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In regards to the previous post and the impending Blackhat speech with Josh Sokol, I thought I'd spend some time enumerating some of the possibilities for reducing the chatter over SSL/TLS that the browser introduces. There are a few things that an attacker generally doesn't care about (not always, but generally). They generally don't care about images, CSS, JavaScript, favicons, and most of the HTTP headers. That is, those parts of the HTML and HTTP request/response are generally less interesting than the content itself or what the user is sending. So there's a few tricks we can use to force the user's browser to cache the content prior to intentionally navigating there (call it pre-caching for lack of a better term).

Firstly, there's a pretty good chance that an attacker can connect to the SSL/TLS encrypted website site in question and see what the HTTP response headers look like. Minus cookies, URL and POST data, an attacker can get a pretty accurate picture of what the HTTP response looks like. The attacker can also identify what sort of key exchange the user will be using with the site in question

through a little enumeration. So the amount of data sent on the wire is smaller, and the data that is sent can be isolated to the few unknown components.

Next, an attacker can create an iframe (from a MITM'd HTTP website - the side channel) to the SSL/TLS encrypted site in question to pre-load all the images, JavaScript, CSS, favicons, and so on, that typically muddy the encrypted HTTP data flying in both directions. Lots of times the files in question are inconsequential to the page in question from the attacker's perspective. But because browsers share sockets for multiple requests, often the chatter for these static objects can make determining what is on the wire much more difficult.

So by forcing the user's browser to pre-cache the content, an attacker can get down to just the pages they are interested in and a few GET requests that return 304 Not Modified responses. That's a much smaller footprint for the unrelated data than it would be if it weren't cached. Now, it may not always be a good idea to pre-cache. Sometimes the content will be hosted on other subdomains or domains, and therefore won't create the same amount of chatter over the socket, because it isn't pulling that content from the same IP. Other times it may be useful to detect that a user is on a certain page, because some of the content is a very specific to that page in question and is a known size - alerting the attacker to the fact that the user being monitored is on the page in question.

In this way an attacker is really getting down to the exact parts of the data they are interested in. Obviously the earlier an attacker can do this the better - trying to cache after the fact doesn't make a lot of sense, although using timing attacks an attacker may be able to tell where the user has been, interestingly enough (Chris Evans did a good writeup on this a while back).

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