
Sentor's Internet Filtering Review 2006

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Introduction

Internet Filtering is becoming increasingly important; employers are focused on preventing misuse of the company's IT assets and safeguarding employee productivity, and parents are seeking reliable means of protecting their children against unsuitable internet content, such as pornography.

The challenge of developing a bullet proof Internet Filtering system is two-fold; on the one hand, it should successfully block all unsuitable content, and on the other hand permit all legitimate internet traffic to ensure that employee productivity and school research is not impacted.

Nordic Netcenter AB is a small technology start-up in Sweden who claims to have developed an Internet Filtering technology based on a self-learning artificial neural network with performance and accuracy superior to the market leaders in this space.

In order to evaluate the level of accuracy of the best Internet Filtering solutions available, and in order to evaluate the performance claims of Nordic Netcenter, Sentor has carried out a comprehensive Internet Filtering test. The results are summarized in this document.

About Sentor

Sentor AB is Sweden's leading provider of innovative IT security solutions, based on a combination of managed security solutions, management and IT consultancy, and a continuous investment in intelligence gathering and R&D.

The Contenders

Sentor elected to test six products; three were ranked winners in the 2007 Internet Filter Report, two are considered market leaders in terms of size, and Content Analyzer, published by Nordic Netcenter:

1. **ContentProtect**, published by ContentWatch, Inc, USA is the Gold winner in the TopTenREVIEWS 2007 Internet Filter Report,
2. **CYBERSitter**, published by Solid Oak Software, Inc, USA, the Silver winner in the TopTenREVIEWS 2007 Internet Filter Report
3. **NetNanny**, published by Looksmart, USA, the Bronze winner in the TopTenREVIEWS 2007 Internet Filter Report
4. **McAfee Internet Security 2007**, published by McAfee Inc, USA
5. **Norton Internet Security 2007**, published by Symantec Corporation, USA
6. **Content Analyzer**, published by Nordic Netcenter AB, Sweden

Methodology

Step 1. Generation of the URL Reference List

Two final-year Masters of Computer Science students at the University of Stockholm were tasked with building a URL reference list, where approximately 50 % of the entries would be considered "adult/pornographic" and 50 % would be considered "acceptable" from a parental and/or employer perspective.

This test is focused on the "adult/pornographic" category, since this is the common denominator and core focus of all six products in this test. Internet filtering accuracy for other categories of content has hence not been evaluated.

Web surfers tend to be creative when it comes to bypassing filtering systems, and the students were therefore instructed to identify and list sites that were not typically mainstream, traditional, well known or high profile, since such sites tend to be well known to, and easy to recognize by most filtering systems.

When it came to the "acceptable" category, the students were asked to identify sites that are acceptable in content but may cover subjects that triggers false positive

classifications; e.g. sites that provide medical information; modeling of clothes including swim suits, sexual information of a non-explicit nature, relationships guidance and sites focused on physical training and exercise.

The students were asked to use their own moral values and judgment for determining the URL classifications in situations where the classification depends upon moral values and culture. A typical example would be a web page containing non-pornographic relationship guidance and sex education.

Comments from the students on URL selection:

“We selected a wide spectrum of web sites in order to test as many different aspects of the filtering systems as we could think of. A few sites we knew would be easy for the systems to categorize correctly (such as explicit porn content and obviously non-pornographic content), where included to test basic functionality. However, most of the sites were selected to really challenge the capabilities of the internet filtering systems. Sites we included in the URL reference list as “acceptable” included web publications, feminist sites, non-nude fetish clothing design sites, information sites about STD’s and gay lifestyle sites. More extreme examples of sites we included in the URL list as “adult/pornographic” include swinger sites, furry porn, very strange fetish sites and vomit-porn. We classified contact sites, where people are to meet and have sex, as “adult/pornographic”, no matter the language or graphic content since this would be very inappropriate for children. The question of moral values naturally impacts classification here and we chose to exclude what we would consider morally ambivalent content. “

Structures and content within web sites change continuously, and internet filtering systems’ URL lists are updated on a regular basis, so it may not be possible to recreate the exact outcome of this test executed on 14th December 2006.

Step 2. Execution of the Test

Each system was installed on a clean PC running Windows XP and Internet Explorer version 6. Any issues during installation were noted. Where applicable, the systems were configured to filter “adult/pornographic” content only, and where applicable, image filtering was enabled.

The URL list was fed through each of the six Internet Filtering products and all instances of incorrect classification were registered as a failure.

For each selected URL, the product was tested as follows:

- For URL:s classified as “adult/pornographic”: The URL was typed into Internet Explorer version 6. If, on the selected URL page or on any subsequently selected links or sub-links, adult or pornographic materials were displayed, then the product

registered a failure (to block). Alternatively, if the selected URL resulted in a pop-up containing adult or pornographic material, then the product registered a failure (to block). If only parts of the internet page were blocked (for example the main section, but not the link lists on the left hand side), then such links were explored in order to search for adult and pornographic materials to see if the product classified content correctly also on the lower levels of the URL.

- For URL:s classified as “acceptable”: The URL was typed into Internet Explorer version 6. If the selected URL page was blocked by the product, then the product registered a failure (to allow).

The results for each system has been converted into %-age success of blocking “adult/pornographic” sites, and %-age success of allowing “acceptable” sites. A perfect score is hence 100 % blocking of “adult/pornographic” sites and 100 % allowing of “acceptable” sites.

The overall accuracy score is calculated as the total number of successful classifications divided by the total number of sites in the URL reference list.

Results

The test process and results demonstrated that each product has a unique approach to classifying web sites.

The overall results in Exhibit 1 specifies the percentage of successfully categorized URL:s out of the 228 URL:s in the reference list, which consists of 118 sites classified as “adult/pornographic” and 110 sites categorized as “acceptable”. The results in exhibit 1 have been weighted so that equal importance has been attributed to ability to block and allow.

It may however be interesting to note that even if the results were weighted 60-40 in favour of ability to block “adult/pornography”, alternatively weighted 60-40 in favour of allowing “acceptable” content, this has no material impact on the overall score and ranking of the top three products.

Nordic Netcenter’s Content Analyzer emerges as the most accurate Internet Filtering product in this test with an 80 % overall accuracy score. CYBERSitter comes in as a good second with a 73 % score.

ContentProtect, Norton Internet Security and NetNanny are on equal third place with a 69 % - 70 % accuracy score, whereas McAfee Internet Security comes last with a 62 % score.

In order to better understand what drives the overall results, we review the detailed result in Exhibit 2.

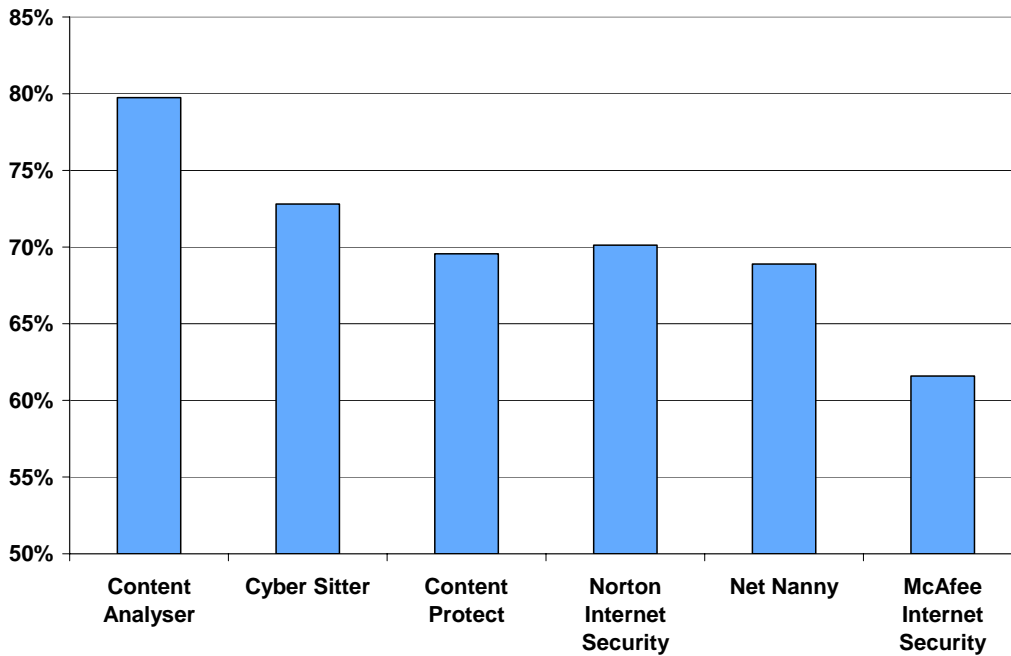


Exhibit 1: Overall Accuracy (weighted 50-50)

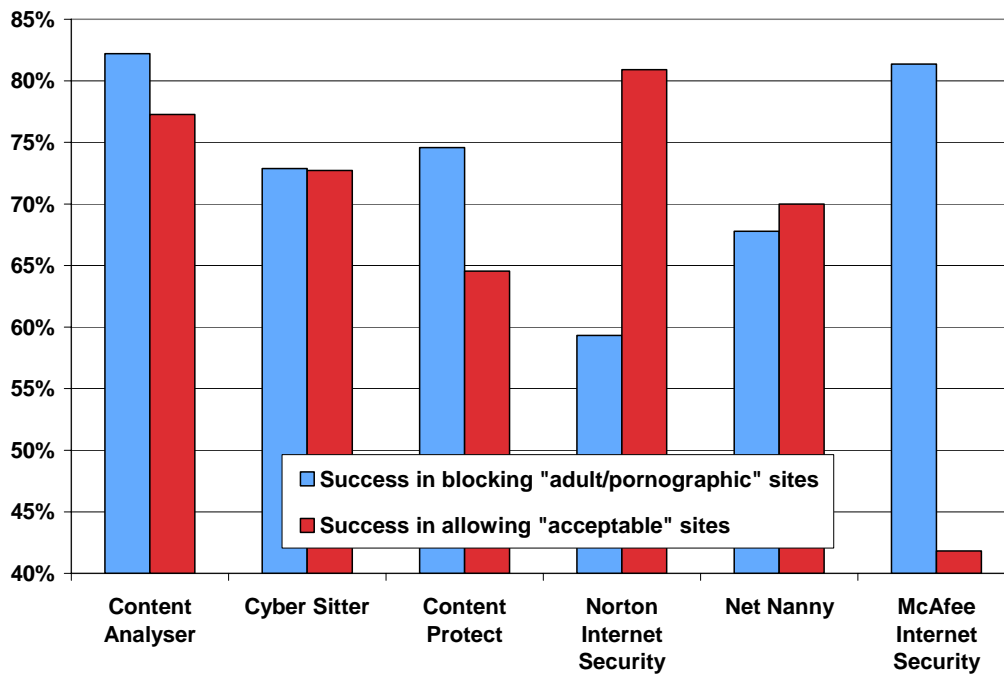


Exhibit 2: Blocking and Allowing Accuracy

For a product to secure a high overall accuracy result, it has to be accurate both in terms of blocking and allowing.

ContentAnalyzer had the highest success rate in terms of blocking “adult/pornography”, and this coupled with a strong success rate in allowing “acceptable” sites resulted in the program emerging with the highest overall accuracy.

McAfee Internet Security had a high success rate in terms of blocking “adult/pornography”, but this was coupled with a poor success rate in allowing “acceptable” sites which overall resulted in a low score. Our students labeled this “an internet filtering program for people who do not like the internet”. It is plausible that this program may negatively impact employee productivity due to high levels of “false positives”.

Norton Internet Security on the other hand was overly permissive with the lowest success rate in terms of blocking “adult/pornography” and the highest success rate in allowing “acceptable” sites. Out of the programs tested here, this program is most likely to allow employees or children to get access to “adult/pornography” material.

While ContentProtect had a high overall success rate, we feel that low success rate in allowing “acceptable” sites may be a problem for employee productivity.

CYBERSitter and NetNanny both demonstrated a good balance between blocking and allowing, with CYBERSitter scoring higher than NetNanny on both counts.

In conclusion, the test results are as follows:

- **ContentAnalyzer** is awarded winner of Sentor’s Internet Filtering Review 2006.
- **CYBERSitter** is awarded second place.
- **NetNanny** is awarded third place and beating ContentProtect due to its better balance between blocking and allowing.
- **ContentProtect** is awarded fourth place.
- **Norton Internet Security** and **McAfee Internet Security** is awarded equal last place.

Other Information about the Products

Content Analyzer

Test version: 2.2.0.0

Changes to standard configuration: none.

Installation was quick and straight forward. The program worked efficiently but gave a slower response rate when opening URLs. The system gave good feedback and always specified when a blocking action took place. On two occasion, the system froze Internet Explorer in midst of the analysis and had to be restarted.

CYBERSitter

Test version: 9.6.7.11

Changes to standard configuration: Selected block on category “adult/sexually oriented” only.

Installation was quick and straight forward. The students found it frustrating that there was insufficient feedback from CyberSitter when a page was blocked. On some occasions, the blockage resulted in a blank page and sometimes in a “this page cannot be displayed” message. It makes it difficult to know if the page has actually been blocked or if the web site is experiencing operational problems. The product seems unstable and Internet Explorer crashed frequently (more than 20 times) during the test period.

ContentProtect

Test version: 2.5.0.74

Changes to standard configuration: Selected block on category set to “adult/mature” only.

The installation took 20 minutes and required a couple of restarts. Otherwise there were no issues.

Norton Internet Security 2007

Test version: 10.0.0.86

Changes to standard configuration: none

Norton’s system proved complicated to get operational. After installation, the parent control module was missing, and the on-line help information on how to activate this module proved incorrect. The students had to contact Symantec technical support in order to locate the correct software addition in order to get parental control operational. This is beyond the acceptable limits of complexity for a consumer.

Netnanny

Test version: 5.1.2.1

Changes to standard configuration: Blocking level set to 3 (block all except family-friendly web sites)

Installation was quick and straight forward. Like CYBERSitter, the students found there was a lack of feedback when a page was blocked. NetNanny went into a loop at certain web pages with frame catcher/ update catcher functionality, and when this happened a reboot was required to continue the test.

McAfee Internet Security 2007

Test version: 9.0, with version 9.1 of the Privacy Service module.

Changes to standard configuration: none

The McAfee system proved complex to configure for parental control (which contains the internet filtering capability); the administrator had to specify both PC/Windows users and McAfee system users through a complex user interface, and thereafter define parental control. Whilst our students managed to install and configure McAfee after about 60 minutes of work, it is quite plausible that less IT savvy parents would fail without help from McAfee's support desk.

Examples of Blocking and Allowing Failures

Why is accurate Internet Filtering important?

Please see in the appendix examples of blocking and allowing *failures* observed during execution of this test. Please be aware that this content is explicit and may contain images and/or words that some readers may find offensive, and it is classified as adult reading only.