



SKD Labs Test Report

4th Quarter 2014

**A Comparative Test on
Anti-Malware Products in the
China Region**



SKD Labs

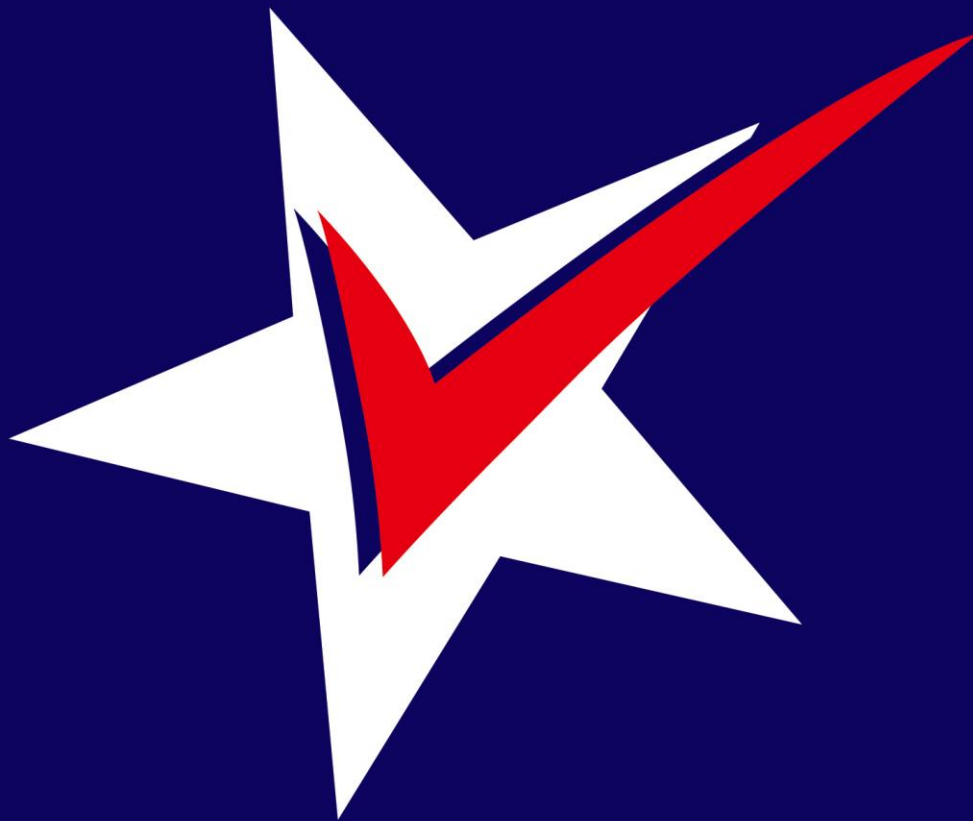
SKD Labs is a leading independent testing facility in the China market and specializes in functionality testing, performance validation and certification of information security products and services. It develops and implements the highest testing standards to ensure maximum product effectiveness in functionality and performance. As West Coast Labs (China), SKD Labs' independent testing and technical consultancy services benefit information security products to gain market advantage and to compete with established brands not only in China but also throughout markets worldwide. Through its conferences, seminars, and information publishing activities, SKD Labs develops awareness among users of security products – both consumers and business users – of the threats to information security and the products available to deal with those threats. Its Starcheck certification has been widely recognized by networking and information security industry, business and home users in the China market.

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1 Introduction

Research has shown that the spread and effectiveness of malware have become more and more dependent on language and cultural factors. Regionalization of malware ecosystem has become a trend. The need for regionalized testing to accommodate the unique needs of specific geographies has been growing. SKD Labs – West Coast Labs (China) recently carried out a comprehensive test on anti-malware products (Chinese edition) on Windows 8.1 (Chinese edition). The previous tests were conducted on Windows 7 and Windows 8.

2 Significance of the Test

- Evaluate performance of anti-malware products (Chinese edition) in the real China user environment.
- Provide information for China Internet users to choose the most suitable product. It is estimated that there are around 800 million of Internet users in China. Protect them from malware will be beneficial for the global Internet security.

3 Products Tested

Instead of relying on Vendors' submitting test versions of their products, we downloaded the real versions from their websites. All products tested are Chinese editions.

Vendor	Product(Chinese Edition)	Version	MD5
360	360 Internet Security	5.0.0.5075	AA25668992FA172A197A911C9439F426
Avast	Avast Internet Security	9.0.2021.515	1674CA0E5AD207007152F3BAE165EC78
AVG	AVG Internet Security System	14.0.0.4259	D3E74E5E0E95CAF2C7712D539CF4CE25
Avira	Antivirus Pro	14.0.6.570	C13E8D3C2E3D4E1D88C4F7B78E7728F6
Baidu	Baidu Antivirus	2.1.0.2625	9581E8FA8E8327C6EC12CB939117B57D
Bitdefender	Bitdefender INTERNET SECURITY	16.33.0.1897	A4B8F66761CF5B24F6B6F04B5851E60B
Comodo	Comodo Internet Security	7.0.317799.4142	B03C6045711E56C4F9A48184462EAF84
Dr.web	Dr.Web Security Space	9.1.1.08180	9151750BF281E248CA8774F9AE4B2230
ESET	ESET Smart Security	6.0.316.1	1BFCC5170402FD85695CBC250C7FA84
Filseclab	TWISTER ANTIVIRUS 8	8.1.7.6865	4F4EBABE4FDD35DDE1A6869AA7BAC57D
JIANGMIN	JIANGMIN SPEED ESSENTIAL Antivirus Software	16.0.0.100	4565CB02F3989A3BD24887CC53406942
Kaspersky	Kaspersky Internet Security	14.0.0.4651(b)	46CF0B296AB8DD1ADC1482F52882F94D
Kingsoft	Kingsoft Antivirus	9.1.177957.10331	94EE1AA2879E3E4E5DF4F7578C5D4B2B
McAfee	McAfee Internet Security	13.6.1492	5B888D8A8BE5D9B85CCCD64D63794444
Microsoft	Windows Defender	Win 8.1 System	Win 8.1 System
Rising	RISING ANTIVIRUS V16+	24.00.18.79	D00CA363FC29CAE4E80D520C3A187BBB
Symantec	Norton Internet Security	21.1.0.18	625210FD31DB3AD6D422C136D023E415
Tencent	Tencent PC Manager	10.4.15685.215	1758542A46C0A476D4AF034889F52195

Trend	Trend Micro PC-cillin 2014	7.0.1151	19E7ED9D298E514F670C145460E67AE0
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All the products were updated before testing. Default settings were used.

4 Test Environment

The test was conducted on Chinese Windows 8.1 64-bit platform. Besides applications that come with Windows 8.1, more than 15 popular Chinese applications were installed to simulate a real Chinese end user computer environment.

Application	Version	MD5
91 助手	3.3.7.1031	E96C14DB8C56A4C3ACEB7A4CBD0D5567
Foxmail	7.13.5.2	2B5266670AF624D70D4E6E1B9B431718
KMP	3.7.0.113	8D1A3FDE75EE6416DFE646D47A76B206
Notepad++	6.5	56AF723D25B24AC57452F8A66C59DAB4
QQ	2013	8725ED60CACFA88CCE48E80059B7A8BD
WINRAR	5	D4C21FED7F7E9106E7EE8FCDC5879D23
YY 语音	6.10.0.2	CB35C02F825606E30A66D328581EF8D0
暴风影音	5-5.29.0926	9A6C2D90D697E435A72CF7F66AFCF424
飞信	4.9.0800.0	300FF4793997DD750C587EC780F43D06
谷歌浏览器	28.0.1500.72	B1DD8760D9DC79AB11B937B5F827696F
酷我音乐盒	5.0.0.0	C0A00B339CF053BA756ADD56D12BDFBD
快播	5.17.153.20131024	93C0BCF48E298C397E46B3AA92522B6B
搜狗拼音输入法	6.7.0.0499	D573E0E9D03B394766703110FE8BDD67
迅雷	7.9.10.4610	91F0D9F03D1B1CA21647B1BE2F098B6E
有道词典	5.4.46.5554	2B640F04252CAAFAC23F8EBEFC08820

5 Testing Vector/Metrics and Scoring System

This comprehensive test consists of seventeen sub-tests. Each sub-test is assigned points that are used in calculating the final score for each product tested.

Test Name	Points
Defense and Protection	
On-demand	15
On-access (Dynamic)	15
Cleaning & Disinfection	10
Malicious and Phishing Website Blocking	10
User Experience	
False Alert/Positive	5
Scan Time	1
Message Control & Quietness	1
Browse Pic,etc.	1
Copy Files	1
Install Other Programs	1
Log On/Log Off	1
Open Websites	1
Run Games	1
Run Multimedia	1
Run Office Programs	1
Run Other Programs	1
Installation/uninstallation	1

The highest score for a product is 67.

6 Testing Results

6.1 On-demand

Test collection consists of 10,000 samples which were considered the most prevalent in the China region at the time of the test. Based on prevalence, they were divided into five groups. A weight was added to each group based on sample prevalence. The score was calculated based on the formula:

$$15 - 5/2000 \times G1 - 4/2000 \times G2 - 3/2000 \times G3 - 2/2000 \times G4 - 1/2000 \times G5$$

Gx represents the number of missed samples in the group x.

The highest score for this sub-test is 15 points.

Product	Score	Detection rate (raw data)
Symantec	14.49	96.92%
Tencent	14.22	95.21%
360	14.13	95.09%
Avira	14.05	94.47%
McAfee	14.01	94.12%
Bitdefender	13.97	94.07%
Kaspersky	13.87	93.46%
AVG	13.84	93.27%
Baidu	13.75	93.03%
Comodo	13.45	91.21%
Avast	13.32	89.95%
Rising	13.28	89.90%
ESET	12.79	87.28%
Microsoft	12.47	85.31%
Dr.web	12.19	82.41%

Kingsoft	12.07	82.55%
Trend	10.86	70.76%
Filseclab	9.51	64.45%
JIANGMIN	8.39	53.19%

It can be seen that the weight does affect the ranking that is based on detection rate.

6.2 On Access (Dynamic)

On-access/dynamic test was conducted through downloading, file copying, and folder viewing. In this test, 10,000 samples were used. They were divided into five groups. A weight was added to each group based on sample prevalence. The score was calculated based on the formula:

$$15 - 5/2000 \times G1 - 4/2000 \times G2 - 3/2000 \times G3 - 2/2000 \times G4 - 1/2000 \times G5$$

Gx represents the number of missed samples in the group x.

The highest score for this sub-test is 15 points.

Product	Score	Detection rate (raw data)
Baidu	14.45	96.88%
Tencent	14.25	95.80%
360	14.04	94.50%
Avira	13.94	93.89%
Bitdefender	13.94	93.99%
AVG	13.82	93.16%
Kaspersky	13.82	93.14%
Symantec	13.81	92.46%
Comodo	13.38	90.78%

Avast	13.07	88.56%
Rising	12.97	84.35%
Microsoft	12.84	87.64%
McAfee	12.45	84.70%
Filseclab	12.23	81.39%
Kingsoft	12.15	83.20%
Dr.web	12.03	81.51%
JIANGMIN	11.66	75.74%
ESET	11.60	80.12%
Trend	10.78	70.33%

6.3 Cleaning & Disinfection

This sub-test is to test AV solutions' capability in repairing infected files. In this test, 100 infected samples were used. The virus families include Bototer, Kate, Alman, Nimmul, Qvod, Salit, Otwycal, Viking, Virut, Parite.

AV solutions are required to identify and repair those samples. Simply deleting will not be counted for points. After repairing, all the files must be able to run normally. 0.1 point will be awarded for each sample repaired successfully. The highest score for this sub-test is 10 points.

Product	Score
Dr.web	7.2
Bitdefender	7.0
Baidu	6.7
Kaspersky	6.7
Symantec	6.7
Trend	6.6
Microsoft	6.6

Tencent	6.3
JIANGMIN	6.1
McAfee	5.8
Kingsoft	5.8
ESET	5.5
360	5.0
Rising	4.9
Avast	3.5
Avira	2.3
AVG	2.1
Comodo	1.9
Filseclab	0.0

6.4 Malicious and Phishing Website Blocking

According to a survey, more than 80% of Chinese Internet users reported that they had experiences of being attacked when visiting a malicious website. This sub-test is to test AV solutions' capability in responding and blocking newly-found malicious and phishing websites. Blocking downloaded files is not included in this sub-test. It is tested under on-access/dynamic test.

65 URLs were selected from our newly-found malicious & phishing website collection. These website samples were in Chinese and were specifically targeting Chinese users.

The highest score for this sub-test is 10 points. The formula used to calculating score is:

$$10 \times (\text{Number of blocked URLs} / (65 - \text{Invalid URLs}))$$

Invalid URLs were those URLs that were not accessible during testing.

Product	Score
Baidu	6.92
360	6.15
Kingsoft	4.92
Tencent	2.92
Avast	1.69
Symantec	0.30
Trend	0.30
Bitdefender	0.15
Kaspersky	0.15
AVG	0.00
Avira	0.00
Comodo	0.00
Dr.web	0.00
ESET	0.00
Filseclab	0.00
JIANGMIN	0.00
McAfee	0.00
Microsoft	0.00
Rising	0.00

The results show that Chinese products are doing much better than international products.

6.5 Defense and Protection Capability

Defense and protection capability includes on-demand, on-access, cleaning/disinfection, and website blocking.

Products	On-demand	On-access	Cleaning & disinfection	Website blocking	Total
Baidu	13.75	14.45	6.7	6.92	41.84
360	14.13	14.04	5.0	6.15	39.33
Tencent	14.22	14.25	6.3	2.92	37.71
Symantec	14.49	13.81	6.7	0.30	35.32
Bitdefender	13.97	13.94	7.0	0.15	35.07
Kingsoft	12.07	12.15	5.8	4.92	34.96
Kaspersky	13.87	13.82	6.7	0.15	34.54
McAfee	14.01	12.45	5.8	0.00	32.27
Microsoft	12.47	12.84	6.6	0.00	31.92
Avast	13.32	13.07	3.5	1.69	31.59
Dr.web	12.19	12.03	7.2	0.00	31.43
Rising	13.28	12.97	4.9	0.00	31.16
Avira	14.05	13.94	2.3	0.00	30.30
ESET	12.79	11.60	5.5	0.00	29.90
AVG	13.84	13.82	2.1	0.00	29.76
Comodo	13.45	13.38	1.9	0.00	28.74
Trend	10.86	10.78	6.6	0.30	28.56
JIANGMIN	8.39	11.66	6.1	0.00	26.15
Filseclab	9.51	12.23	0.0	0.00	21.74

6.6 False Positive

The highest score for this sub-test is 5 points. One false positive will cause reduction of one point.

We created a clean system environment. Besides Chinese Windows 8.1 64 bit operating system along with its standard applications, more than 15 popular Chinese applications were installed. There was no malware item installed on the system.

Products	False Positive Score
360	5
Avast	5
AVG	5
Baidu	5
Bitdefender	5
ESET	5
Kaspersky	5
Kingsoft	5
Microsoft	5
Rising	5
Symantec	5
Tencent	5
Trend	5
Avira	4
Comodo	4
JIANGMIN	4
McAfee	4
Dr.web	0
Filseclab	0

6.7 Scan Time

On-demand folder scanning was used. The highest score for this sub-test is 1 point.

Products	Scan Time(min)	Score
Tencent	5	0.95
Kingsoft	5	0.95
Avast	6	0.94
Filseclab	6	0.94
Avira	7	0.93
Baidu	8	0.92
360	13	0.87
JIANGMIN	13	0.87
ESET	24	0.76

Dr.web	33	0.67
Bitdefender	40	0.60
Rising	41	0.59
AVG	57	0.43
Comodo	69	0.31
Symantec	76	0.24
Kaspersky	79	0.21
McAfee	93	0.07
Microsoft	>100	0.00
Trend	>100	0.00

6.8 Message Control & Quietness

This sub-test is to check whether popup or other message displaying is controllable or selectable.

The highest score for this sub-test is 1 point.

Products	Message Control
360	1
Avast	1
AVG	1
Avira	1
Baidu	1
Bitdefender	1
Comodo	1
Dr.web	1
ESET	1
Filseclab	1
Kaspersky	1
Rising	1
Symantec	1
Tencent	1
Trend	1
JIANGMIN	0

Kingsoft	0
McAfee	0
Microsoft	0

6.9 Browse Pictures, etc.

This sub-test is to measure AV solutions' effects on browsing pictures, photos, et al.

The highest score is 1 point.

Products	Browse Pic(ms)	Score
Microsoft	368	0.98
Avira	907	0.95
360	920	0.95
Tencent	925	0.95
Kingsoft	954	0.95
Bitdefender	1089	0.94
Comodo	1515	0.92
AVG	1534	0.91
Kaspersky	1606	0.91
Symantec	1614	0.91
ESET	1710	0.91
Trend	1742	0.90
JIANGMIN	1853	0.90
Rising	2000	0.89
Baidu	2168	0.88
Dr.web	2551	0.86
Avast	3096	0.83
Filseclab	3667	0.80
McAfee	15132	0.16

6.10 Copy Files

This sub-test is to measure AV solutions' effect on file copying. The highest score is 1 point.

Products	Copy File(ms)	Score
360	3203	0.87
JIANGMIN	3223	0.87
Kingsoft	3262	0.87
Kaspersky	3267	0.87
Avast	3271	0.87
Avira	3370	0.87
Trend	3403	0.86
Microsoft	3418	0.86
Rising	3499	0.86
ESET	3595	0.86
Filseclab	3835	0.85
Bitdefender	3893	0.84
Dr.web	4086	0.84
McAfee	6865	0.73
Baidu	9317	0.63
Tencent	11254	0.55
AVG	19937	0.20
Comodo	22313	0.11
Symantec	22611	0.10

6.11 Install Other Programs

This sub-test is to measure AV solutions' effect on installing application programs.

The highest score is 1 point.

Products	Install Application(ms)	Score
Avira	10746	0.69
AVG	10804	0.69
ESET	11068	0.68
Microsoft	11429	0.67
Tencent	11701	0.67
JIANGMIN	12117	0.65
Kaspersky	12171	0.65
360	12179	0.65
Comodo	12284	0.64

Dr.web	12336	0.64
Avast	12439	0.64
Bitdefender	12767	0.63
Kingsoft	13542	0.61
Trend	13668	0.60
Symantec	15315	0.56
Rising	15523	0.55
Filseclab	15995	0.54
McAfee	16837	0.51
Baidu	22762	0.34

6.12 Log On/Log Off

This sub-test is to measure AV solutions' effect on computer logon/logoff operations. The highest score for this sub-test is 1 point.

Products	Log on & off(s)	Score
Baidu	96	0.73
Tencent	159	0.56
Avast	164	0.54
Filseclab	192	0.47
Trend	196	0.46
ESET	203	0.44
Microsoft	203	0.44
JIANGMIN	204	0.43
Rising	217	0.40
Dr.web	227	0.37
Kingsoft	231	0.36
Comodo	237	0.34
Symantec	244	0.32
McAfee	245	0.32
Kaspersky	253	0.30
AVG	254	0.30
360	258	0.28
Avira	277	0.23

Bitdefender	297	0.17
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6.13 Open Websites

This sub-test is to measure AV solutions' effect on users' visiting websites.

The highest score is 1 point.

Products	Open websites(ms)	Score
Rising	57355	0.93
Trend	67216	0.92
Kingsoft	68767	0.92
Filseclab	69950	0.92
Avast	80116	0.91
ESET	98016	0.89
Comodo	107864	0.87
Symantec	117648	0.86
JIANGMIN	120277	0.86
Baidu	165469	0.81
McAfee	228952	0.73
Bitdefender	240686	0.72
AVG	242757	0.72
Kaspersky	250475	0.71
360	251048	0.71
Tencent	259262	0.70
Dr.web	385794	0.55
Microsoft	465953	0.46
Avira	753601	0.12

6.14 Run Games

This sub-test is to measure AV solutions' effect on playing games on computer. The highest score is 1 point for this sub-test.

Products	Run game(ms)	Score
Symantec	5431	0.58
Kaspersky	6038	0.54
Rising	6078	0.53
Tencent	6155	0.53
Microsoft	6376	0.51
ESET	6587	0.49
Bitdefender	6614	0.49
JIANGMIN	6904	0.47
Filseclab	7279	0.44
Baidu	7418	0.43
Avast	7607	0.41
Trend	7987	0.39
McAfee	8846	0.32
Comodo	9236	0.29
Avira	9652	0.26
360	9761	0.25
Dr.web	10051	0.23
AVG	10596	0.18
Kingsoft	10840	0.17

6.15 Run Multimedia

This sub-test is to measure AV solutions' effect on playing movies, music, and other multimedia files. The highest score for this sub-test is 1 point.

Products	Run Media(ms)	Score
ESET	8082	0.38
Filseclab	8145	0.37
AVG	8159	0.37
Microsoft	8182	0.37
Avira	8190	0.37
Bitdefender	8198	0.37
Avast	8201	0.37
Rising	8211	0.37
Kingsoft	8222	0.37

Tencent	8231	0.37
360	8234	0.37
Dr.web	8261	0.36
JIANGMIN	8357	0.36
Baidu	8362	0.36
McAfee	8367	0.36
Kaspersky	8396	0.35
Symantec	8490	0.35
Comodo	8536	0.34
Trend	9081	0.30

6.16 Run Office Programs

This sub-test is to measure AV solutions' effect on using office applications. The highest score for this sub-test is 1 point.

Products	Run office document(ms)	Score
Microsoft	11109	0.52
Tencent	11165	0.51
AVG	11239	0.51
JIANGMIN	11259	0.51
Filseclab	11354	0.51
Comodo	11417	0.50
ESET	11468	0.50
Kingsoft	11468	0.50
Symantec	11484	0.50
Avast	11531	0.50
Kaspersky	11556	0.50
Avira	11612	0.50
Bitdefender	11731	0.49
Trend	12012	0.48
360	12017	0.48
Rising	12289	0.47
McAfee	12320	0.46

Dr.web	15892	0.31
Baidu	19801	0.14

6.17 Run Other Programs

This sub-test is to measure AV solutions' effect on running general applications.

The highest score for this sub-test is 1 point.

Products	Run other application(ms)	Score
Tencent	5562	0.24
360	5976	0.18
JIANGMIN	6084	0.16
ESET	6126	0.16
AVG	6137	0.15
Symantec	6167	0.15
Rising	6220	0.14
Comodo	6242	0.14
Avira	6267	0.14
Dr.web	6300	0.13
Bitdefender	6348	0.13
Avast	6353	0.12
Filseclab	6360	0.12
Microsoft	6362	0.12
Kingsoft	6468	0.11
Kaspersky	6572	0.09
Baidu	6796	0.06
McAfee	6828	0.06
Trend	7214	0.01

6.18 Installation/Uninstallation

This sub-test is to check whether AV solutions can be installed and uninstalled properly. All the AV products tested performed well and each of them received 1 point that is the highest score for this sub-test.

Products	Score
360	1
Avast	1
AVG	1
Avira	1
Baidu	1
Bitdefender	1
Comodo	1
Dr.web	1
ESET	1
Filseclab	1
JIANGMIN	1
Kaspersky	1
Kingsoft	1
McAfee	1
Microsoft	1
Rising	1
Symantec	1
Tencent	1
Trend	1

6.19 Overall User Experience Evaluation

Products	User experience total score
Avast	13.15
ESET	13.06
Tencent	13.02
Rising	12.74
360	12.61
Bitdefender	12.39
Baidu	12.31
Kaspersky	12.13
Trend	11.94
Kingsoft	11.81
Symantec	11.57
AVG	11.47
JIANGMIN	11.08
Avira	11.06
Microsoft	10.94
Comodo	10.47
McAfee	8.73
Filseclab	7.96
Dr.web	6.97

7 Overall Evaluations: Quality of Protection and User Experience

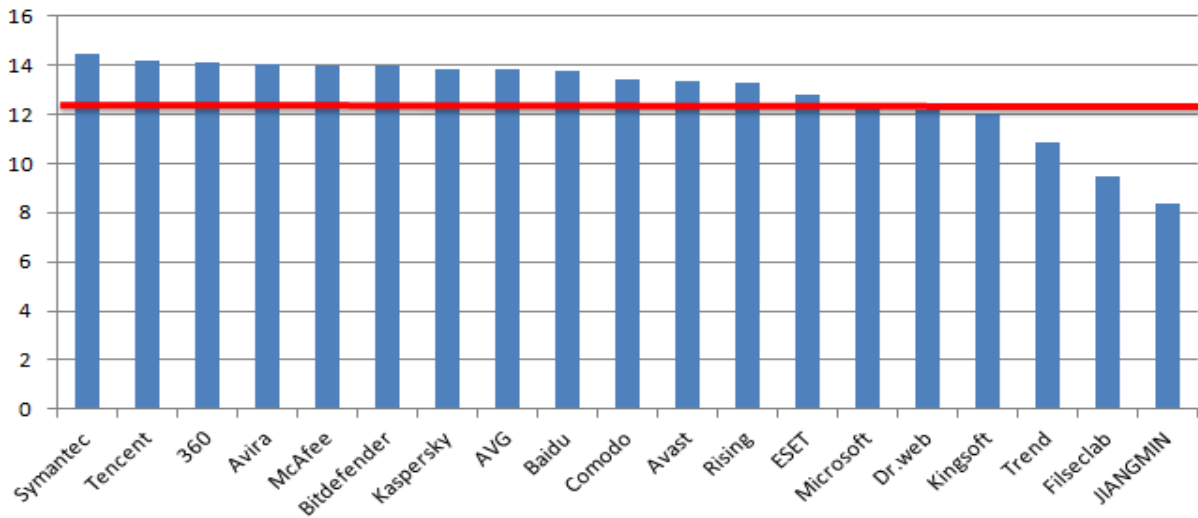
To achieve SKD Labs' Starcheck certification, the minimum required score is 45 points.

Products	Total Score
Baidu	54.15
360	51.94
Tencent	50.73
Bitdefender	47.46
Symantec	46.89
Kingsoft	46.77
Kaspersky	46.67
Avast	44.74
Rising	43.90
ESET	42.96
Microsoft	42.86
Avira	41.36
AVG	41.23
McAfee	41.00
Trend	40.50
Comodo	39.21
Dr.web	38.40
JIANGMIN	37.23
Filseclab	29.70

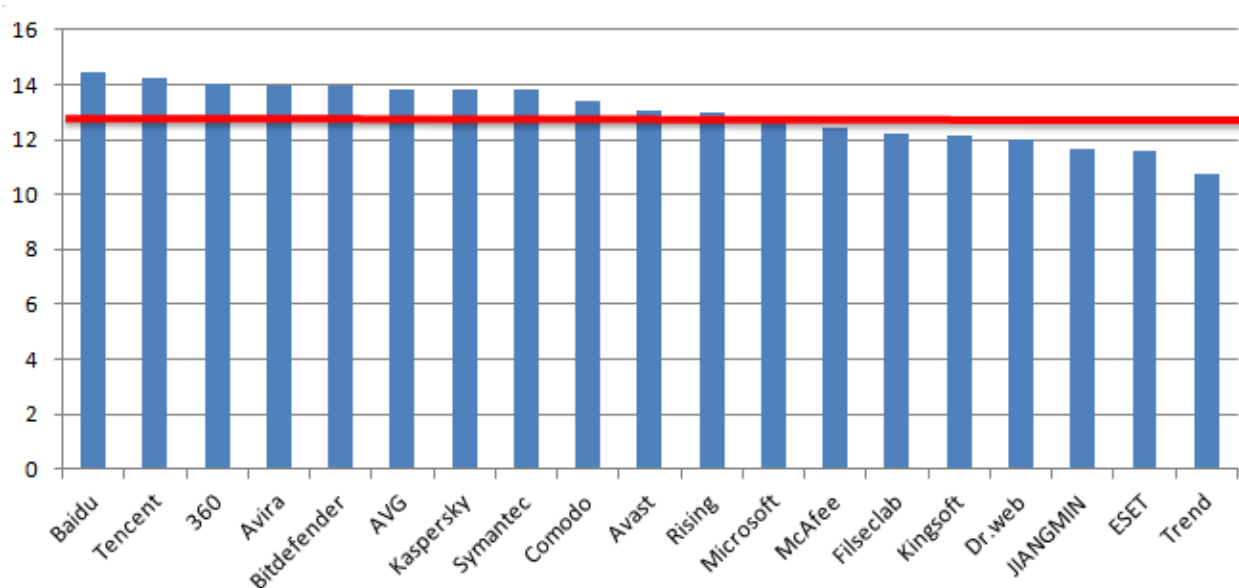
8 Baseline Concept Presentations

Red line in the graph represents Microsoft baseline

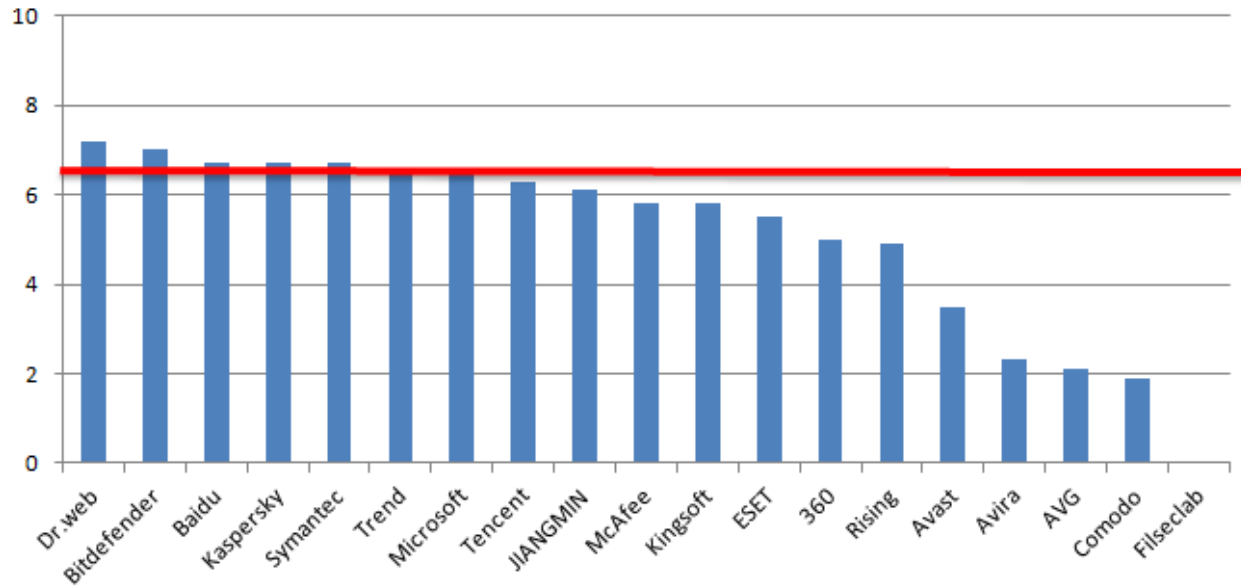
8.1 On-demand



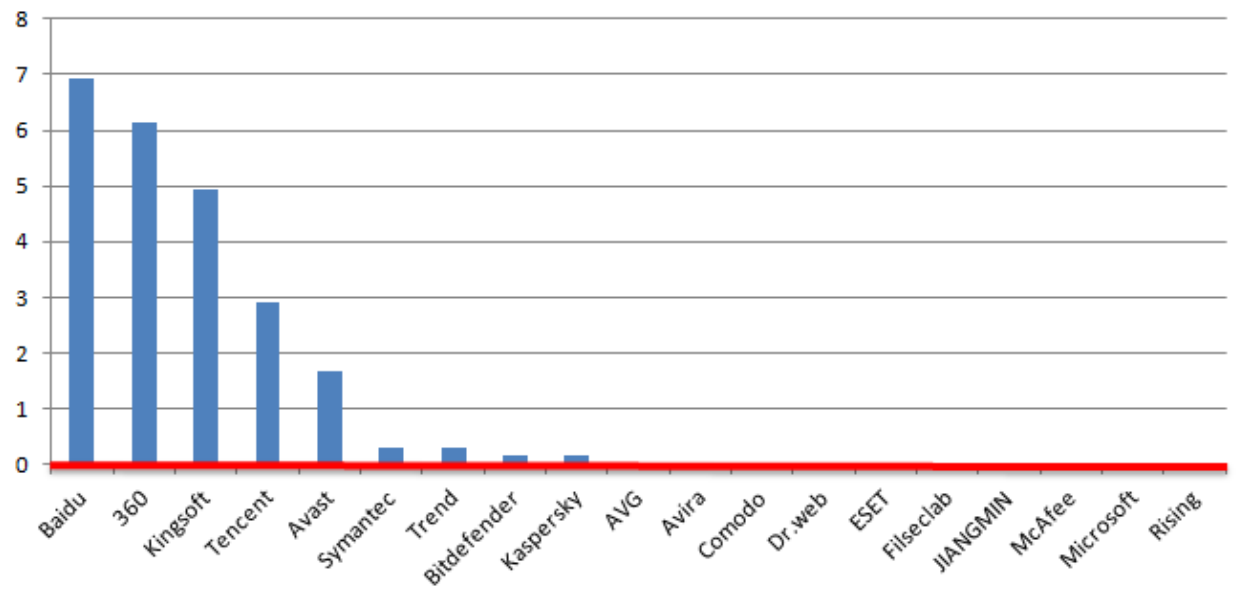
8.2 On-access (Dynamic)



8.3 Cleaning and Disinfection

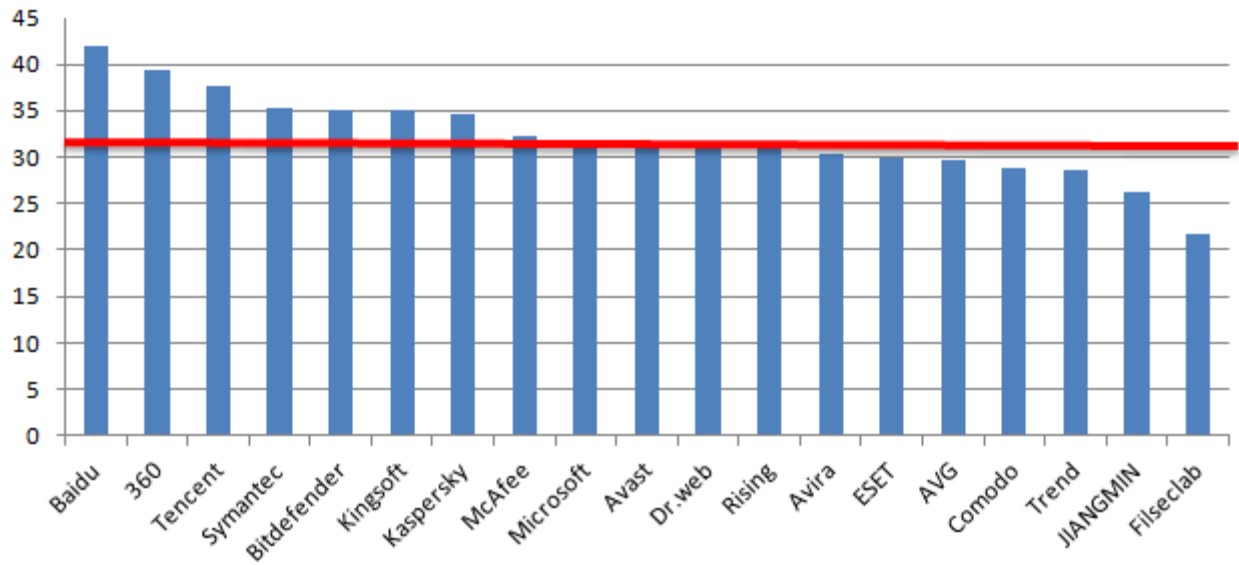


8.4 Malicious and Phishing Website Blocking

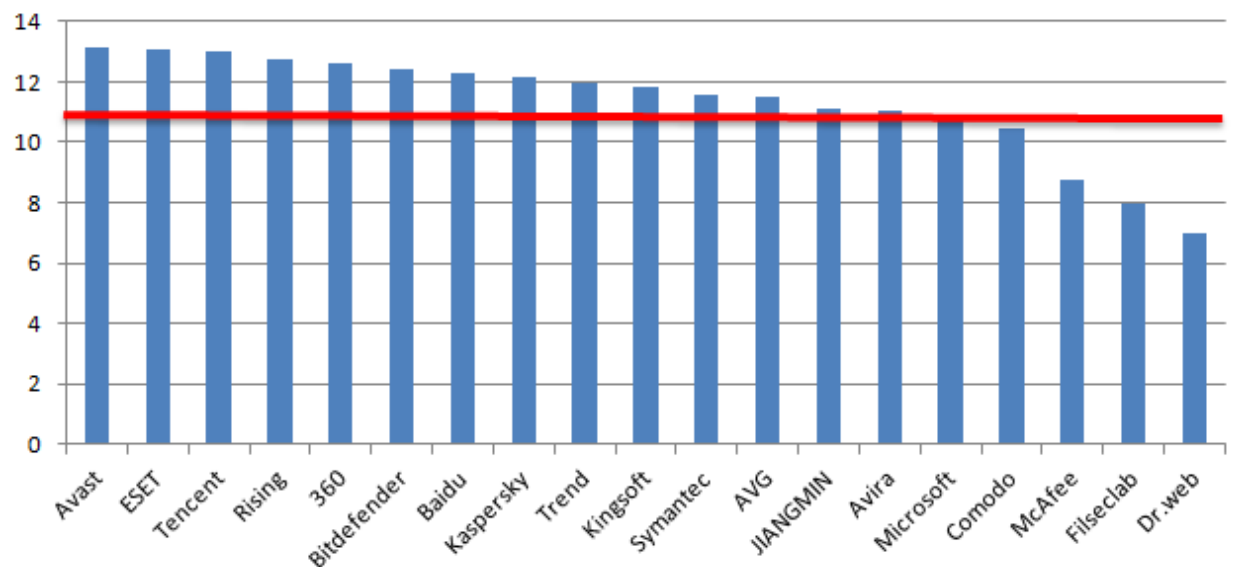


8.5 Defense and Protection Capability

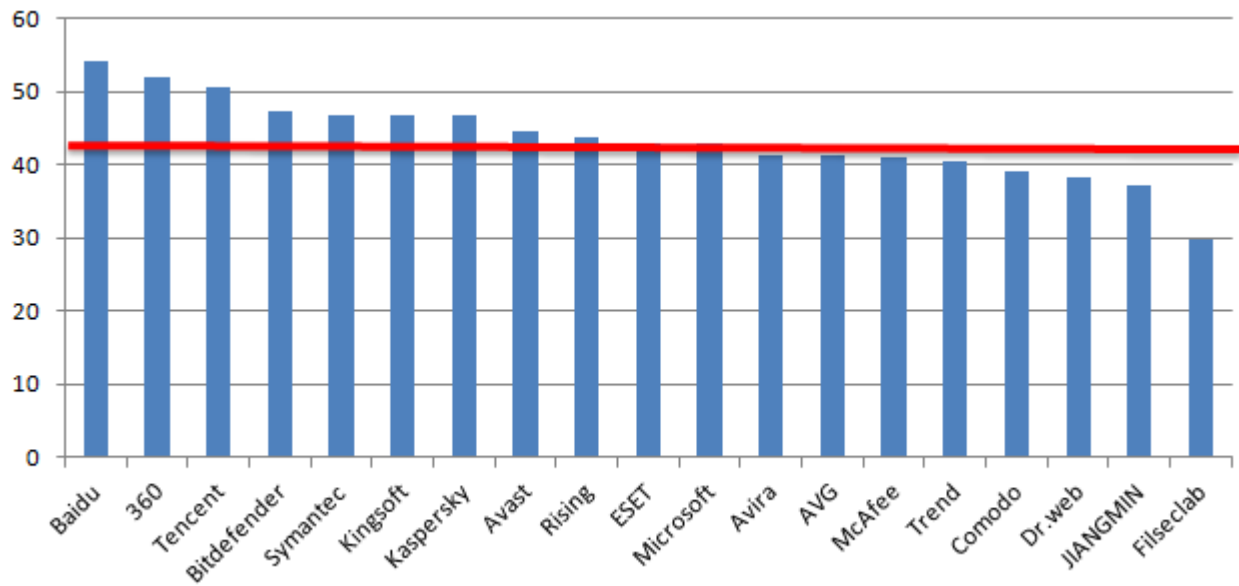
Defense and protection capability includes on-demand, on-access, cleaning/disinfection, and website blocking.



8.6 User Experience



8.7 Total Evaluation: Protection Capability and User Experience



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