



Securing a safer environment for online advertising – how far does CV technology deliver?



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1. Executive Summary

Trust is vital if the online advertising market is to reach its full potential; as the buying process shifts towards using automated decision-making, advertisers need to have confidence in online ad trading systems for the market to flourish.

We have been working with IASH (Internet Advertising Sales Houses) since 2006 to verify whether its members meet the self-regulatory code of conduct for online advertising sales houses. The learning from IASH is that the model works; a successful voluntary code of practice, underpinned by independent verification, brings trust, and consequently growth, to the market. Since the development of the IASH code, now in its 11th iteration, the online ad matrix has evolved and new Content Verification (CV) technology, which aims to safeguard ad placement, has become available.

In 2011 ABC was asked by JICWEBS to review the capabilities of CV products in order to deliver greater transparency to the industry in terms of the role played by CV technology in reducing the risk of misplaced advertising. Eight organisations submitted their products for review against criteria agreed by JICWEBS. The aim of our review was to test the ability of these products to block or report, in real time, the serving of an online ad onto destinations that have been defined in advance as inappropriate to a campaign. Inappropriate content in this context refers to any words deemed by the advertiser as unsuitable for the campaign, including brand conflicting content.

This interim report provides an initial snapshot of what each product delivered against the agreed criteria. Overall our testing showed that the eight CV products all had different, sometimes complementary, capabilities and they all reduced the risk of ad misplacement. The products tested varied in their ability to make decisions in real-time, which has implications where ads are being served alongside constantly changing content. It is notable that some of the tools were only able to respond to certain aspects of HTML code. Our testing was in controlled conditions with small scale delivery requirements. At scale operating, on a live campaign, the results may look different.

CV technology is a significant step towards securing a safer environment for online advertising but needs to be seen in context and decision-making should not be left to algorithms alone. The way systems are configured, inappropriate content schedules agreed, instructions applied, and how all this is maintained over time throughout the ad serving process are all key to the success of CV technology based solutions.

CV technology is part of a young and fast developing industry. What the CV products have achieved to date has been groundbreaking and can rightly lay claim to helping to grow safer online ad placement. All the signs are that there will be significant ongoing development of the underlying technology. I believe that this, underpinned by industry certification to verify the capability of these solutions, will lead to ever greater industry trust and the realisation of the full potential within the digital advertising market.

I would like to record my sincere thanks to everyone who worked on this review and look forward to updating the industry further in 2012.

Richard Foan

Group Executive Director of Communication and Innovation

February 2012

2. Background

The IAB Online Ad spend study showed that the UK online market grew by £244m in the first half of 2011 compared to the same period in 2010. This reflects the rise in consumer use of the internet and the opportunity that online advertising presents – the chance to optimise return on investment by reaching a defined audience demographic contextually. However, in the eyes of many, online is still not attracting big budgets from some of the major advertiser brands.

One of the significant arguments against online automated ad-serving technology is that it places heavy reliance on systems that serve ads in real time, bringing some inherent risks in terms of the content with which ads can appear. The good news is that there are solutions on the market, such as CV products, which seek to ensure every ad served appears on an appropriate site in accordance with the buying instructions.

JICWEBS asked us to test CV products as the first step toward delivering a set of industry agreed principles and a resulting certification programme to verify which of these standards the products met. This interim report summarises our findings and recommendations based on the results of our work to date.

3. Objectives and scope

3.1 Objectives

The objective of our review was to attest that a CV product is *capable* of blocking, in real time, serving of online advertising onto pages that have content defined in advance as inappropriate for the campaign.

Whilst we have traditionally reviewed digital ad serving solutions for compliance with industry standards, no such standards existed for CV products. The review was therefore set up to test the capability of CV products and not whether the tools met a pre-determined standard.

For the purpose of this review the phrase “capable of blocking in real-time” applies to the blocking decision, NOT to the information used to make the decision, which may be gathered in part in advance.

Inappropriate content refers to any content deemed unsuitable for the campaign. This may take the form of words associated with hate, obscenity, offensive, illegal content, violence and spyware. It may also take the form of rival brands, or simply other content that the advertiser chooses not to engage with.

3.2 Scope

Eight organisations signed up to take part in the testing programme. A full list of the products taking part is in Appendix I.

The scope of the review was determined following a period of consultation with the members of IASH in the last quarter of 2010.

Following this consultation a test programme was developed and submitted to the CV product suppliers for review. The final testing programme is in Appendix II.

Tests 1-7 were designed to consider whether a CV product could prevent advertising being served in various scenarios. For example, the ability to detect specified content in different places on the page or where it was embedded within source code.

Test 8 aimed to record the additional time taken (milliseconds) for an ad to be served when the CV product is installed.

Our work also included tests of how responsive the product was to changing instructions, for example when new words were added to the list of inappropriate content (test 9) and the effectiveness and timeliness of reporting (test 10).

Prior to testing, each CV product was asked to submit a formal written Declaration of Methodology (DOM) explaining how the CV product works, including examples of the controls that are put in place.

3.3 Outside the scope of the review

CV products offer a range of services for their clients. This review was limited to the ability to block inappropriate content and did not extend to a live campaign outside the testing environment. Whilst a number of CV products offer optional services such as applying geographical filters to ad serving instructions, this fell outside the scope of our testing.

During the course of the test phase it was acknowledged that meaningful latency test results would require generation of a substantial volume of traffic from a variety of global locations. This was not practical to undertake at this stage and was therefore removed from the scope of the test programme.

For detail of the audit test caveats please see section 4.2.

4. Methodology

4.1 Testing Environment

Testing took place in October and November 2011.

We created a standardised testing environment, designed to be representative of any website. Conditions and procedures were the same for each product tested and a full audit trail was kept for each tool. Only one CV Product was tested at a time. These controlled conditions were designed to allow meaningful comparisons as to the capability of each CV product. Each product was subject to a test run. Four CV product owners took the opportunity to re-configure their product and were re-tested.

Testing took place in a “walled garden” environment that allowed access only to specified IP addresses. Within this environment were a number of different domains and sub-domains including pages with URLs or keywords specified as inappropriate for the purpose of testing both in textual content and domains. It was our expectation that these would be blocked by the CV product.

The environment allowed page content to be modified by us in real time via a Content Management System (CMS). Each CV product was given its own basic configuration area to test that the simple block/allow functionality worked before submitting for testing.

Functionality was tested by the product’s decision to block or allow advertising when faced with a range of test scenarios (see tests 1-7 described in Appendix II). The creative served took the form of a simple green or red banner. If the CV product decided to block, a red advertising banner was requested from our ad server. If allowed, a green banner was requested. This gave a clear visual indication of whether a blocking decision had been made (red banner) or the ad was allowed to be served (green banner).

Each CV product provider supplied a piece of ad tag code which was installed in the ABC ad server to generate the requests for red and green banners. The CV products were asked to make the decision to block by default. Each CV product was configured to exclude a list of keywords, domains and sub-domains. This list was the same for all products.

4.2 Test Programme Caveats

Our testing confirms only that the CV product is capable of preventing ad delivery alongside inappropriate content when configured correctly (with certain exceptions as stated below). It does not guarantee that no ad will ever be served alongside inappropriate content when the CV product is used in real life. The following specific caveats must also be noted:

- Testing was at a point in time
- We did not test the scalability of the product
- The context of testing does not fully reflect real life conditions (multiple campaigns running in multiple sites, including the effects of latency)
- We did not assess implementation times required in real life
- We only attest that the product blocks on the basis of HTML text and URLs. We have not verified that the product blocks all content formats, particularly non-HTML (e.g. AV content, images etc.)
- The scope of testing is limited to English-language content
- Blocking in real time is defined as taking less than 30 seconds to block advertising
- All tests are carried out on browsers that run JavaScript
- Testing was carried out on **one** specified version of the CV product

5. Findings

The results in the table below present a snapshot of what each product delivered in our test. Overall our testing showed that the eight CV products tested all had different capabilities and they all reduced the risk of ad misplacement.

It is notable that some of the tools were able to respond to certain aspects of HTML code but not others. For example, in test 1 a number of the products were able to identify specified words on a page and make a correct serving decision but were not able to block an ad where the specified words appeared within meta tags and JavaScript. Similarly variable results were found for test 6 where some products were able to identify a specified word within a sub-domain name but not a domain. This leads us to conclude that some tools may not be set up to look at the entire code.

In particular we note that the products tested varied in their ability to make decisions in real-time as shown in tests 4 and 9. Each product tested was configured to exclude a list of keywords, domains and sub-domains. Test 4 reviewed the ability to respond to the addition or removal of content on a page. Where a specified word appeared on our test web page we expected the ad would be blocked (Test 4.1). Once this content was removed we expected the ad would be served. A number of the CV products were able to block the initial serving of the ad but were unable to recognise when the relevant key word had been removed and change the instruction to serve the ad. Similarly, where specified keywords were added, some of the products failed to recognise this change and still served the ad.

Test 9 was designed to review responsiveness to additional instructions within an ongoing campaign. We recorded how long each CV product took to respond when additional specified keywords, domains or sub-domains were added to our blocking criteria. Time taken for the products to block based on the new specification varied from under a minute to over 48 hours. Those products with a directly accessible client interface produced a far quicker response time than those without.



ABC Interim Review of Content Verification Technology

These findings have implications where the ability to update CV product instructions in real-time is important, for example where ads are being served onto sites where content is dynamic or which contain posts or forums with limited editorial control.

ABC Interim Review of Content Verification Technology



Inappropriate Content test results			Results: ✓ = expected result, ✗ = unexpected result, ⊗ = mixed result							
Test no.	Test Condition for each page loaded.	Expected Result.	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8
1	Test to identify specified words in HTML source code.									
1.1	Specified words before the ad.	Ad is blocked.	✓	✓	✓	✓	✓	✓	✓	✓
1.2	Specified words after the ad.	Ad is blocked.	✓	✓	✓	✓	✓	✓	✓	✓
1.3	Specified words in meta tags.	Ad is blocked.	✓	✗	✗	✓	✗	✗	✗	✓
1.4	Specified words in alt tags.	Ad is blocked.	✓	✓	✗	✓	✗	✗	✗	✓
1.5	Specified words in inline JavaScript code.	Ad is blocked.	✓	✗	✓	✓	✗	✗	✓	✗
2	Test to identify specified words in content delivered via a linked file.									
2.1	Script tag linked to another JavaScript source file containing specified bad content.	Ad is blocked.	✓	✗	✓	✓	✗	✗	✓	✗
2.2	A frameset with good content and an advert, but a frameset with specified words.	Ad is blocked.	✓	✗	✓	✓	✗	✓	✗	✗
3	Test to identify specified words in content delivered using inline embedded content.									
3.1	Ad delivered on parent page with specified words in an iframe.	Ad is blocked.	✓	✗	✗	✓	✓	✗	✓	✗
3.2	Ad is delivered in an iframe with good content and parent page contains specified words.	Ad is blocked.	✓	✓	✓	✓	✓	✓	✗	✓
3.3	Ad delivered on parent page with specified words in an object.	Ad is blocked.	✓	✗	✗	✓	✓	✗	✗	✗
3.4	Ad is delivered in an object with good content and parent page contains specified words.	Ad is blocked.	✓	✓	✓	✓	✓	✓	✗	✓
3.5	Parent page contains good content, but the page also has an object within an <embed> tag which contains specified words. (Note: this test is only valid for Opera, Safari and Chrome browsers.)	Ad is blocked.	✓	✗	✗	✓	✗	✓	✗	✗



Inappropriate Content test results			Results: ✓ = expected result, ✗ = unexpected result, ⊗ = mixed result							
Test no.	Test Condition for each page loaded	Expected Result.	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8
3.6	Parent page contains specified words, and the ad is delivered within an embed tag which contains good content. (Note: this test is only valid for Opera, Safari and Chrome browsers.)	Ad is blocked.	✓	✗	✓	✓	✓	✓	✗	✓
3.7	Parent page contains specified words and the ad is delivered using nested iframes (3 deep)	Ad is blocked.	✓	✗	✓	✓	✓	✓	✗	✗
3.8	Parent page contains specified words and the ad is delivered using nested iframes (5 deep)	Ad is blocked.	✓	✗	✓	✓	✓	✓	✗	✗
4	Test of responsiveness to change in page content.									
4.1	Specified words are present on the page, the page is refreshed and then specified words are removed and the page is refreshed.	1. Ad is blocked. 2. Ad is blocked. 3. Ad is served.	✗	✗	✗	⊗	✓	✗	✓	✓
4.2	No specified words are present on the page, the page is refreshed and then specified words are added and the page is refreshed.	1. Ad is served. 2. Ad is served. 3. Ad is blocked.	✗	✗	✗	⊗	✗	✗	✓	✓
5	Test to identify URLs on specified domains/sub-domains.									
5.1	Add a domain to the CV products specified list and load a page on this domain.	Ad is blocked.	✓	✓	✗	✓	✓	✗	✗	✓
5.2	Add a sub-domain to the CV products specified list and load a page on this domain.	Ad is blocked.	✓	✓	✓	✓	✓	✗	✓	✓
6	Test to identify specified words in URLs.									
6.1	Domain name contains a specified word.	Ad is blocked.	✓	✗	✗	✓	✓	✗	✗	✓
6.2	Sub-domain name contains a specified word.	Ad is blocked.	✓	✓	✓	✓	✓	✗	✗	✓
6.3	The directory part of the URL contains a specified word.	Ad is blocked.	✓	✗	✓	✓	✓	✗	✓	✓
6.4	The query part of the URL contains a specified word.	Ad is blocked.	✓	✗	✗	✓	✓	✗	✓	✓



Inappropriate content test results			Results: ✓ = expected result, ✗ = unexpected result, ⊗ = mixed result							
Test no.	Test Condition for each page loaded	Expected Result.	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8
7	Test to identify Alias URLs.									
7.1	The page contains an alias (Tiny URL) which links a domain with specified words.	Ad is blocked.	✓	✓	✓	✓	✓	✗	✗	✓
8	Test to record additional time taken (milliseconds) for an ad to be served when the CV product is installed.									
8.1	Page size 8k and the ad is at the top.	Average time =>								
8.2	Page size 49k and the ad is at the top.	Average time =>	Taken out of scope – see point 3.3							
8.3	Page size 8k and the ad is at the bottom.	Average time =>								
8.4	Page size 49k and the ad is at the bottom.	Average time =>								
9	Test to assess the time taken for the CV product to respond to updated specified content.									
9.1	The CV product is updated with new specified content and auto-refreshed until the ad is blocked.	Time taken =>	2 hours	Ad was never blocked in > 48 hours	< 1 minute	2 minutes	Ad was never blocked in > 48 hours	Ad was never blocked in > 48 hours	< 1 minute	1 hour
10	CV product report tests.									
10.1	Did the number of ad calls reported and ad calls blocked reconcile with the ABC adserver report?	Yes	✓	✓	✓	✓	✓	✓	✓	✓
10.2	How long after tests 1-7 were complete was the adcall report available? (Note if available online or requested from product provider.)	Time taken =>	Same day	1 hour	Same day from provider	2 working days	1 hour	2 working days	Same day from provider	2 working days

6. Conclusions

CV technology aims to deliver increased safety for online ad placement by delivering ads in line with buyers' instructions. Our review shows that all products tested are capable of this but that capability varies, as does the ability to make decisions in real-time. Furthermore, the CV products' capabilities are changing over time as improvements and modifications are made to underlying systems.

Those placing reliance on CV technology would be advised to regularly review the capabilities of and methods employed by CV products to ensure a solution meets their current specific needs. For example, where ads are being delivered to dynamic pages regularly updated with new content via blogs or forums a buyer may place more emphasis on the speed at which the CV product can respond to new content. Where key words are likely to change, direct access to the CV product interface allows for much quicker response time.

Looking ahead we recommend that a set of testing principles is adopted by the industry in order to benchmark CV products against a set of specified capabilities. We believe that such a testing programme, applied regularly, would increase transparency and allow buyers to make informed choices based on their needs.

Given the varying nature of the products tested, we do not believe that a minimum industry standard, setting out a list of pass / fail criteria, would be the most effective way to provide transparency for those who place reliance on CV products. However, independent verification of capability would give buyers comfort and build trust by providing a regular review of the ability of a CV product to meet its claims. Given that the capabilities of CV products are constantly developing we recommend that any such verification should be updated on a regular basis.

A set of principles for such a programme, as detailed in Appendix III, has been submitted and approved by JICWEBS.

7. Acknowledgements

We would like to record our thanks to all those companies, both global and local, that have taken part in this initial study. Thanks to JICWEBS for their guidance and endorsement of this work and the teams at ABC that worked on this review.

The test environment was built by Switch Concepts. Thanks in particular to Tom Barnett and Amanda Golding <http://www.switchconcepts.co.uk/>

Thanks to IASH members and especially to all the CV product owners who took part in this review.



Appendix I

CV product owners taking part are as follows

- AdSafe Media Brand Safety Firewall <http://adsafemedia.com>
- AdXpose by comScore <http://adxpose.com>
- DoubleVerify BrandShield www.doubleverify.com
- Emediate SiteScreen www.sitescreen.com
- Peer39 www.peer39.com
- Project Sunblock www.projectsunblock.com
- PulsePoint (formerly ContextWeb) www.pulsepoint.com
- Vibrant Media SafeServe www.vibrantmedia.com/safeserve



Appendix II

Summary of inappropriate content tests, including brand conflicting content, as derived from JICWEBS approved principles	
<p>Requirement: The CV Product blocks, in real time, serving of online advertising onto content identified in advance as inappropriate</p> <p><i>Capable</i> is defined as once configured to do something the product consistently does this during the period of testing.</p> <p><i>Blocks, in real time</i> is defined as the product taking 30 seconds or less to take action. Therefore any test that takes longer than 30 seconds will fail.</p> <p>If identification of content is not in real time the CV product must block the serving of advertising to any URL not previously checked as safe until status is known.</p>	
Tests will check that the CV product can:	
<i>Tests 1.1-1.5</i>	Block the serving of advertising on to pages which contain specified content in HTML source code
<i>Tests 2.1-2.2</i>	Block the serving of advertising on to pages which contain specified words in content delivered via a linked file
<i>Tests 3.1-3.6</i>	Block the serving of advertising on to pages which contain specified words in content delivered using inline embedded content
<i>Tests 3.7-3.8</i>	Break through 1 and/or 3 and/or 5 iframes and block the serving of advertising if specified keywords or URLs are detected
<i>Tests 4.1-4.2</i>	Register changes in page content and then block the serving of advertising on to pages which contain specified content, in real time.
<i>Tests 5.1-5.2</i>	Block the serving of advertising on to pages which contain specified URLs in domains and sub-domains.
<i>Tests 6.1-6.4</i>	Block the serving of advertising on to pages which contain specified words in URL
<i>Test 7.1</i>	Block the serving of advertising on to pages which contain specified URL in alias URL
<i>Tests 8.1-8.4</i>	The additional time required by the CV product to make a 'correct' decision before the ad is served/blocked. This will be for 2 page sizes (8k and 49k) and tested from more than one geographical location.
<i>Test 9.1</i>	That the list of any specified keywords or URLs can be programmed into the CV product within X? working days of a list's production
<i>Test 10.1-10.2</i>	CV product report tests

Appendix III

JICWEBS Content Verification (CV) Product Principles.

CV Products can be used to increase the safety of online advertising placement, avoiding content deemed inappropriate by the advertiser.

This document sets out 10 principles for review by JICWEBS. The principles have been developed following our testing of 8 CV Products which took place in October-November 2011 and replace those principles put forward in May 2011.

Note – principles are set out below in **bold** with supplementary information in *italics*. A CV Product will be tested against the following principles:

1. **Block the serving of advertising on to pages which contain content, deemed to be inappropriate by the advertiser, in HTML source code.** *Detect inappropriate words on a web page or the code of that web page before or after the ad appears.*
2. **Block the serving of advertising on to pages which contain words in content delivered via a linked file deemed to be inappropriate by the advertiser.** *When the page appears in the browser it displays content pulled from another source which may be unrelated to the expected content on the page.*
3. **Register changes in page content and then block the serving of advertising on to pages which contain content, deemed to be inappropriate by the advertiser, in real time.** *A page which has rapidly changing content such as a Forum.*
4. **Block the serving of advertising on to domains and sub-domains, deemed inappropriate by the advertiser.** *An inappropriate text string in the domain or sub-domain name such as `http://inappropriate.com` OR `http://inappropriate.safesite.com`*
5. **Block the serving of advertising on to pages which contain words in the URL, deemed to be inappropriate by the advertiser.** *An inappropriate text string contained within the URL such as `http://normal.com/okay/inappropriate.aspx`*
6. **Block the serving of advertising on to aliases of an URL or domain, deemed to be inappropriate to the advertiser.** *A URL may look like `http://normal.com/safe.aspx` but the page that is displayed is `http://inappropriate.com/unsafe.aspx`*
7. **See through iframes and block the serving of advertising if keywords or URLs, deemed to be inappropriate, to the advertiser, are detected.** *Inappropriate words may be contained within the iframe which is embedded on a web page and the ad is served on the page, or vice versa.*

An approved CV Product will also be able to serve ads correctly in equivalent scenarios that contain only appropriate content. In addition, the CV Product will:

8. **Operate consistently in allowing or blocking advertising when JavaScript is disabled.** *If the product requires JavaScript to be enabled by a browser for it to make a decision as to whether the content is appropriate or not, does it block the serving of ads if JavaScript is disabled?*
9. **Be capable of incorporating any list of keywords or URLs, deemed to be inappropriate by the advertiser, into the CV product within 2 working days of that new list being produced.**
10. **Be configurable to block the serving of advertising to any URL not previously checked as safe, until the status is known, if identification of content is not in real time.**

The objective of ABC's test programme is to verify whether a CV Product is capable of meeting claims in relation to some or all of the principles above. For the purpose of ABC testing note:

- 1) *Capable* is defined as once configured; the product consistently blocks or serves ads under different scenarios during the period of testing.
- 2) *Blocking, in real time* refers to the decision to serve or not serve the ad and not any spidering or pre-classification activity.

ABC Test Programme Caveats:

ABC's audit opinion confirms only that the CV Product is capable of preventing ad delivery when **configured correctly** (with certain exceptions as stated below) on Inappropriate Content, but does not guarantee that no ad will ever be served onto an inappropriate site when the CV Product is used in real life. The following specific caveats must also be noted:

- Testing is at a point in time and on a limited scale
- ABC will test that the CV product hasn't been configured to block serving of ads in all tests by default
- The test programme does not verify the scalability of the product
- The context of testing does not fully reflect real life conditions such as multiple campaigns running in multiple sites
- The test programme does not verify implementation times required in real life
- The test programme only verifies that the product blocks on the basis of HTML text and URLs. It does not verify that the product blocks all content formats, particularly non-HTML (e.g. AV content, images etc.)
- The scope of ABC's opinion is limited to English-language content
- Testing is carried out on **one** specified version of the CV product
- Testing does not examine any impact that the CV product may have upon campaign delivery