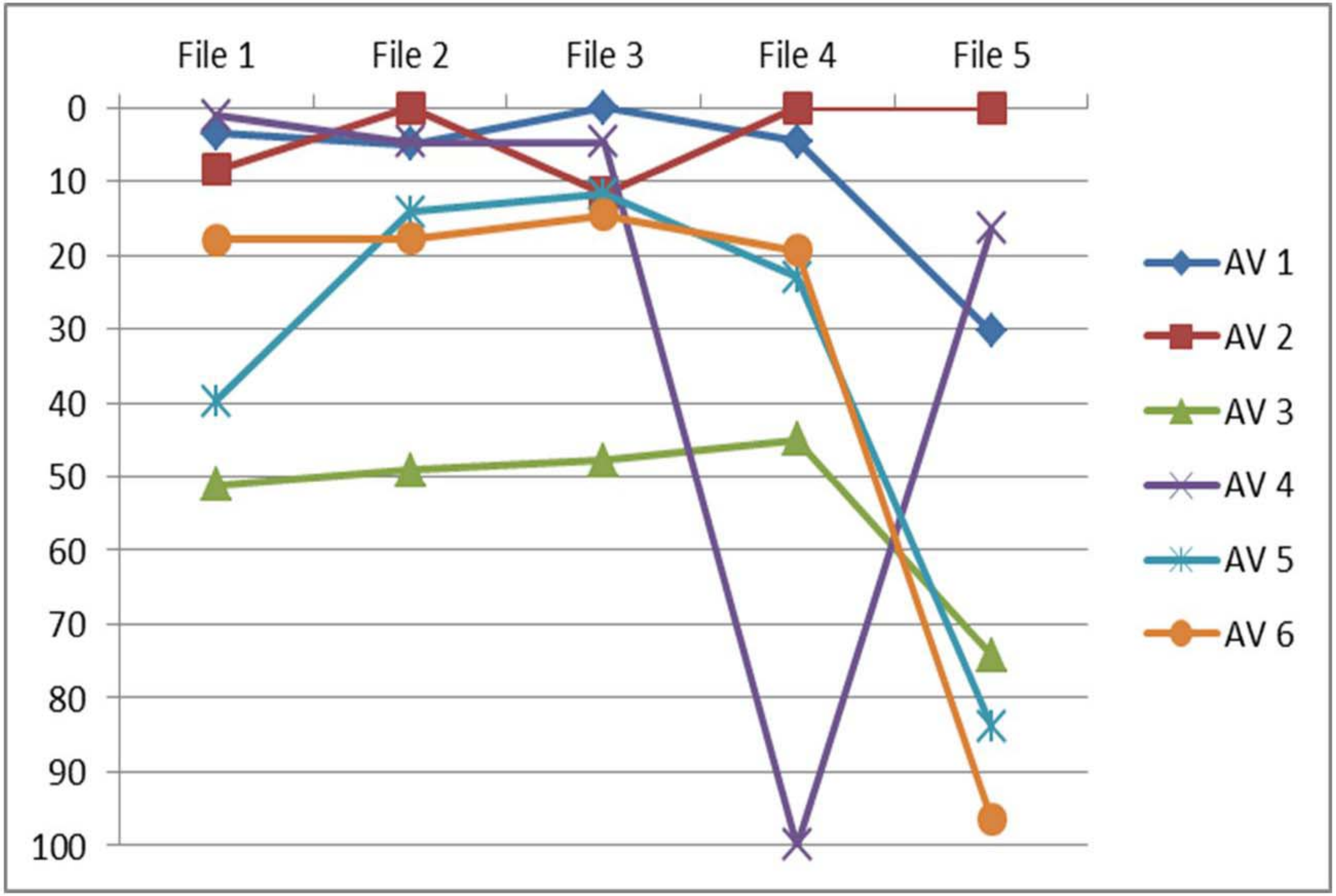
On demand test results from AV comparatives
from the 2010 August test and 2011 February test.

Threats missed by one may be found by others



Y axis is percentages of missing detections
while 3 or more AVs among 9 AVs reports as threats.

Various response times to outbreak



Comparison of response time to outbreak with selected AVs, AV-Test.org.
Y-axis represents delay time in hours.

Suspicious

Detection ratio

- Heuristic scan increases detection rates

  but also increases false positive

  No easy way to determine false positive

- No more black and white

  Detection ratio (decision making factor)

  www.metascan-online.com

  www.virustotal.com

  virusscan.jotti.org

Fallback/Redundancy

- Software failure in race condition

- Disable temporary proactively

  (e.g., catastrophic update)

- During the regular maintenance of AV such as upgrade

Overcoming Challenge

1+1!=2

Challenge

Downside of more AVs

- Scanning time

  1+1 > 2

- Potential failure due to an exploit

  1+1=2

- False positive

  1+1=2

Combining downside of AVs:

1+1 >= 2

Performance optimization

Strategies to discuss

- Avoid redundant pre-scanning tasks
  - Decompressing data
- Reduce scanning needs
  - Filtering based on file type
- Avoid redundant scanning
  - Caching scan results

Performance optimization

Utilizing File Type Analysis

- Detecting archive file
- Filtering based on file types

  Accept/Reject specific file types
- Multiple algorithms for file type analysis

  E.g., Linux File, TrID

Performance optimization

Pre-processing Archive File

- Remember
  - Extracting archive files is very expensive

- Improve detection rate of AV

- Consider
  - Multiple archive libraries
  - Handling bad archive files such as archive bomb
    - recursion level, file size, and file ratio

Caching

carefully

- Remove redundant scanning

  same data is usually seen over and over

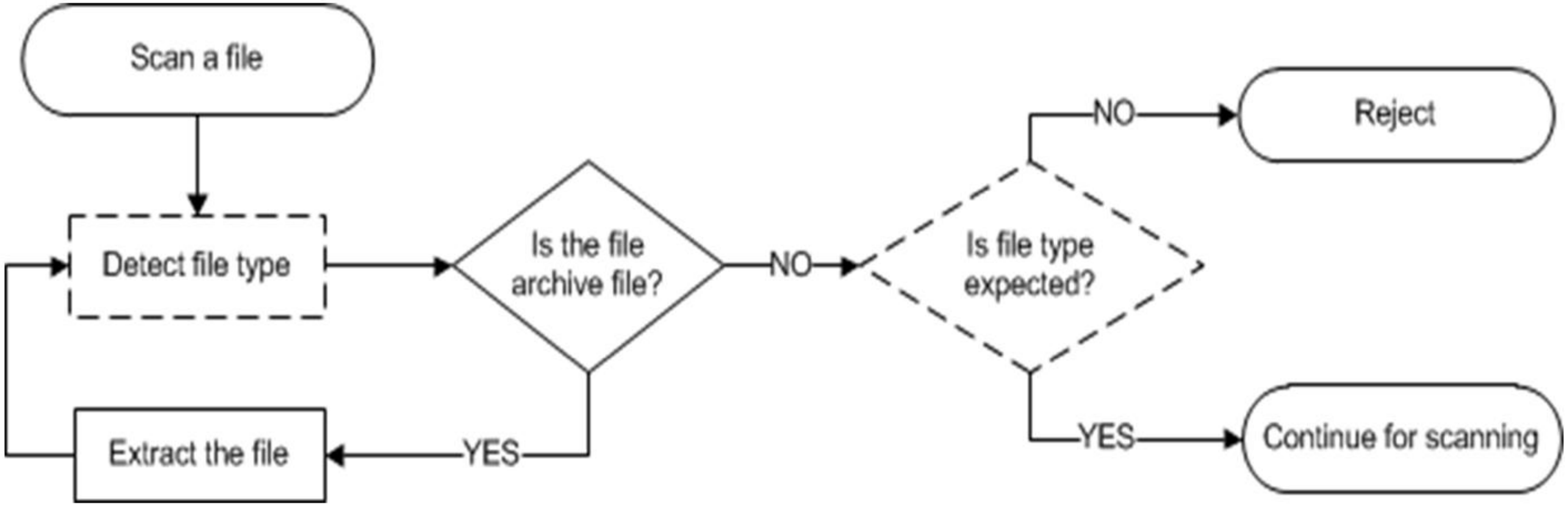
- To consider

  Rescan on demand to override cache

  Reset on update of definition database

Summary of performance optimization

For Example



Overcoming Challenge

Downside of more AVs

- Scanning time

  1+1 < 1

- Potential failure due to an exploit

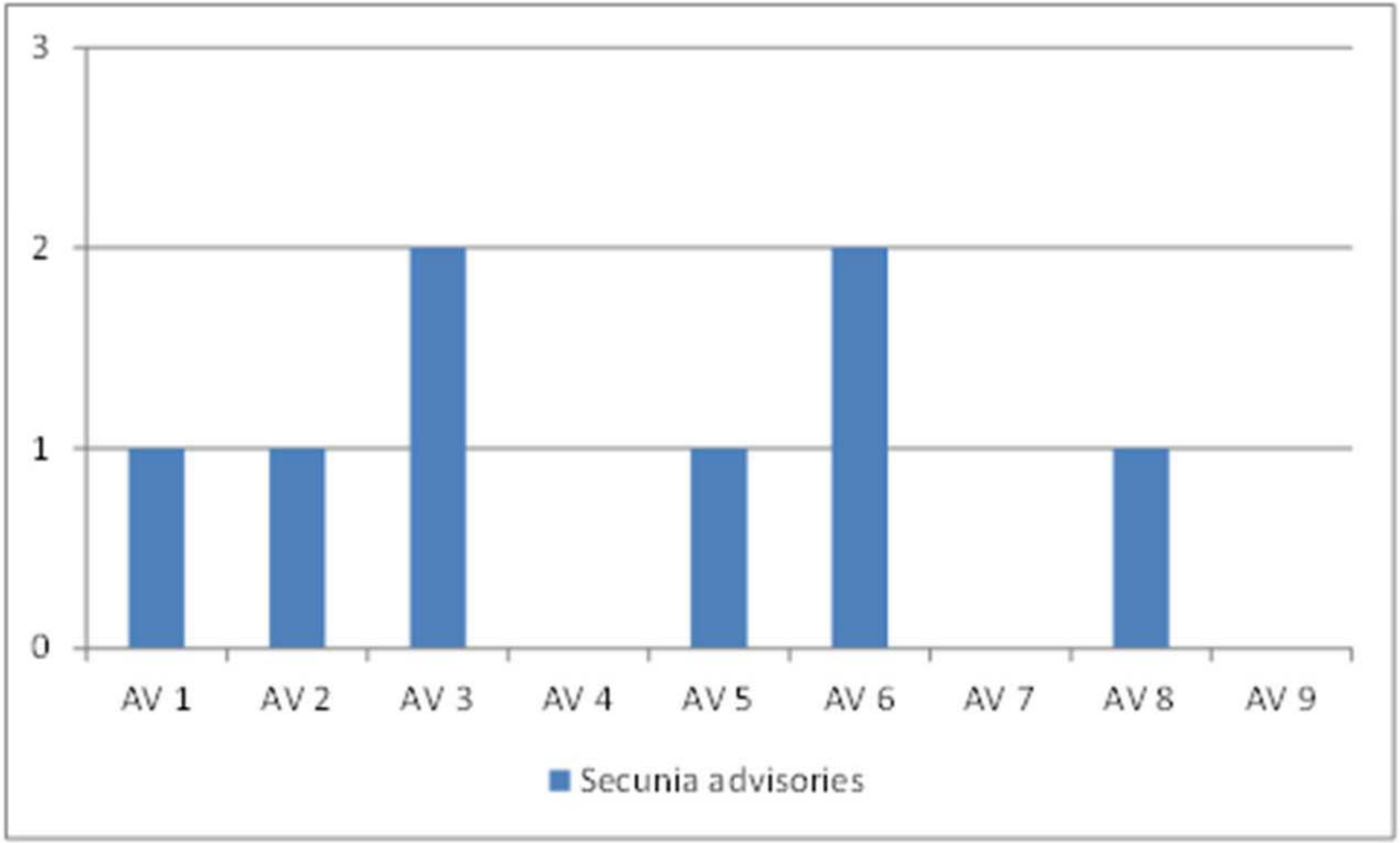
  1+1 = 2

- False positive

  1+1 = 2

Software vulnerabilities

For 9 Advanced+ AVs



Number of secunia advisories on the selected AVs.

Robust integration

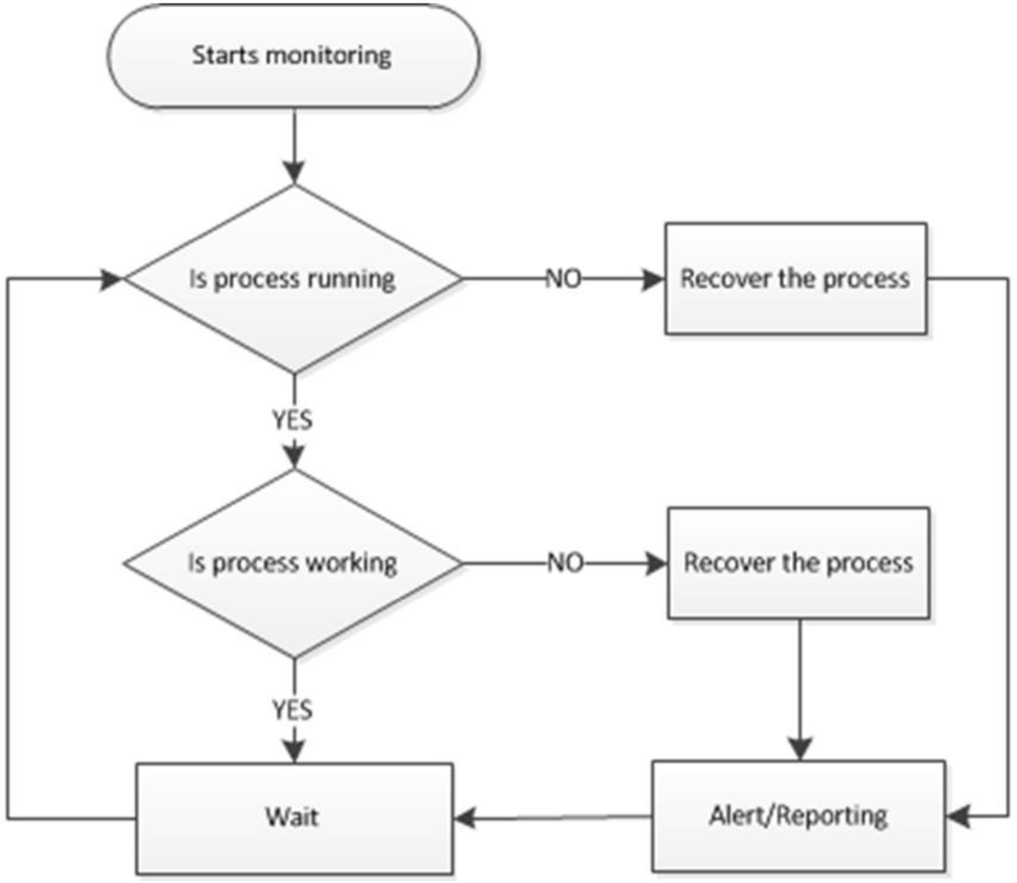
Resiliency from minimizing impact

- What we can do?
  - ✓ Minimize the impact of AV/components failure
- Multi-process (with Inter-Process Communication)

  E.g, web browser technology
- Handle DoS vulnerability
  - ✓ Timeout for scanning
  - ✓ RAMDISK

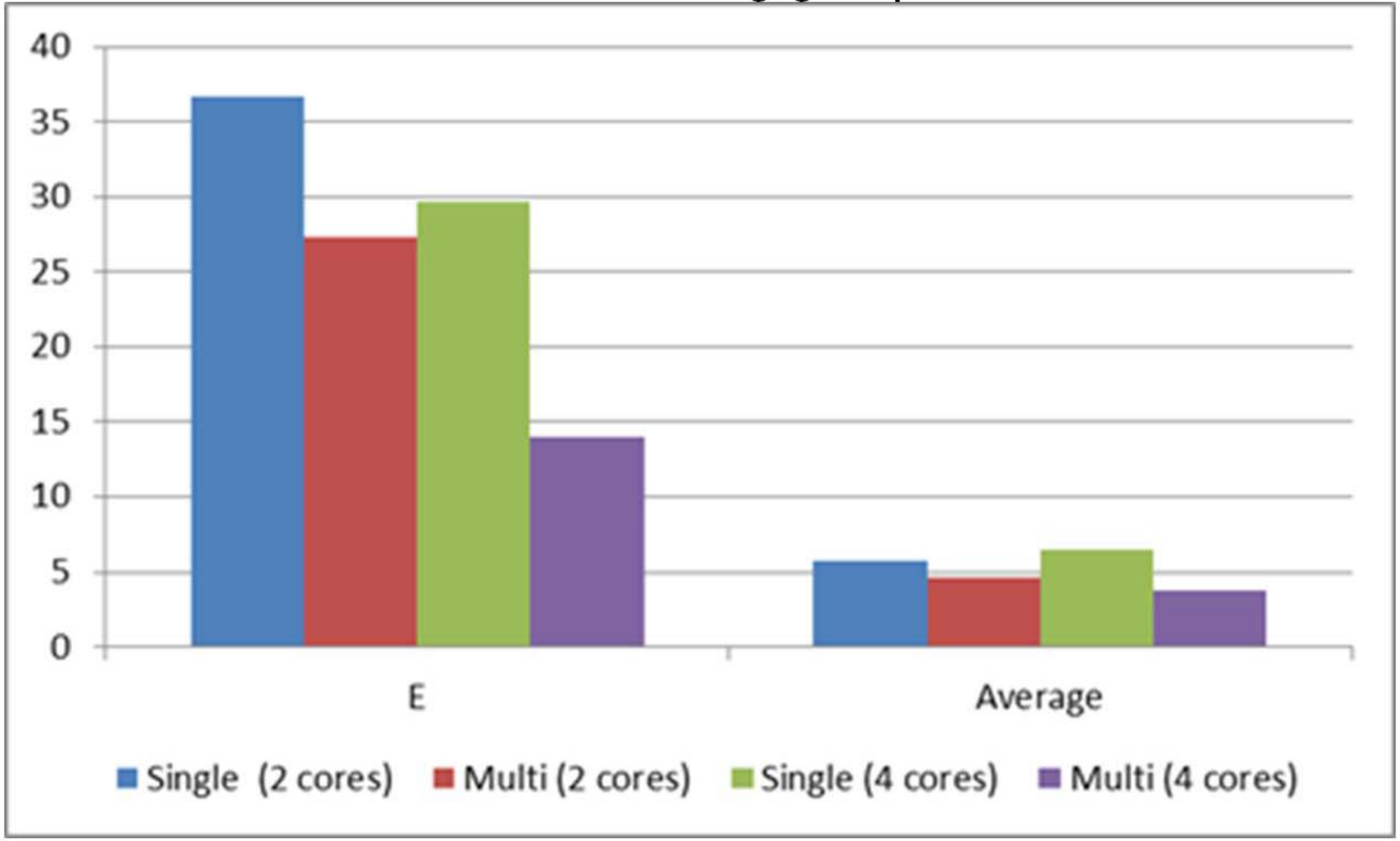
Robust integration

Watchdog



Robust integration

Negligible performance overhead or better



Comparison of scanning speeds between single process-based solution (marked as Single) and multi-process-based solutions (marked as Multi) for executables(marked as E) and 3788 files without differenciating the file types.

Overcoming Challenge

Downside of more AVs

- Scanning time

  $1+1 < 1$

- Potential failure due to an exploit

  $1+1 < 1$

- False positive

  $1+1 = 2$

Detecting False Positive

Not simple but possible

- No logical OR operation of the scan results

  Utilizing detection ratio

  (e.g., label data as “suspicious” if lower than 25%)

- Integration with comprehensive analysis tools such as sandbox solution.

- Further Manual inspection

- More AVs means

  higher confidence level based on detection ratio

Overcoming Challenge

Downside of more AVs

- Scanning time

  $1+1 < 1$

- Potential failure due to an exploit

  $1+1 < 1$

- False positive

  $1+1 < 1$

Combining downside of AVs:

$$1+1 < 1$$

Acknowledgement

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QnA

For any question or feedback,
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