

Transparency report

Examining the AV-TEST May-June 2018 results

Prepared by

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1 Introduction

In [AV-TEST's May-June 2018](#) testing cycle, [Windows Defender Antivirus](#) achieved perfect scores (6.0/6.0) in both Protection and Usability tests and maintained its previous score (5.5/6.0) in the Performance test. This report presents more details on test scores, with commentary for context and transparency.

1.1 Key takeaways

Below is a summary of this report:

- 1 Protection:** Windows Defender AV achieved an overall Protection score of 6.0/6.0, detecting 100% of 5,790 malware samples. With the latest results, Windows Defender AV has achieved 100% on 10 of the 12 most recent antivirus tests (combined "Real World" and "Prevalent malware"). [Learn More](#)
- 2 Usability (false positives):** Windows Defender AV achieved a Usability score of 6.0/6.0, an improvement from its previous score of 5.5/6.0. Based on telemetry, the two samples that were incorrectly classified as malware (false positive) had very low prevalence and are not commonly used in business context. This means that it's unlikely for these false positives to affect enterprise customers. [Learn More](#)
- 3 Performance:** Windows Defender AV maintained its previous score of 5.5/6.0 and continued to outperform the industry in most areas. These results reflect the investments we put in optimizing performance for high-frequency actions. [Learn More](#)

2 Dissecting test results

2.1 Summary of overall scores

The table below summarizes overall test results for Windows Defender AV in the May-June 2018 testing by AV-TEST:

	Protection	Usability	Performance
Overall score for this cycle >>>	6.0/6.0 (+0.5)	6.0/6.0 (+0.5)	5.5/6.0 (±0)

Table 1. Windows Defender AV's overall test results in the [May-June 2018 AV-TEST Business User test](#). AV-TEST uses [Protection](#), and [Usability](#), and [Performance](#) test modules.

2.2 Understanding Protection scores

Below are details of Protection scores in the May-June 2018 testing cycle:

	May	June
"Real World" testing	100% (105/105)	100% (120/120)
"Prevalent malware" testing	100% (2,485/2,485)	100% (3,080/3,080)
Overall malware protection rate (all samples)	100% (5,790/ 5,790)	
Overall Protection score for this cycle >>>	6.0/6.0 (+0.5)	
Overall Protection ranking for this cycle >>	1 st out of 16 (tied with 10 more)	

Table 2. Summary of [Protection](#) scores for the May-June 2018 Business User test

The diagrams below show Windows Defender AV detection rates in "Prevalent malware" and "Real World" testing over a one-year period:

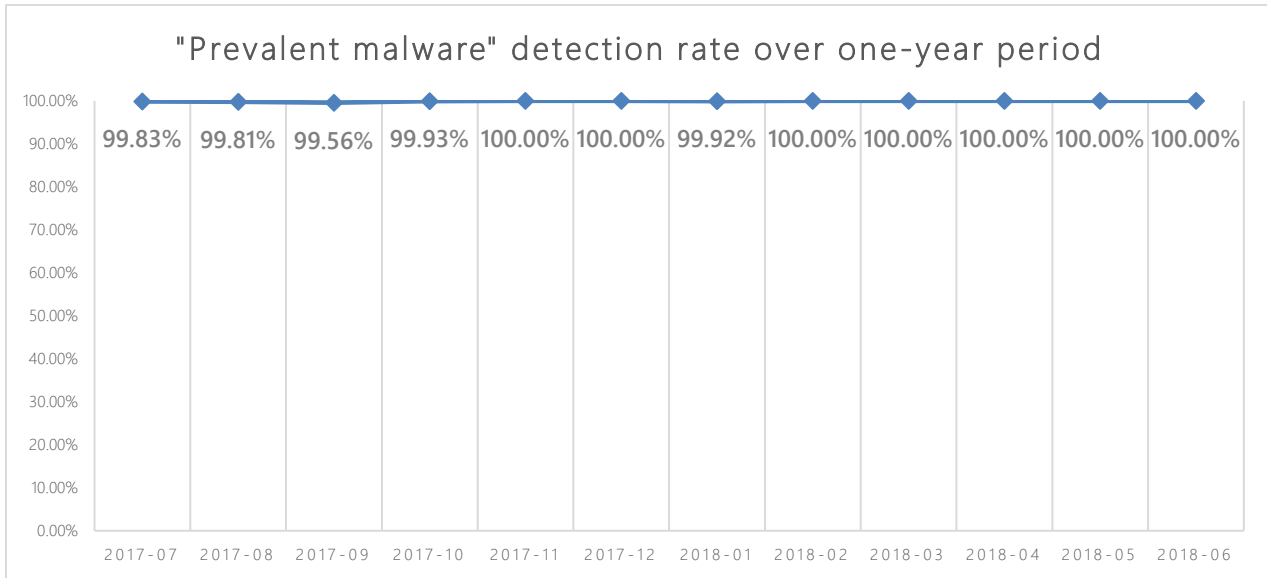


Figure 1. Windows Defender AV detection rates in AV-TEST "Prevalent malware" tests over a one-year period

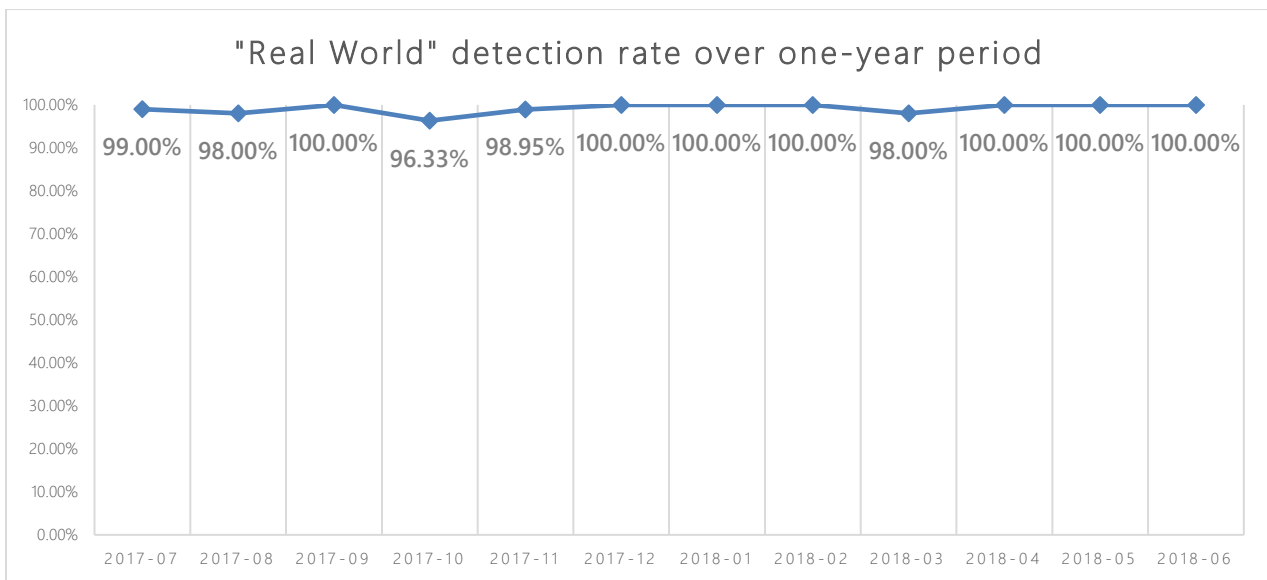


Figure 2. Windows Defender AV detection rates in AV-TEST "Real World" tests over a one-year period

2.3 Understanding Usability scores

In Usability tests, AV-TEST includes clean file samples in the test population and checks whether antivirus products incorrectly classify them as malware (what is known as false positive, or FP). Below is a summary of results in the Usability test:

	May	June
Number of misclassified files	1 (out of 764,980 samples)	1 (out of 901,982 samples)
Overall Usability score for this cycle >>>	6.0/6.0 (+0.5)	
Overall Usability ranking for this cycle >>>	1 st out of 16 (tied with 7 more)	

Table 3. Summary of [Usability test](#) scores for the May-June 2018 Business User test

2.3.1 Analysis: What kinds of files were misclassified?

Below is a list of files that Windows Defender AV misclassified in this test cycle. Based on our research and file prevalence data, the misclassified samples are not common in enterprise environments.

Sample	File prevalence (30 days)	Description	Digitally signed? (Y/N)
Sample a	547	Hosts file editor	N
Sample b	2	Game setup	N

Table 4. Files that Windows Defender AV incorrectly classified as malware

Microsoft encourages software vendors to take [steps to raise the level of trust](#) both by security vendors and users alike. These steps include signing software with certificates issued by reputable Certification Authorities.

2.3.2 The synthetic nature of Usability tests

Misclassifications in a synthetic test are not necessarily indicative of false positives in real-world scenarios. This is true when the test methodology discounts contextual elements that Windows Defender AV uses for issuing a verdict. For example, when a file is tested, it is not downloaded from the vendor website. Both the original file name and the download site are contextual information that are removed in tests. We've seen many cases where a customer in the real world downloads a clean program from the vendor site without encountering any erroneous detection. However, when a tester gives the file a seemingly random name (e.g., its SHA-256 hash), removes the mark of the web, and doesn't download the file from the vendor website, some of our more aggressive machine learning models issue blocks that don't occur in the real world.

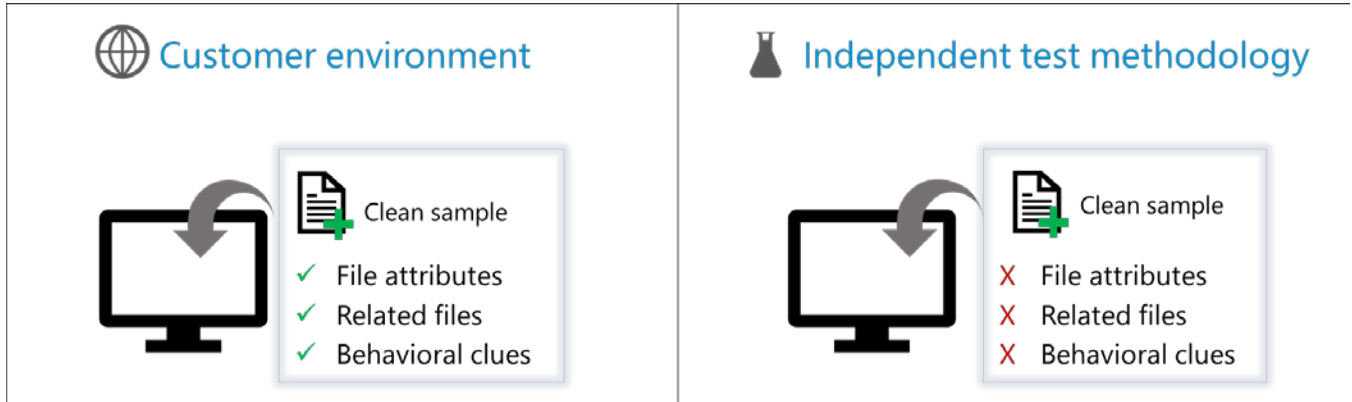


Figure 3. In some cases, samples are incorrectly classified (false positive) in the synthetic test environment but not on customer machines.

2.3.3 Criteria for evaluating files may vary across vendors and testers

The criteria for classification can vary between antivirus vendors and testers depending on their policies. Some files identified as clean by some vendors could be files that Windows Defender AV identifies as potentially unwanted application (PUA) and thus would be blocked. Microsoft’s policy aims to protect customers against malicious software while minimizing the restrictions on developers. The diagram below demonstrates the high-level [evaluation criteria](#) Microsoft uses for classifying samples:

- Malicious software: Performs malicious actions on a computer.
- Unwanted software: Exhibits the behavior of adware, browser modifier, misleading, monitoring tool, or software bundler
- Potentially unwanted application (PUA): Exhibits behaviors that degrade the Windows experience
- Clean: We trust that the file is not malicious, is not inappropriate for an enterprise environment, and does not degrade the Windows experience

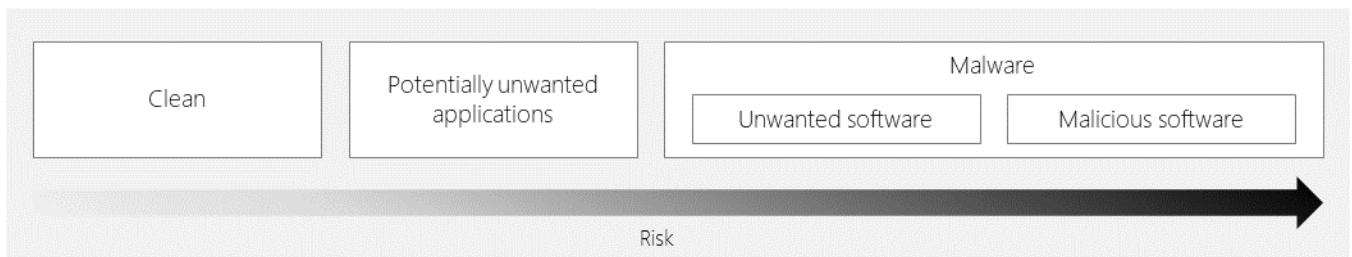


Figure 4. Microsoft's high-level sample classification criteria

2.4 Understanding Performance scores

Performance tests measure the effect of certain user actions, which are executed as part of the test, on system speed. The table below summarizes Performance test results in the May-June cycle:

May-June	
Performance test score for this cycle	5.5/6.0 (± 0) \leftrightarrow
Performance ranking for this cycle	9/16 (tied with 2 more vendors)

Table 5. [Performance test](#) results for Windows Defender AV for the May-June cycle

The table below presents the details of performance test results compared to industry averages. Performance is measured by the average impact of the product on computer speed. Therefore, a smaller number is favorable. Green boxes indicate areas where Windows Defender AV performed better than the industry average; red boxes indicate lower than the industry average.

Action	Standard PC	Industry average	High-end PC	Industry average
Launching popular websites	11%	17%	7%	13%
Downloading frequently used applications*	0%	1%	0%	1%
Launching standard software applications	8%	13%	13%	13%
Installation of frequently used applications	45%	30%	37%	27%
Copying of files (locally and in a network)	3%	4%	2%	8%

Table 6. Average impact of the product on computer speed in daily usage

*The description for these operations is given by AV-TEST and might not be aligned with what Microsoft's data indicates as realistic.

2.4.1 Areas that matter most to customers

Based on results presented in Table 6, Windows Defender AV outperformed the industry average in most areas. The only area where performance is below the industry average is in *Installation of frequently used applications*.

There are several factors to consider for driving the right conclusion out of these test results:

- Consider the frequency of the action**
 Most users in enterprise environments are information workers whose common user activities include:

- Browsing the web
- Using email clients
- Processing documents
- Accessing network resources

Users spend substantially less time installing new applications compared to the activities listed above. This is true for all user segments, but especially for enterprises, where software installation is usually governed by usage policies. Windows Defender AV is optimized for delivering high levels of performance during high-frequency actions. For example, *Installation of frequently used applications* (a low-frequency action) is the only area where Windows Defender AV scored lower than the industry average. Performance is a priority area for the Windows Defender AV team, and we're working to improve it even further.

- **Consider the level of risk**

Windows Defender AV is designed to perform thorough scanning during the software installation process. This could have a performance cost. One reason for this is that software installation is a relatively complex operation that touches different areas of the operating system. Thorough inspection is necessary to reduce the risk of introducing malicious software on the system.

- **What impactful areas are not being tested?**

There are several areas that are not being tested for performance by AV-TEST that are critical to user experience. Examples include:

- Shutdown and startup
- Universal Windows app launch
- Battery consumption