

1. Public Resources

- css, scripts, fonts, static images like favicon or logo
- Cache for 1 year, public, weak ETag, stale resource allowed.
- Header example:

```
Cache-Control: public, max-age=31536000
ETag: W/"368d-15cc3a03146"
```

- Expected result:
 - ✓ status 200
 - ✓ from local cache
 - ✓ have Cache-Control: public, max-age=31536000
 - ✓ have ETag
- Test result (screenshot):
 - a) First load of style.css

bootstrap.min.css	200	stylesheet	(index)	22.9 KB	683 ms
style.css	200	stylesheet	(index)	21.0 KB	492 ms
logo.png	200	image	(index)	23.5 KB	257 ms

Name

vinylholics.herokuapp.com

logo.png

24

23

22

21

20

19

18

17

16

15

bootstrap.min.css

style.css

facebook.css

jquery.min.js

bootstrap.min.js

font-awesome.min.css

font-awesome.min.css

shopping_cart.js

bootstrap.min.css

glyphicons-halflings-regular....

Headers

Preview

Response

Cookies

Timing

General

Request URL: https://vinylholics.herokuapp.com/css/style.css

Request Method: GET

Status Code: 200 OK

Remote Address: 50.16.205.156:443

Referrer Policy: no-referrer-when-downgrade

Response Headers

view source

Accept-Ranges: bytes

Cache-Control: public, max-age=31536000

Connection: keep-alive

Content-Length: 21181

Content-Type: text/css; charset=UTF-8

Date: Wed, 28 Jun 2017 07:02:02 GMT

Etag: W/"52bd-15ced068330"

Last-Modified: Wed, 28 Jun 2017 04:47:26 GMT

Server: Cowboy

Via: 1.1 vegur

X-Powered-By: Express

Request Headers

view source

Accept: text/css,*/*;q=0.1

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2

Cache-Control: no-cache

Connection: keep-alive

Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE

Host: vinylholics.herokuapp.com

Pragma: no-cache

Referer: https://vinylholics.herokuapp.com/

User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36

b) Reload of `style.css`

The resource is retrieved from disk cache, so there is no bandwidth use.

Significantly reduced the loading time from 492ms to 8ms.

shopping_cart.js	200	script	(index)	(from memory cache)	0 ms
style.css	200	stylesheet	(index)	(from disk cache)	8 ms
logo.png	200	png	(index)	(from memory cache)	0 ms

Name

vinylholics.herokuapp.com

jquery.min.js

bootstrap.min.css

bootstrap.min.js

shopping_cart.js

style.css

logo.png

24

23

facebook.css

22

21

20

font-awesome.min.css

19

18

font-awesome.min.css

17

16

× Headers Preview Response Timing

▼ General

Request URL: `https://vinylholics.herokuapp.com/css/style.css`

Request Method: GET

Status Code: 200 OK (from disk cache)

Remote Address: `50.16.205.156:443`

Referrer Policy: `no-referrer-when-downgrade`

▼ Response Headers

Accept-Ranges: bytes

Cache-Control: `public, max-age=31536000`

Content-Length: 21181

Content-Type: `text/css; charset=UTF-8`

Date: `Wed, 28 Jun 2017 07:02:02 GMT`

Etag: `W/"52bd-15ced068330"`

Last-Modified: `Wed, 28 Jun 2017 04:47:26 GMT`

Server: `Cowboy`

Via: `1.1 vegur`

X-Powered-By: `Express`

▼ Request Headers

⚠ Provisional headers are shown

Referer: `https://vinylholics.herokuapp.com/`

User-Agent: `Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36`

2. Relatively Static Resources

- Images for albums or artists
Not-so-dynamic pages (browse artists, artist page, 404)
- Cache for 1 day, public, weak ETag, stale resource allowed.
- Header example:

```
Cache-Control: public, max-age=86400
ETag: W/"1885-jF9p90VGh0jPGOXRLQu9TnQ+l0c"
Expires: Thu, 29 Jun 2017 02:45:31 GMT
```

- Expected result:
 - ✓ status 200
 - ✓ from local cache
 - ✓ have Cache-Control: public, max-age=86400
 - ✓ have Expires: ... (only for old browser compatibility)
 - ✓ have ETag
- Test result (screenshot):
 - a) First load of <https://vinylholics.herokuapp.com/artist/4>

Name	Status	Type	Initiator	Size	Time	Waterfall	2.00 s
4	200	document	Other	6.6 KB	244 ms		
bootstrap				22.9 KB	168 ms		

Name	Headers	Preview	Response	Cookies	Timing
4	▼ General				
	Request URL: https://vinylholics.herokuapp.com/artist/4				
	Request Method: GET				
	Status Code: 200 OK				
	Remote Address: 54.197.234.71:443				
	Referrer Policy: no-referrer-when-downgrade				
	▼ Response Headers view source				
	Cache-Control: public, max-age=86400				
	Connection: keep-alive				
	Content-Length: 6441				
	Content-Type: text/html; charset=utf-8				
	Date: Wed, 28 Jun 2017 07:16:31 GMT				
	ETag: W/"1929-0N8V2AiiKwxdTaHm+voqKfQVnSg"				
	Expires: Thu, 29 Jun 2017 07:16:31 GMT				
	Server: Cowboy				
	Via: 1.1 vegur				
	X-Powered-By: Express				
	▼ Request Headers view source				
	Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8				
	Accept-Encoding: gzip, deflate, br				
	Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2				
	Cache-Control: no-cache				
	Connection: keep-alive				
	Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE				
	Host: vinylholics.herokuapp.com				
	Pragma: no-cache				
	Referer: https://vinylholics.herokuapp.com/browse/artist				
	Upgrade-Insecure-Requests: 1				
	User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36				

b) Reload of <https://vinylholics.herokuapp.com/artist/4>

The resource is retrieved from disk cache, so there is no bandwidth use.

Significantly reduced the loading time from 244ms to 2ms.

Name	Status	Type	Initiator	Size	Time	Waterfall	100.00 ▲
4	200	document	Other	(from disk cache)	2 ms		
jquery.min.js	200	script	4	(from memory cache)	0 ms		

Name	× Headers	Preview	Response	Timing
4	<div>▼ General</div> <div>Request URL: https://vinylholics.herokuapp.com/artist/4</div> <div>Request Method: GET</div> <div>Status Code: 200 OK (from disk cache)</div> <div>Remote Address: 54.197.234.71:443</div> <div>Referrer Policy: no-referrer-when-downgrade</div> <div>▼ Response Headers</div> <div>Cache-Control: public, max-age=86400</div> <div>Content-Length: 6441</div> <div>Content-Type: text/html; charset=utf-8</div> <div>Date: Wed, 28 Jun 2017 07:18:31 GMT</div> <div>Etag: W/"1929-0N8V2AiiKwxwTaHm+voqKfqVn5g"</div> <div>Expires: Thu, 29 Jun 2017 07:18:31 GMT</div> <div>Server: Cowboy</div> <div>Via: 1.1 vegur</div> <div>X-Powered-By: Express</div> <div>▼ Request Headers</div> <div>⚠ Provisional headers are shown</div> <div>Referer: https://vinylholics.herokuapp.com/browse/artist</div> <div>Upgrade-Insecure-Requests: 1</div> <div>User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36</div>			

3. Dynamic Pages

- Index, browse albums, album page
- Re-validate before using cached resource, public, weak ETag, stale resource not allowed.
- Header example:

```
Cache-Control: public, no-cache, must-revalidate
ETag: W/"1d97-t1Wdzs8mP00TMek25jjTJosI/QY"
```

- Expected result:
 - ✓ if not modified, status 304; if Modified, status 200.
 - ✓ if not modified, from local cache; if Modified, from server.
 - ✓ have Cache-Control: public, no-cache, must-revalidate
 - ✓ have ETag
- Test result (screenshot):
 - a) First load of <https://vinylholics.herokuapp.com/browse/page/1>

The screenshot displays the Chrome DevTools Network tab. The first request is highlighted, showing a status of 200 and a size of 7.5 KB. The 'Headers' panel is expanded, showing the following details:

- General:**
 - Request URL: <https://vinylholics.herokuapp.com/browse/page/1>
 - Request Method: GET
 - Status Code: 200 OK
 - Remote Address: 23.23.117.76:443
 - Referrer Policy: no-referrer-when-downgrade
- Response Headers:**
 - Cache-Control: public, no-cache, must-revalidate
 - Connection: keep-alive
 - Content-Length: 7343
 - Content-Type: text/html; charset=utf-8
 - Date: Wed, 28 Jun 2017 07:26:53 GMT
 - ETag: W/"1caf-RS8z7Khga94dstokyhCahGR+K6o"
 - Server: Cowboy
 - Via: 1.1 vegur
 - X-Powered-By: Express
- Request Headers:**
 - Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
 - Accept-Encoding: gzip, deflate, br
 - Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2
 - Cache-Control: no-cache
 - Connection: keep-alive
 - Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsZlpFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE
 - Host: vinylholics.herokuapp.com
 - Pragma: no-cache
 - Upgrade-Insecure-Requests: 1
 - User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36

b) Reload of <https://vinylholics.herokuapp.com/browse/page/1>

The browser has to re-validate with server due to `no-cache`. Server replied with status `304 Not Modified`, which means local cache can be used. Therefore, the resource is retrieved from disk cache which was saved in step a. There is a roundtrip for revalidation that consumes 258B of bandwidth.

Name	Status	Type	Initiator	Size	Time	Waterfall	
1	304	document	Other	258 B	237 ms		
bootstrap.min.css	200	stylesheet	1	(from memory cache)	0 ms		

Name	Headers	Preview	Response	Cookies	Timing
1	<div><div>▼ General</div><div>Request URL: https://vinylholics.herokuapp.com/browse/page/1</div><div>Request Method: GET</div><div>Status Code: ● 304 Not Modified</div><div>Remote Address: 23.23.117.76:443</div><div>Referrer Policy: no-referrer-when-downgrade</div></div> <div><div>▼ Response Headers</div><div>view source</div><div>Cache-Control: public, no-cache, must-revalidate</div><div>Connection: keep-alive</div><div>Content-Length: 0</div><div>Date: Wed, 28 Jun 2017 07:28:22 GMT</div><div>Etag: W/"1caf-RS8z7Khga94dstokyhCahGR+K6o"</div><div>Server: Cowboy</div><div>Via: 1.1 vegur</div><div>X-Powered-By: Express</div></div> <div><div>▼ Request Headers</div><div>view source</div><div>Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8</div><div>Accept-Encoding: gzip, deflate, br</div><div>Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2</div><div>Connection: keep-alive</div><div>Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsZ1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE</div><div>Host: vinylholics.herokuapp.com</div><div>If-None-Match: W/"1caf-RS8z7Khga94dstokyhCahGR+K6o"</div><div>Referer: https://vinylholics.herokuapp.com/</div><div>Upgrade-Insecure-Requests: 1</div><div>User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36</div></div>				
bootstrap.min.css					
style.css					
facebook.css					
jquery.min.js					
bootstrap.min.js					
font-awesome.min.css					
font-awesome.min.css					
shopping_cart.js					
logo.png					
9					
24					
23					
8					
10					
1					
22					
2					
21					
19					
glyphicons-halflings-regular....					

c) Log in to change the page content, then reload of

<https://vinylholics.herokuapp.com/browse/page/1>

The browser tried to re-validate cached resource, but the server replied that the content has changed (ETag was different). Therefore, the new content was freshly retrieved from server.

Name	Status	Type	Initiator	Size	Time	Waterfall	500.00 ms	
1	200	document	Other	11.2 KB	281 ms			
facebook.css	200	stylesheet	memory cache		0 ms			

Name	Headers	Preview	Response	Cookies	Timing
1	<div><div>▼ General</div><div>Request URL: https://vinylholics.herokuapp.com/browse/page/1</div><div>Request Method: GET</div><div>Status Code: 200 OK</div><div>Remote Address: 50.19.250.53:443</div><div>Referrer Policy: no-referrer-when-downgrade</div><div>▼ Response Headers view source</div><div>Cache-Control: public, no-cache, must-revalidate</div><div>Connection: keep-alive</div><div>Content-Length: 11135</div><div>Content-Type: text/html; charset=utf-8</div><div>Date: Wed, 28 Jun 2017 07:29:33 GMT</div><div>ETag: W/"2b7f-fTHfJ7nDdKGcn7d+3s9CJj8L840"</div><div>Server: Cowboy</div><div>Via: 1.1 vegur</div><div>X-Powered-By: Express</div><div>▼ Request Headers view source</div><div>Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8</div><div>Accept-Encoding: gzip, deflate, br</div><div>Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2</div><div>Connection: keep-alive</div><div>Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE</div><div>Host: vinylholics.herokuapp.com</div><div>If-None-Match: W/"1caf-RS8z7Khga94dstokyhCahGR+K6o"</div><div>Referer: https://vinylholics.herokuapp.com/</div><div>Upgrade-Insecure-Requests: 1</div><div>User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36</div></div>				

d) Reload of <https://vinylholics.herokuapp.com/browse/page/1>

This process is similar to step b. The only difference is that the cache in this step is from step c.

Name	Status	Type	Initiator	Size	Time	Waterfall	500.00 ms	▲
1	304	document	Other	258 B	281 ms			
bootstrap.min.css	304	document	1	(from memory cache)	0 ms			

Name	×	Headers	Preview	Response	Cookies	Timing
1		▼ General				
bootstrap.min.css		Request URL: https://vinylholics.herokuapp.com/browse/page/1				
style.css		Request Method: GET				
facebook.css		Status Code: 304 Not Modified				
jquery.min.js		Remote Address: 50.19.250.53:443				
bootstrap.min.js		Referrer Policy: no-referrer-when-downgrade				
font-awesome.min.css		▼ Response Headers view source				
font-awesome.min.css		Cache-Control: public, no-cache, must-revalidate				
shopping_cart.js		Connection: keep-alive				
logo.png		Content-Length: 0				
9		Date: Wed, 28 Jun 2017 07:31:00 GMT				
24		Etag: W/"2b7f-fTHfJ7nDdKGcn7d+3s9CJj8L840"				
23		Server: Cowboy				
8		Via: 1.1 vegur				
10		X-Powered-By: Express				
1		▼ Request Headers view source				
22		Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8				
2		Accept-Encoding: gzip, deflate, br				
21		Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2				
19		Connection: keep-alive				
glyphicons-halflings-regular....		Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtF95n8FIzyc1H4dzMayQ%2Bzv8gaE				
fontawesome-webfont.woff2...		Host: vinylholics.herokuapp.com				
icon_cart_close.svg		If-None-Match: W/"2b7f-fTHfJ7nDdKGcn7d+3s9CJj8L840"				
icon_arrow_next.svg		Referer: https://vinylholics.herokuapp.com/browse/artist				
		Upgrade-Insecure-Requests: 1				
		User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36				

4. Private content

- Orders page, checkout page, user information
- No cache, no store, private, stale resource not allowed
- Header example:

```
Cache-Control: private, no-cache, no-store, must-revalidate
```

- Expected result:
 - ✓ status 200
 - ✓ always from server
 - ✓ have Cache-Control: private, no-cache, no-store, must-revalidate
- Test result (screenshot):
 - a) First load of <https://vinylholics.herokuapp.com/orders> (user logged in)

The screenshot displays the browser's developer tools, specifically the Network and Headers panels. The Network panel shows a list of resources, with 'orders' selected. The Headers panel shows the response headers for the 'orders' resource, with 'Cache-Control: private, no-cache, no-store, must-revalidate' highlighted. The Request Headers panel shows the request headers for the 'orders' resource.

Name	Status	Type	Initiator	Size	Time	Waterfall
orders	200	document	Other	10.0 KB	526 ms	
bootstrap.min.css	200	stylesheet	orders	22.0 KB	258 ms	

headers Preview Response Cookies Timing

orders

General

Request URL: <https://vinylholics.herokuapp.com/orders>

Request Method: GET

Status Code: 200 OK

Remote Address: 54.225.152.138:443

Referrer Policy: no-referrer-when-downgrade

Response Headers view source

Cache-Control: private, no-cache, no-store, must-revalidate

Connection: keep-alive

Content-Length: 9920

Content-Type: text/html; charset=utf-8

Date: Wed, 28 Jun 2017 07:52:55 GMT

Etag: W/"26c0-vV2fS+Fjw530DUd065sm6jvK8Go"

Server: Cowboy

Via: 1.1 vegur

X-Powered-By: Express

Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2

Cache-Control: no-cache

Connection: keep-alive

Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE

Host: vinylholics.herokuapp.com

Pragma: no-cache

Referer: <https://vinylholics.herokuapp.com/browse/artist>

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36

b) Reload of <https://vinylholics.herokuapp.com/orders> (user logged in)

The browser cannot cache this resource due to `no-cache, no-store`. The content has to be fresh every time.

Name	Status	Type	Initiator	Size	Time	Waterfall	500.00 ms	▲
orders	200	document	Other	10.0 KB	265 ms			
bootstrap.min.css	200	stylesheet	orders	(from disk cache)	2 ms			
style.css	200	stylesheet	orders	(from disk cache)	1 ms			

orders

bootstrap.min.css

style.css

jquery.min.js

bootstrap.min.js

shopping_cart.js

logo.png

22

20

17

15

facebook.css

21

font-awesome.min.css

font-awesome.min.css

bootstrap.min.css

glyphicons-halflings-regular....

icon_cart_close.svg

icon_arrow_next.svg

shopping_cart/

19

icon_select.svg

× Headers Preview Response Cookies Timing

▼ General

Request URL: <https://vinylholics.herokuapp.com/orders>

Request Method: GET

Status Code: 200 OK

Remote Address: 54.221.211.25:443

Referrer Policy: no-referrer-when-downgrade

▼ Response Headers view source

Cache-Control: private, no-cache, no-store, must-revalidate

Connection: keep-alive

Content-Length: 9920

Content-Type: text/html; charset=utf-8

Date: Wed, 28 Jun 2017 07:53:55 GMT

Etag: W/"26c0-vV2fS+fjw530Dud065sm6jvK8Go"

Server: Cowboy

Via: 1.1 vegur

X-Powered-By: Express

▼ Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8,zh-CN;q=0.6,zh;q=0.4,en-NZ;q=0.2

Connection: keep-alive

Cookie: connect.sid=s%3Agk1lj981BweKA9q8Pf-0ddhRsz1pFnom.0d16ZmZLDQr0xOdMtR95n8FIzyc1H4dzMayQ%2Bzv8gaE

Host: vinylholics.herokuapp.com

Referer: <https://vinylholics.herokuapp.com/browse/artist>

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.109 Safari/537.36