



JavaScript Debugging

JavaScript runs in the browser so it must be debugged in the browser





Firebug was the
trailblazer for
debuggers

It's the original Firefox add-on

Needed to be installed

But now merged with built-in Firefox tools

But all browsers have debuggers baked in

- No need for installs and extra packages

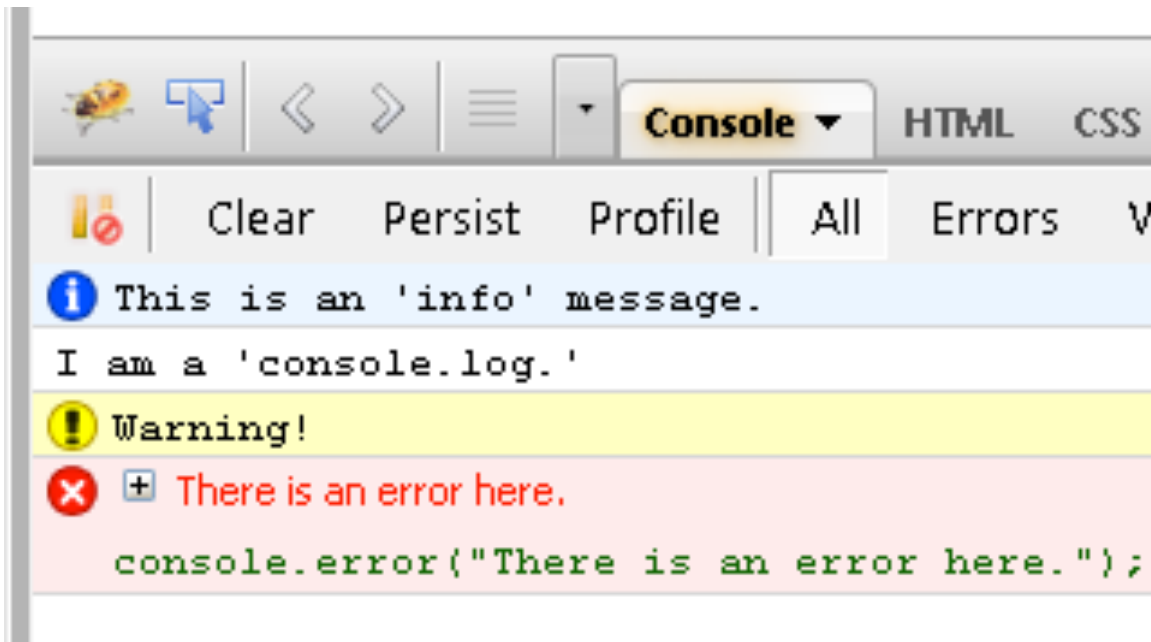
**Option -
Cmd - i**

F12



We can send messages to the console

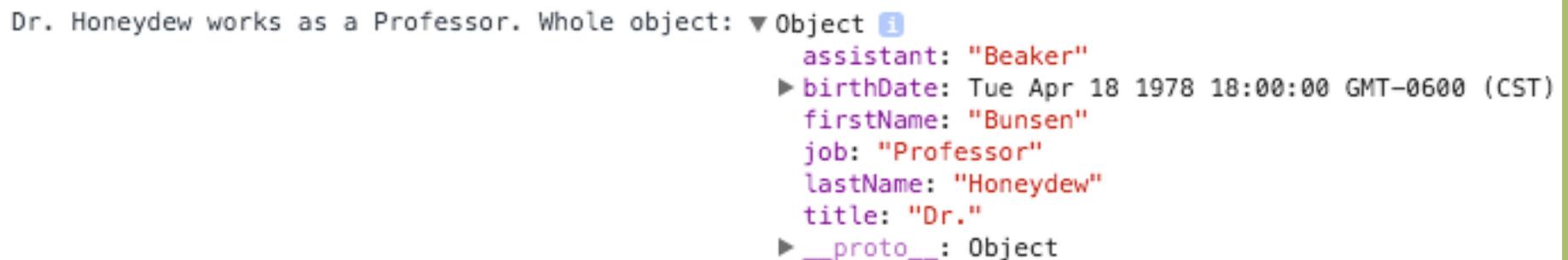
```
console.info("This is an 'info' message.");  
console.log("I am a 'console.log.'");  
console.warn("Warning!");  
console.error("There is an error here.")
```



```
console.log(
  "%s %s works as a %s. Whole object: %o",
  person.title, person.lastName,
  person.job, person);
```

- %s - string
- %f - floating point number
- %d or %i - integer
- %o - Expandable DOM object
- %O - Expandable JavaScript object

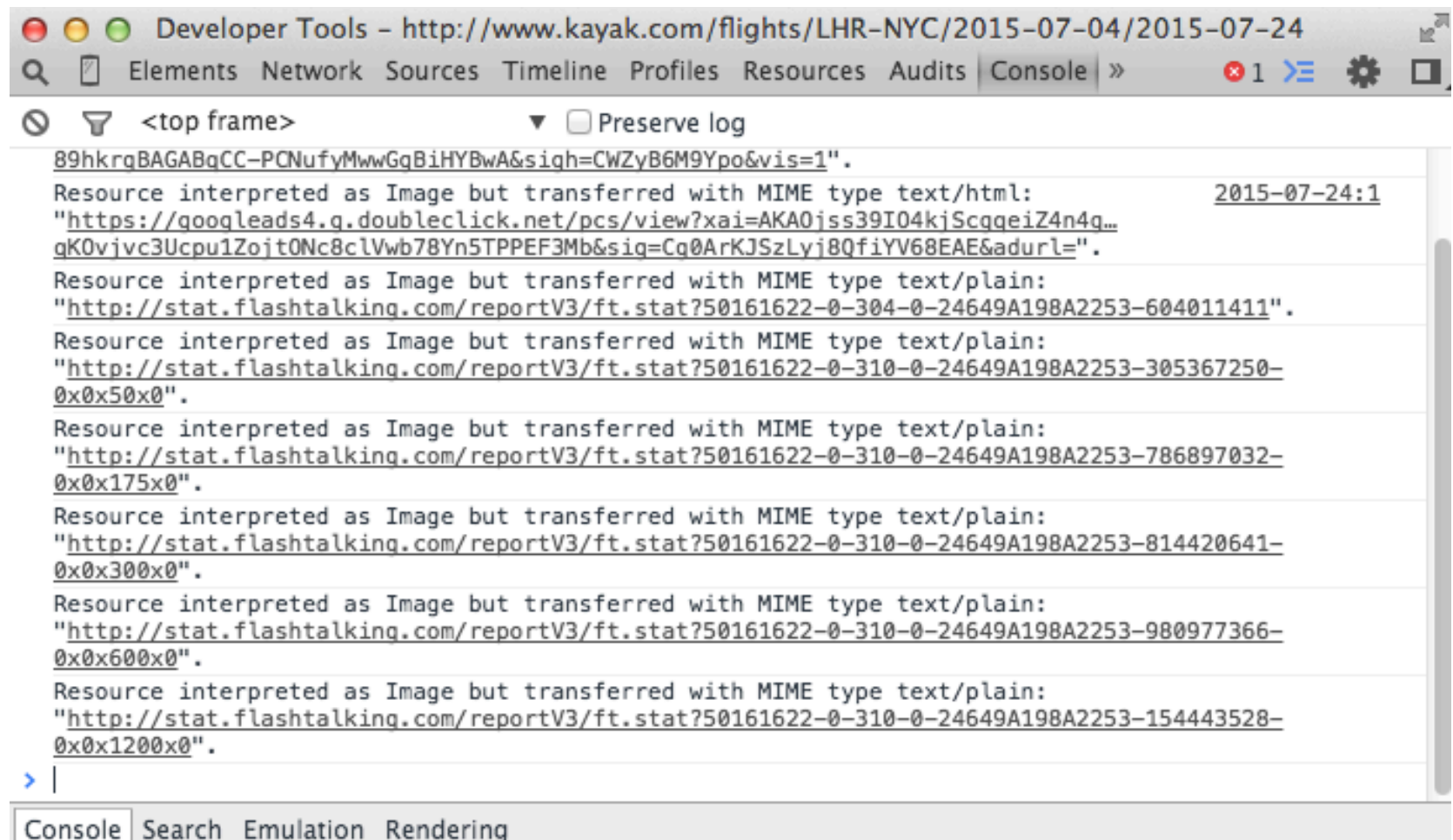
console.log
can format



```
Dr. Honeydew works as a Professor. Whole object: ▼ Object ⓘ
  assistant: "Beaker"
  ▶ birthDate: Tue Apr 18 1978 18:00:00 GMT-0600 (CST)
  firstName: "Bunsen"
  job: "Professor"
  lastName: "Honeydew"
  title: "Dr."
  ▶ __proto__: Object
```

All Browsers Tools Work Pretty Much Alike

- Let's see how Chrome works differently. This'll give us clues as to how the others work



Application shows memory storage

Like cookies, local & session storage

Developer Tools - https://www.kayak.com/flights/NYC-LHR/2017-07-04/2017-07-24

Elements Console Sources Network Timeline Profiles Application Security >> 1 7

Application

- Manifest
- Service Workers
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies
 - https://www.kayak.com
 - https://5142311.fls.do
 - https://cdn.krxd.net
 - https://stags.bluekai.c
 - https://ad.atdmt.com
 - https://tpc.googlestync
 - https://r.254a.com

Name	Value	Domain	Pa...	Expires / M..	Size	HT...	Sec...	Sa...
Apache	L7qjlg-AAABWTx7...	www.kayak...	/	2019-09-2...	34	✓		
DSID	ADyxuksEYUWtTE...	.doubleclick...	/	2017-03-1...	123	✓		
IDE	AHWqTUKBMrekL...	.doubleclick...	/	2018-11-1...	61	✓		
IM_eu_freq_cap	Y	.kayak.com	/	2017-02-2...	15			
NSC_q4-lbqj	ffffffff094f9a14455...	www.kayak...	/	2017-02-2...	55	✓		
NSC_q4-tqbslmf	ffffffff094f2a2f455...	www.kayak...	/	2017-02-2...	58	✓		
__gads	ID=f02950bf59010...	.kayak.com	/	2018-12-2...	75			
_ga	GA1.2.106792449...	.kayak.com	/	2019-02-2...	30			
_gat	1	.kayak.com	/	2017-02-2...	5			
cluster	4	www.kayak...	/	2017-02-2...	8	✓		
id	22aedbc3ae0a000...	.doubleclick...	/	2018-11-1...	69			
im_puid	0654a143-02c3-4...	.kayak.com	/	2018-03-2...	43			
im_xu_poll_open	1	www.kayak...	/	2017-02-2...	16			
kayak	P9qRMikR0b0W2...	www.kayak...	/	2019-12-2...	25	✓		
kykprf	347	www.kayak...	/	Session	9	✓		
p1.med.bsc	I\$onO0PKhaCL	www.kayak...	/	Session	22	✓		
p1.med.sc	12	www.kayak...	/	2017-05-2...	11			
p1.med.searched	true	www.kayak...	/	2017-05-2...	19			
p1.med.sid	H-4tnJq65Y6iucG...	www.kayak...	/	Session	75	✓		
p1.med.token	U_98Vdmv68Eo1a...	www.kayak...	/	2017-08-2...	34	✓	✓	

Debugging JavaScript

Find all JavaScript source under Sources

Developer Tools - https://www.kayak.com/flights/NYC-LHR/2017-07-04/2017-07-24

Elements Console Sources Network Timeline Profiles Application Security Audits >> 4

Sources Content scripts >> pubads_impl_110.js x

- top
 - www.kayak.com
 - flights/NYC-LHR/2017-07-24
 - king/logos
 - res
 - (no domain)
 - a.cdn.intentmedia.net
 - a1.r9cdn.net
 - d37gvrvc0wt4s1.cloudfront.net
 - ng-inspector for AngularJS
 - pagead2.googlesyndication.com
 - securepubads.g.doubleclick.net
 - gampad
 - gpt
 - pubads_impl_110.js

```
1 (function(){var window=this,document=this.doc
2 if("[object Function]"==c||"undefined"!type
3 da(a)},y=function(a){var b=typeof a;return"
4 -1!=Function.prototype.bind.toString().inde
5 b.prototype;a.Fa=b.prototype;a.prototype=ne
6 Cc=function(a){return-1!=a.indexOf("&")?"doc
7 case "gt":return">";case "quot":return'"';de
8 if(31<g&&127>g)e=d;else{if(256>g){if(e=="\x
9 c=Ic(0==f[1].length?0:parseInt(f[1],10),0==
10 pd=function(a,b){var c=0;H(a,function(d,e){
11 Array.prototype.splice.call(a,b,1)},wd=func
12 a[c++]=e)}a.length=c,Bd=function(a,b){a.sor
13 arguments[e];for(c in d)a[c]=d[c];for(var f=
14 "7.0"==c[1])if(a&&a[1])switch(a[1]){case "4.
15 a:{var sa="",ua=function(){var a=Id;if(re)re
16 xa=ya&&L?ye()||("CSS1Compat"==ya.compatMode
17 b,c){if(null==b)c.push("null");else{if("obje
18 !isNaN(b)?String(b):"null");break;case "boo
19 Aa.prototype.toString=function(){var a=this
20 Ca.prototype.log=function(a,b,c,d,e){a=new
21 Za=Ea(23),$a=D(26),ab=D(27),bb=D(28),cb=D(30
22 $b=D(92),ac=D(93),bc=D(94),Cd=D(95),E=func
23 d)&&b.call(c,a[d],d,a)},jc=function(a){var l
24 nc=function(a){if(!a)return"";var b="/ *[%#?
25 }
```

Line 1, Column 1



Click "pretty print" to de-minify the code.

Set breakpoints
by clicking a line
number

Read or edit
variables

Continue

Step over

Step into

Step out

Developer Tools - https://www.kayak.com/flights/NYC-LHR/2017-07-04/2017-07-24

Sources >> Elements Console Sources Network Timeline Profiles Application Security Audits >>

Sources >> horizon.js?v=92...3ade:formatted x >>

top
www.kayak.com
flights/NYC-LHR/2017-07-24
king/logos
res
(no domain)
a1.r9cdn.net
Desktop

```
2142     this.questions[a] = b;  
2143     d.question.answer(a, b)  
2144   }  
2145   );  
2146   createComponentClass = function(a) { a = "base.results.Rail";  
2147   if (3 === arguments.length && "object" === typeof arguments[0])  
2148     var b = arguments[2]; b = undefined;  
2149     d.events.when(arguments[1], function(c) {  
2150       f(a, b, c) a = "base.results.Rail", b = undefined;  
2151     })  
2152   } else  
2153     f.apply(this, arguments) arguments = ["base.results.Rail", arguments[1], arguments[2]]  
2154  
2155   define("R9.common.Component", e.extend({}, d.Component, {  
2156     parentClass: "BaseClass"  
2157   })  
2158   )  
2159   d.R9, window.jQuery, window.base2.Base);  
2160   ion(c, e) {  
2161     publish("authentication", {  
2162       url: "common/authentication/DialogContainer",  
2163       formToken: null,  
2164       userInfo: null,  
2165       cached_params: null,  
2166     })
```

Call Stack

Scope

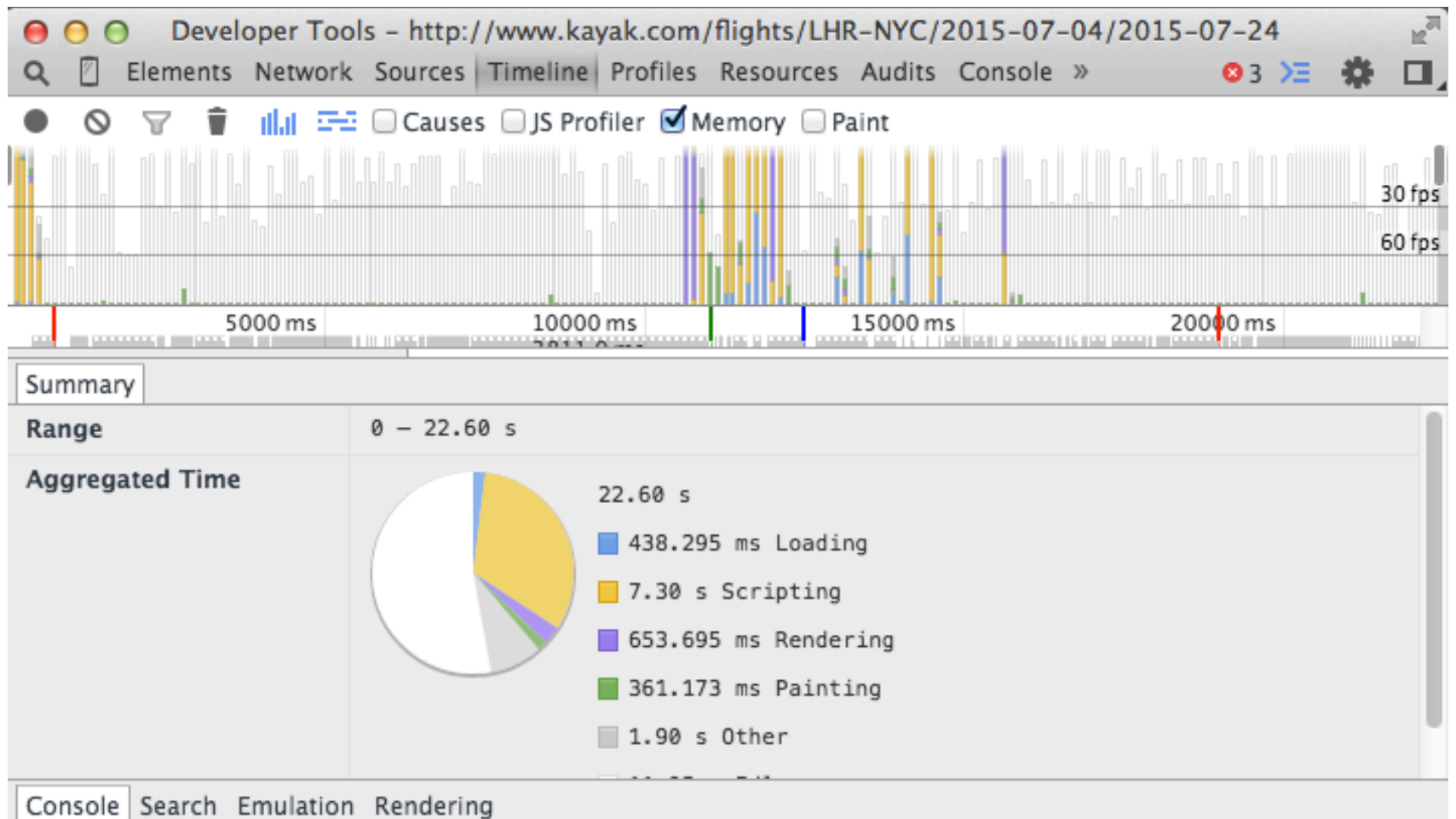
Local

- a: "base.results.Rail"
- arguments: Arguments[2]
 - 0: "base.results.Rail"
 - 1: Object
 - callee: (a)
 - length: 2
 - Symbol(Symbol.iterator): Symbol
 - __proto__: Object
- b: undefined
- this: Object
 - Admin: Object
 - Analytics: Object
 - Common: Object
 - CompareTo: Object
 - Component: [base2.Base]
 - ComponentManager: Object
 - DatePicker: Object

Line 2147, Column 9

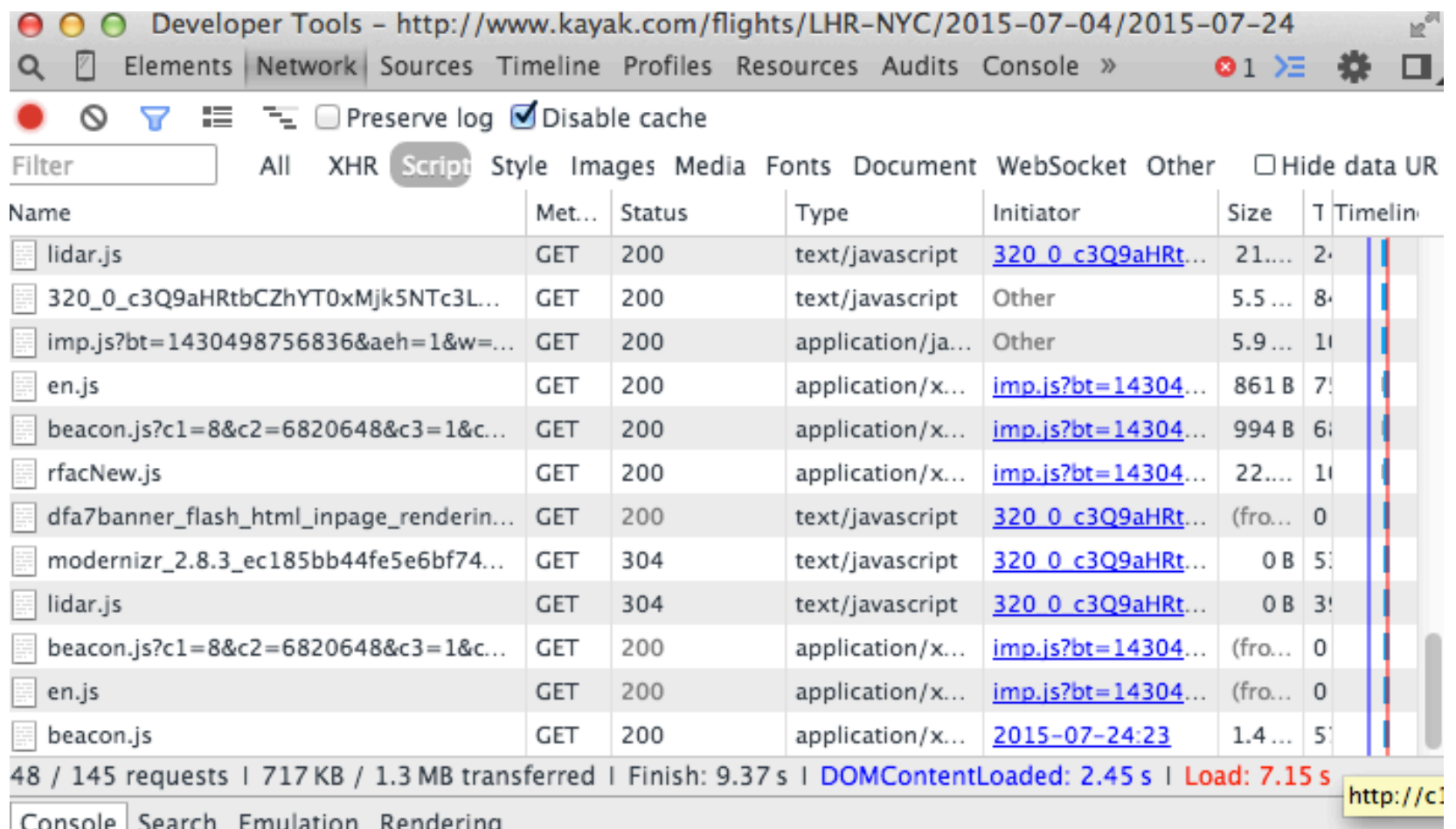
Timeline and Profiles are for performance

They allow watching the speed and memory usage of your page



Examine traffic on the Network tab

Shows each resource requested, its HTTP method, result, type, and speed



The screenshot shows the Chrome Developer Tools Network tab for the URL `http://www.kayak.com/flights/LHR-NYC/2015-07-04/2015-07-24`. The 'Script' filter is selected, displaying a list of JavaScript files. The table below summarizes the visible entries:

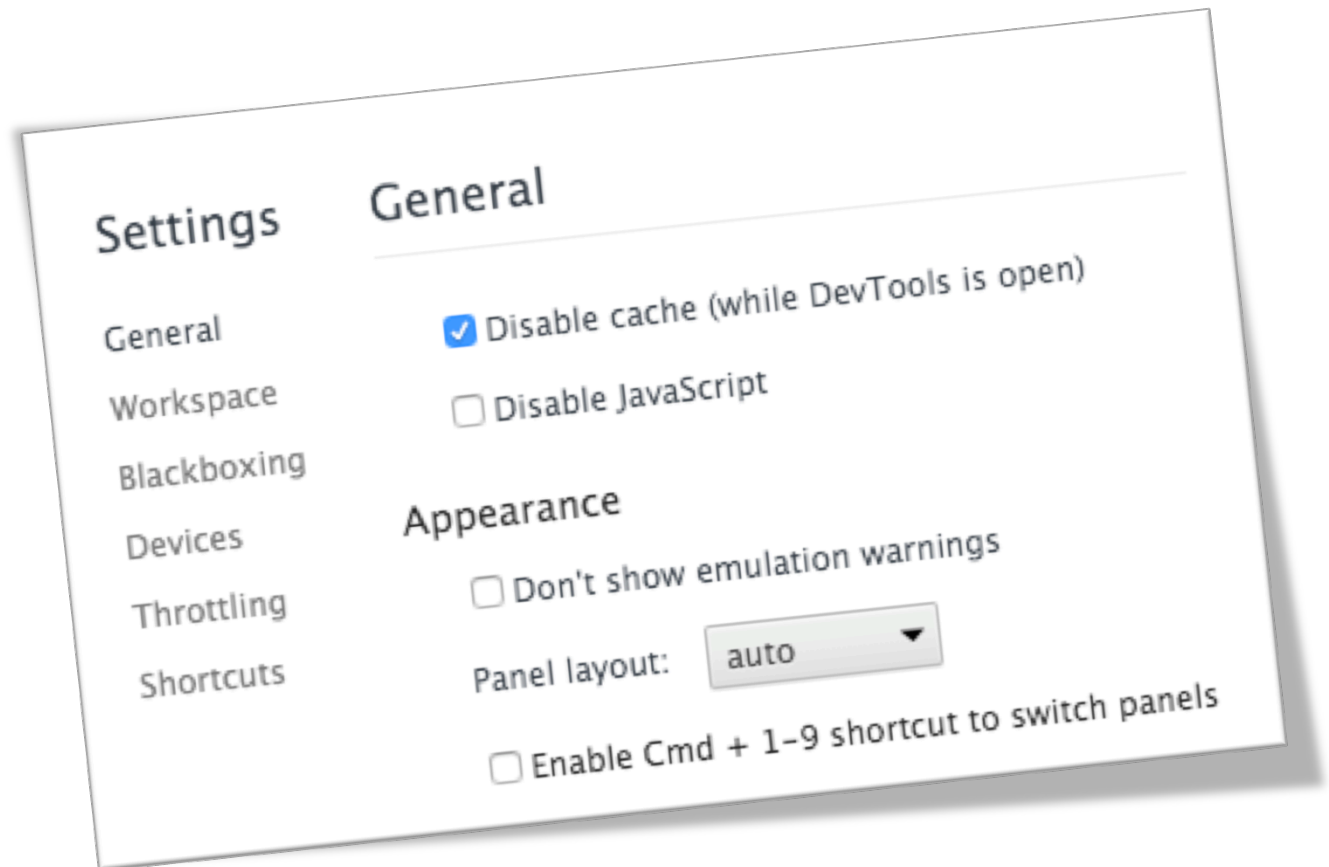
Name	Met...	Status	Type	Initiator	Size	T	Timelin
lidar.js	GET	200	text/javascript	320_0_c3Q9aHRt...	21...	2...	
320_0_c3Q9aHRtbCZhYT0xMjk5NTc3L...	GET	200	text/javascript	Other	5.5 ...	8...	
imp.js?bt=1430498756836&aeh=1&w=...	GET	200	application/ja...	Other	5.9 ...	10...	
en.js	GET	200	application/x...	imp.js?bt=14304...	861 B	7...	
beacon.js?c1=8&c2=6820648&c3=1&c...	GET	200	application/x...	imp.js?bt=14304...	994 B	6...	
rfacNew.js	GET	200	application/x...	imp.js?bt=14304...	22...	10...	
dfa7banner_flash_html_inpage_renderin...	GET	200	text/javascript	320_0_c3Q9aHRt...	(fro...	0	
modernizr_2.8.3_ec185bb44fe5e6bf74...	GET	304	text/javascript	320_0_c3Q9aHRt...	0 B	5...	
lidar.js	GET	304	text/javascript	320_0_c3Q9aHRt...	0 B	3...	
beacon.js?c1=8&c2=6820648&c3=1&c...	GET	200	application/x...	imp.js?bt=14304...	(fro...	0	
en.js	GET	200	application/x...	imp.js?bt=14304...	(fro...	0	
beacon.js	GET	200	application/x...	2015-07-24:23	1.4 ...	5...	

Summary: 48 / 145 requests | 717 KB / 1.3 MB transferred | Finish: 9.37 s | DOMContentLoaded: 2.45 s | Load: 7.15 s

Bottom bar: Console | Search | Emulation | Rendering

Sometimes your files aren't re-read from the server. You can force it!

- In developer tools go ...
- Settings (gear)
- General
- Check "Disable cache (while DevTools is open)"



tl;dr

- JavaScript debugging must be done in the browser
- Firebug is available for Firefox
- All browsers have their own debugging tools
- Fortunately they all behave pretty much the same way and all have
 - DOM inspection
 - CSS debugging
 - JavaScript debugging
 - Network analysis