

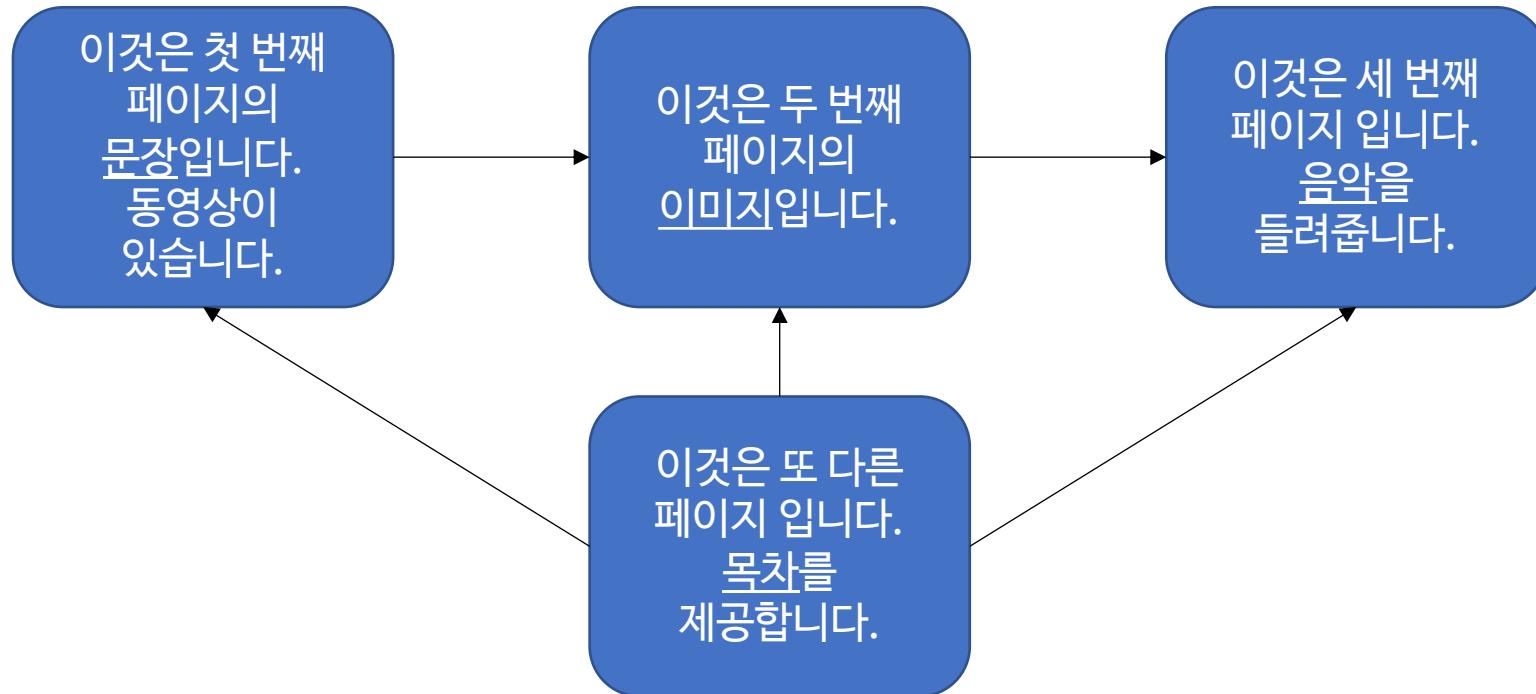
웹 프로그래밍을 위한 모던 Web Engineering

강상진 (sangjinn@gmail.com)
<https://tech.brandonkang.net>

웹의 기본

하이퍼텍스트, 하이퍼링크

Hypertext, Hyperlink

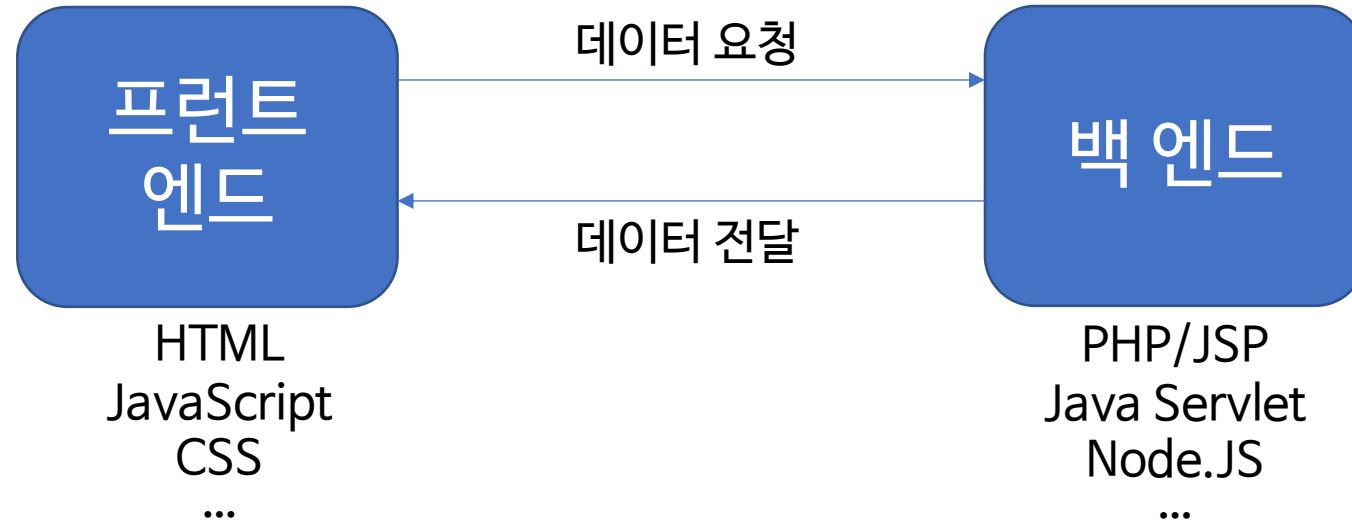


URL의 구성

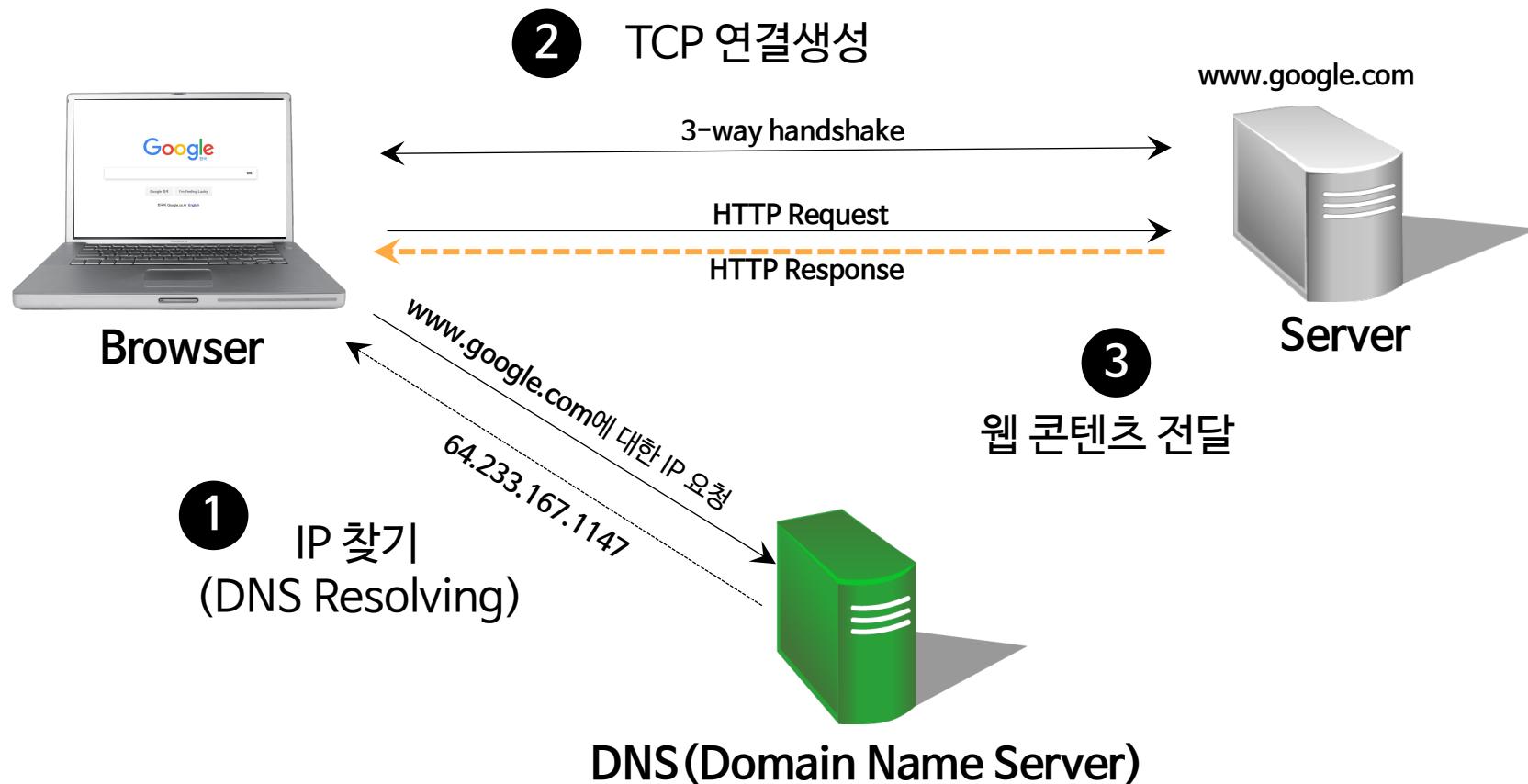
https://blog.naver.com:443/sehyunfa/222647771702



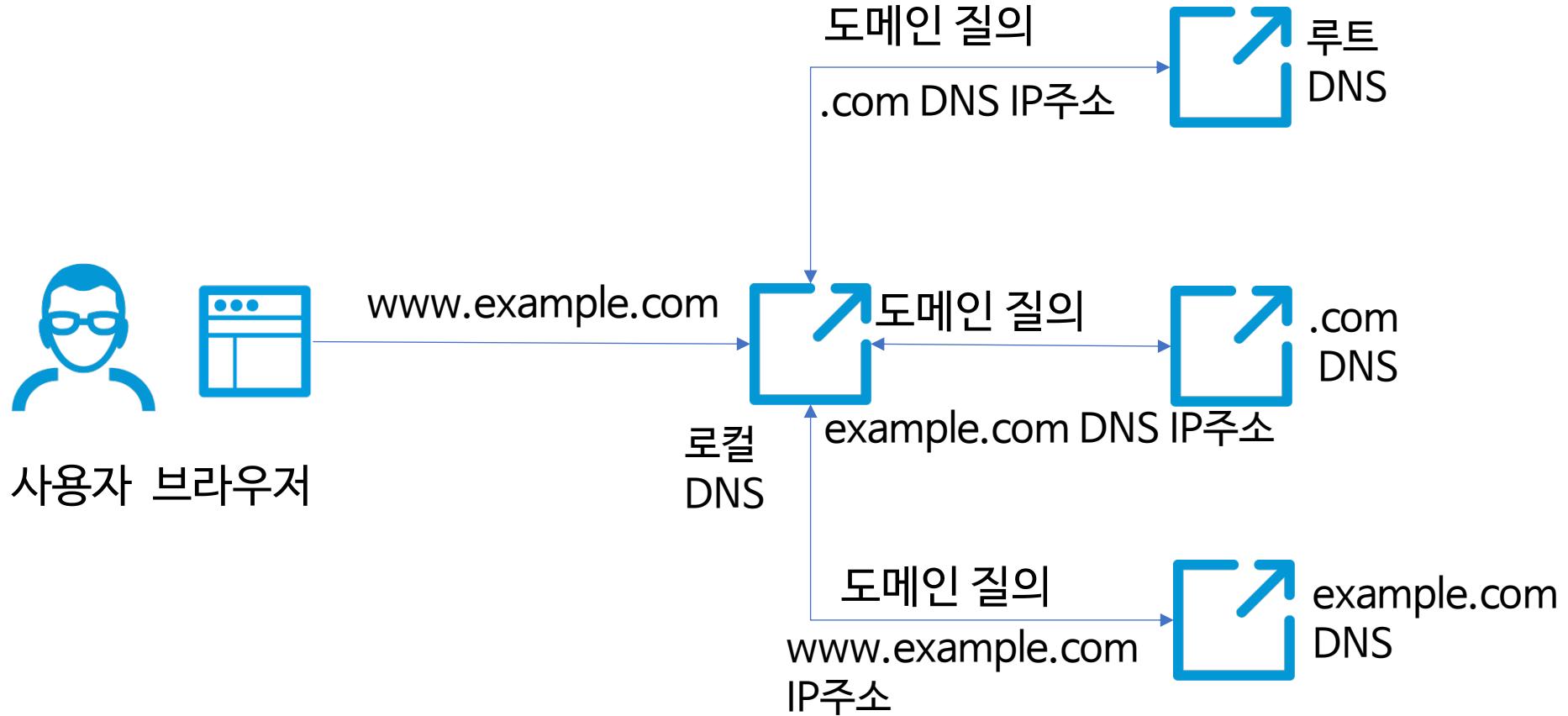
Frontend & Backend



웹 사이트에 접속할 때 발생하는 일들..



DNS 질의 순서



도메인의 DNS 정보 관리하기

DNS 레코드는 웹사이트 콘텐츠 표시 및 이메일 전송과 같은 도메인 동작 방식을 정의합니다.

		삭제	복사	필터	추가	...
유형	이름	데이터	TTL	삭제	편집	...
<input type="checkbox"/>	A	@ Parked	600 초	<button>삭제</button>	<button>편집</button>	
<input type="checkbox"/>	NS	@ ns07.domaincontrol.com.	1시간	삭제할 수 없음	편집할 수 없음	
<input type="checkbox"/>	NS	@ ns08.domaincontrol.com.	1시간	삭제할 수 없음	편집할 수 없음	
<input type="checkbox"/>	CNAME	demo demo.brandonkang.net.edgekey-staging.net.	30분	<button>삭제</button>	<button>편집</button>	
<input type="checkbox"/>	CNAME	tech tech.brandonkang.net.edgekey.net.	30분	<button>삭제</button>	<button>편집</button>	
<input type="checkbox"/>	CNAME	www brandonkang.net.	1시간	<button>삭제</button>	<button>편집</button>	
<input type="checkbox"/>	CNAME	_domainconnect _domainconnect.gd.domaincontrol.com.	1시간	<button>삭제</button>	<button>편집</button>	

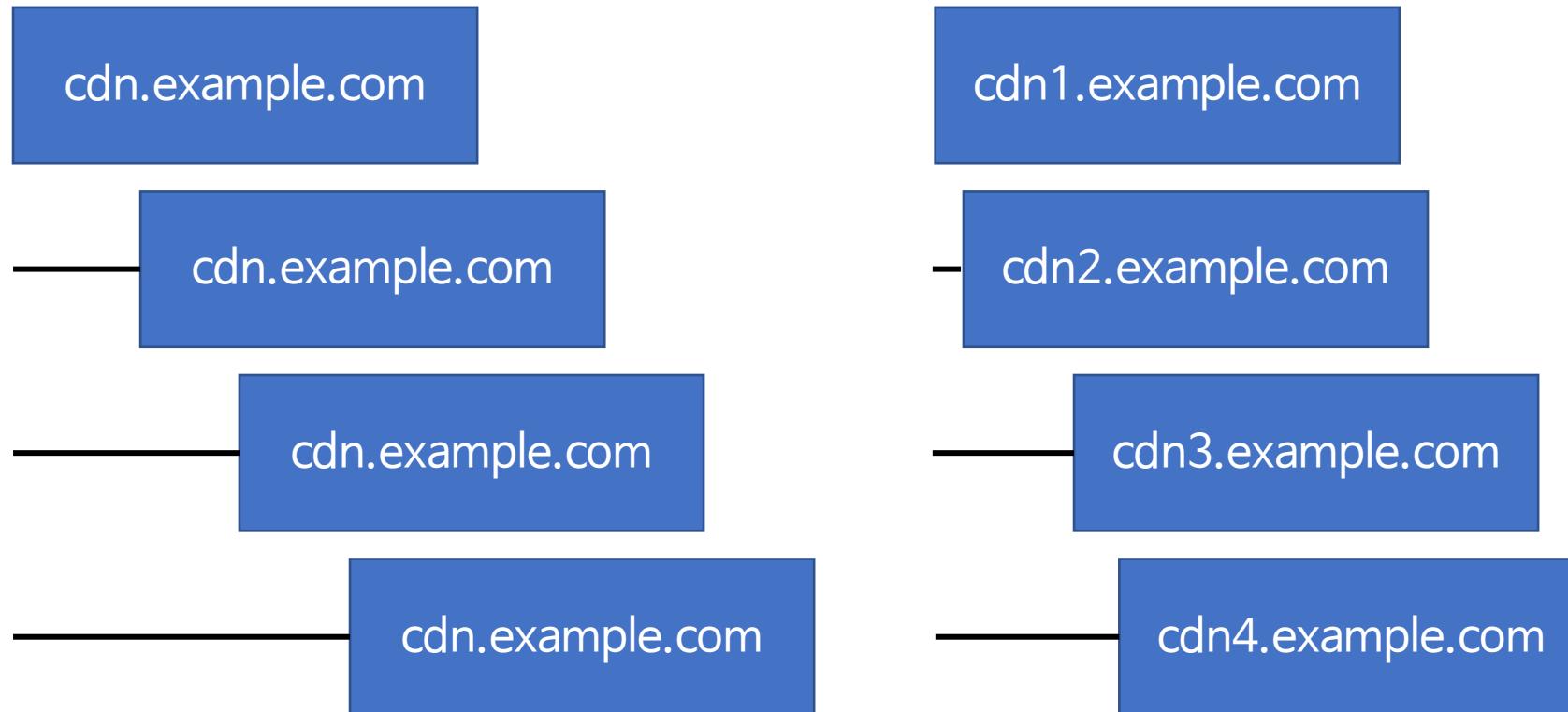
DNS Record의 종류

DNS management for examplesite1.cf					
+ Add record		Search DNS Records		Advanced	
Type	Name	Content	TTL	Proxy status	
A	host	185.27.134.201	Auto	DNS only	Edit ▶
A	examplesite1.cf	185.27.134.202	Auto	Proxied	Edit ▶
A	www	185.27.134.202	Auto	Proxied	Edit ▶
CNAME	mail	host.examplesite1.cf	Auto	DNS on	Edit ▶
MX	examplesite1.cf	mail.examplesite1.cf	Auto	DNS on	Edit ▶
TXT	examplesite1.cf	sample-txt-content	Auto	DNS on	Edit ▶

Common DNS Record Types

Record	Description
A	Address record (IPv4)
AAAA	Address record (IPv6)
CNAME	Canonical Name record
MX	Mail Exchanger record
NS	Nameserver record
PTR	Pointer record
SOA	Start of Authority record
SRV	Service Location record
TXT	Text record

도메인 샤딩(Domain Sharding)

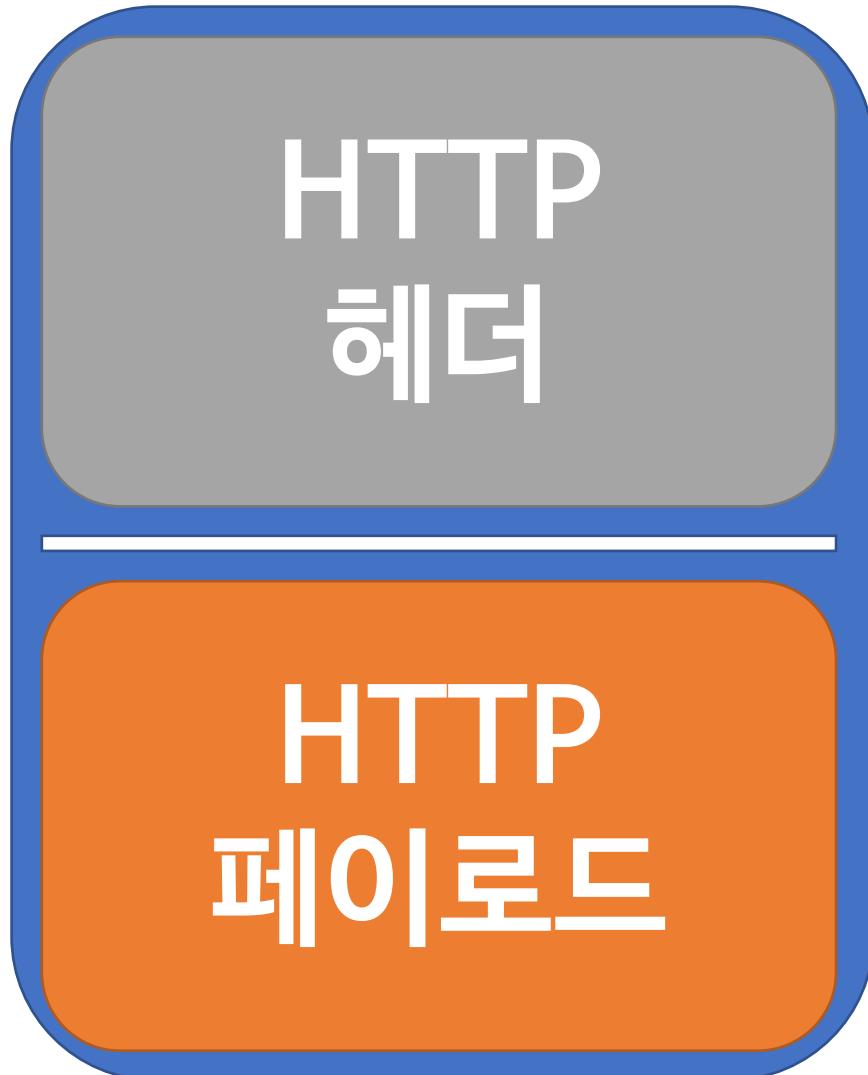


실습 1)

- whois 명령으로 본인이 소유한 도메인의 네임 서버 조회
- dig 혹은 nslookup 명령으로 본인의 블로그 도메인 정보 조회하기

시간: 3분

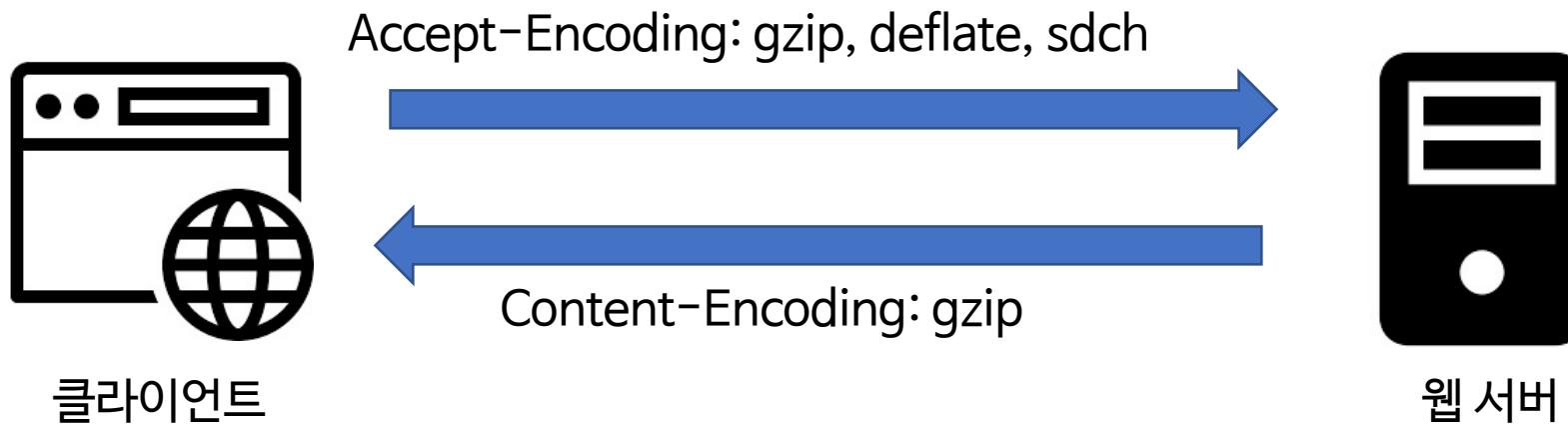
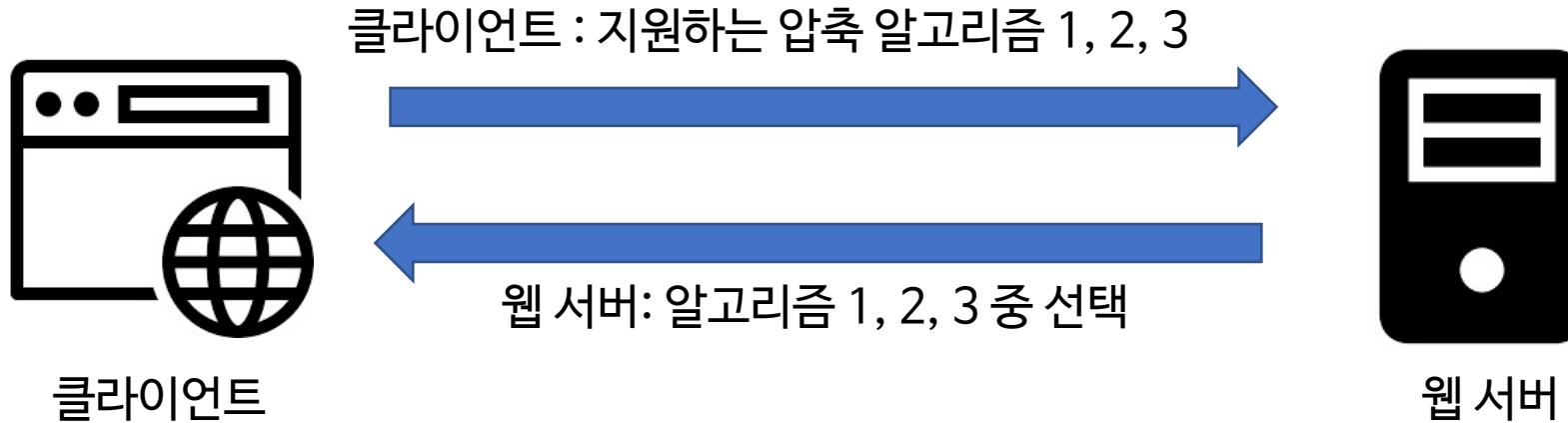
HTTP 메시지의 구성



....
cache-control: max-age=600
content-encoding: gzip
content-length: 34735
content-type: text/html
....
....
<li class="last">
<a href="/kr/ko/our-thinking/"
class="utility-item">참고 자료

....

헤더 예제 - 스크립트 압축 헤더

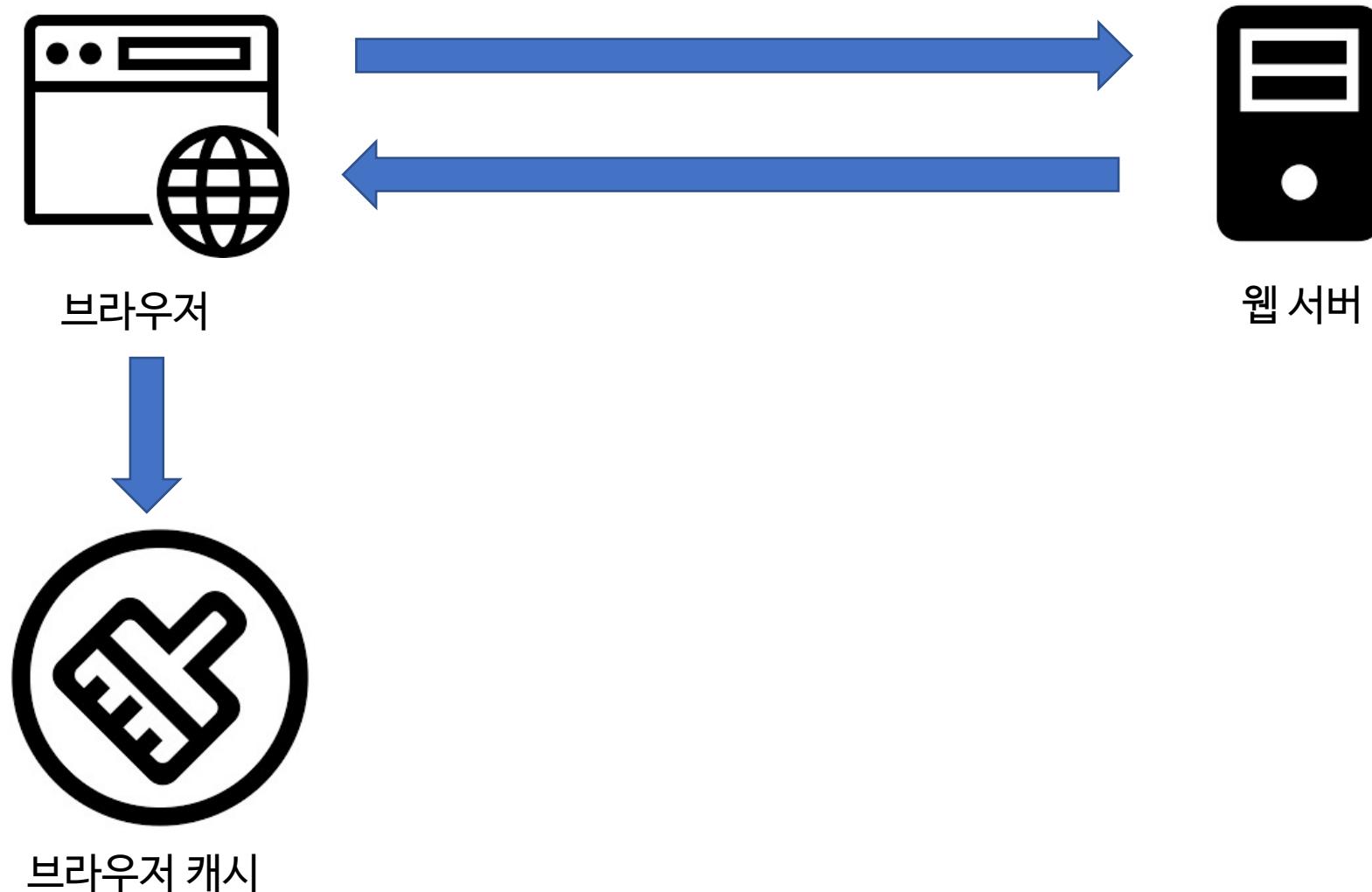


실습 2)

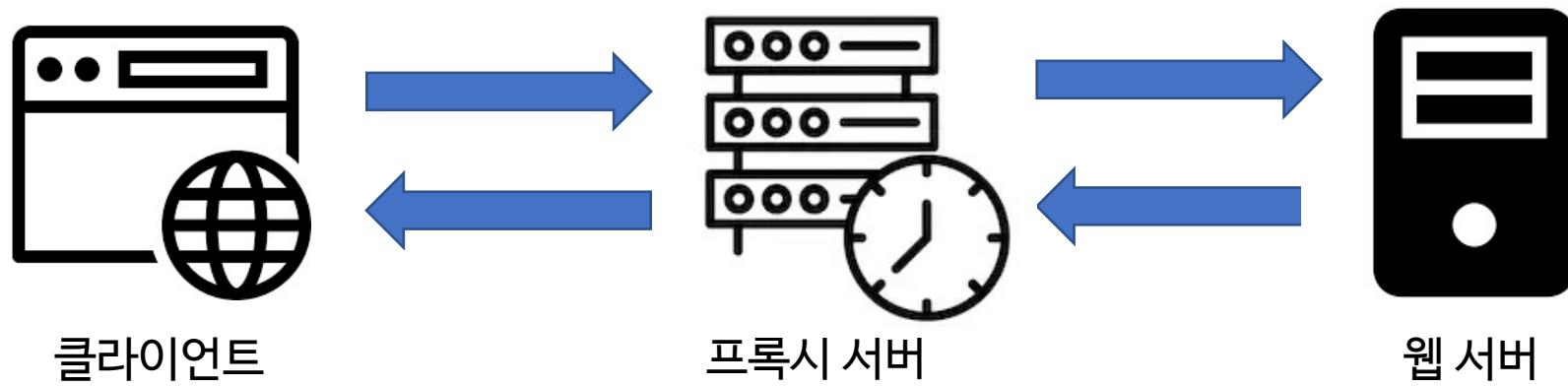
- 본인의 블로그 도메인 첫 HTML 페이지 호출시의 Accept-Encoding, Content-Encoding 정보 확인하기
- br(brotli) 압축은 무엇인지 구글링 해보기

시간: 5분

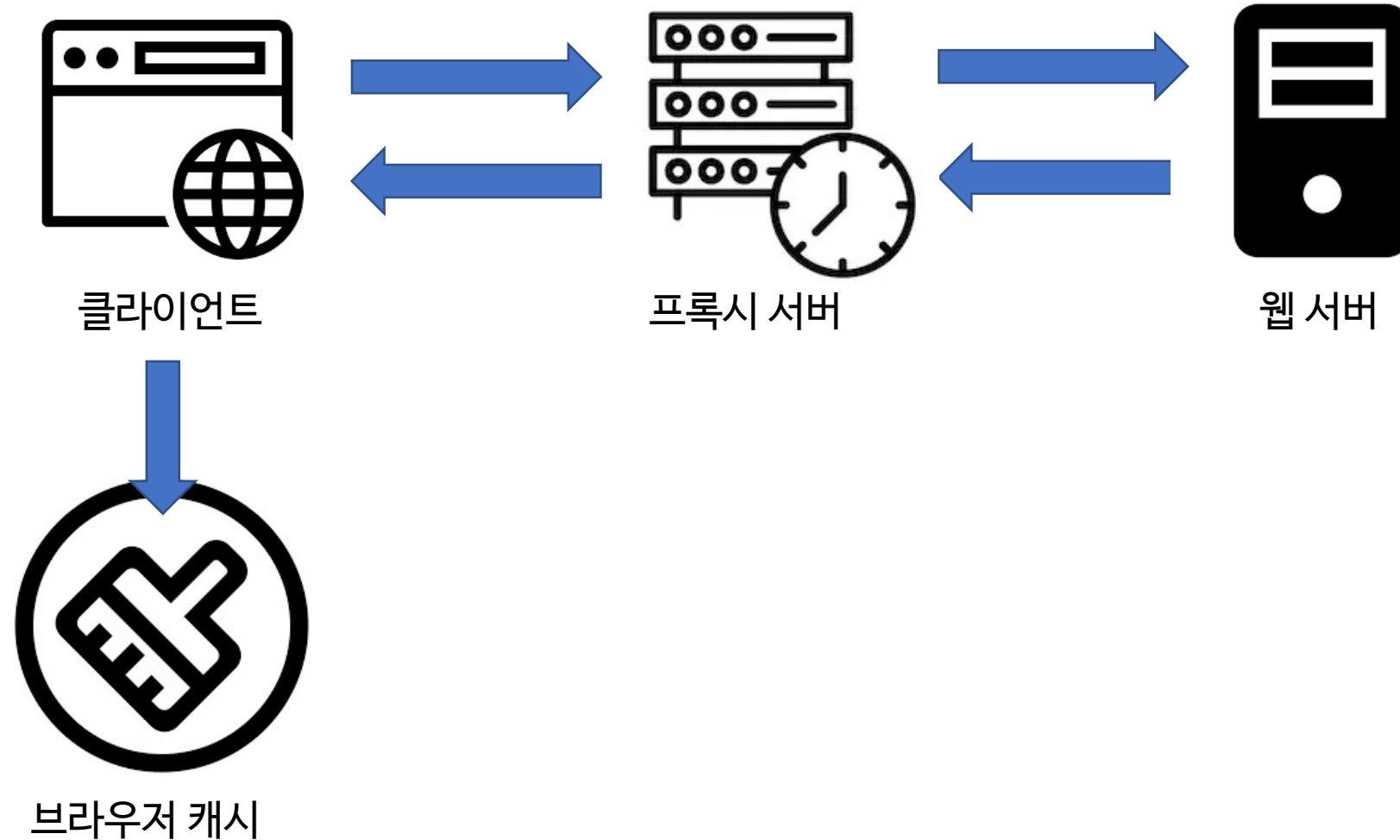
캐싱이 발생하는곳



많이 들어보았던 프록시(proxy)



캐싱이 발생하는곳



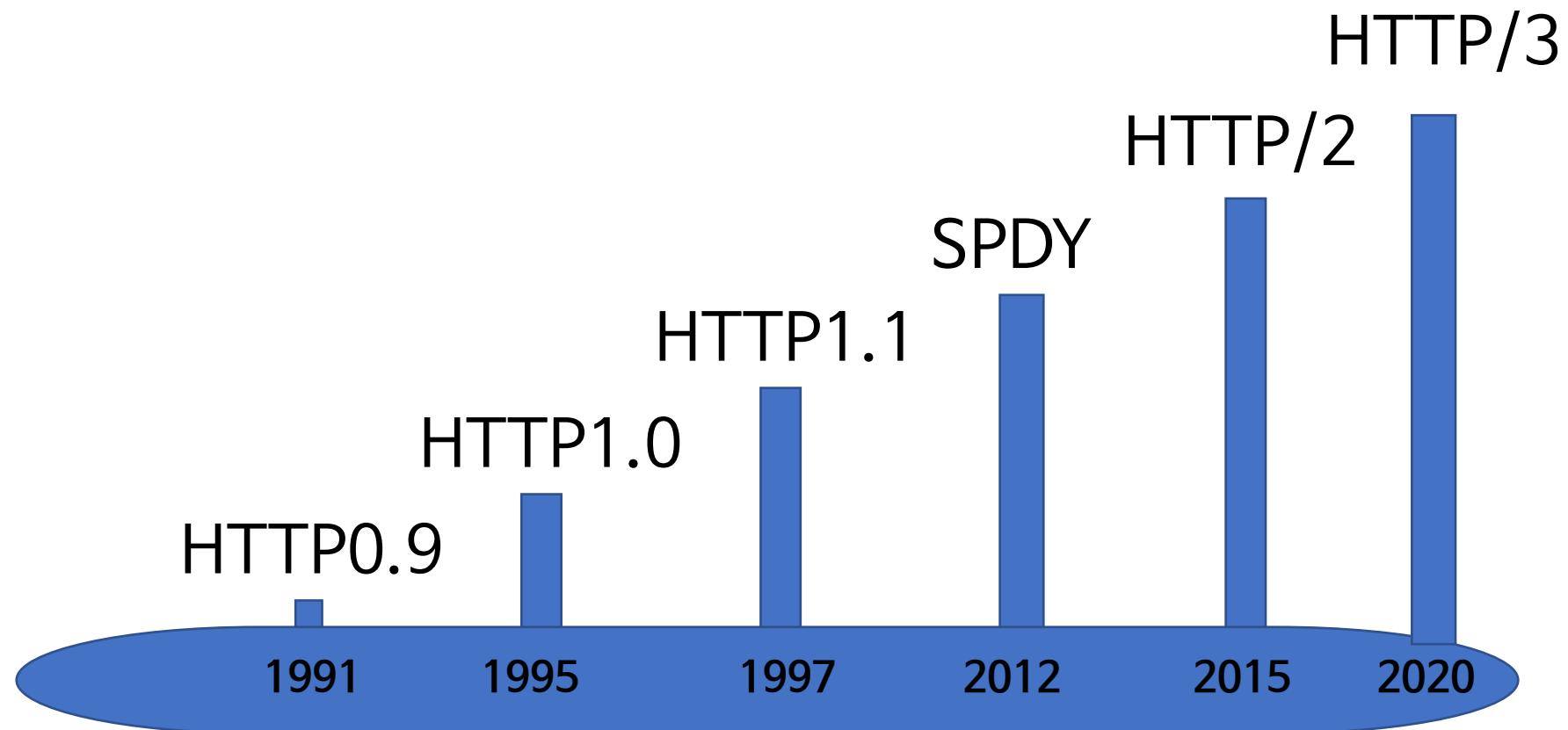
실습 3)

- 본인의 블로그 웹 페이지 리소스의 Cache-Control 정보 조회하기
- 이 헤더를 언제 사용하고, 언제 사용하지 말아야 할까 생각해보기

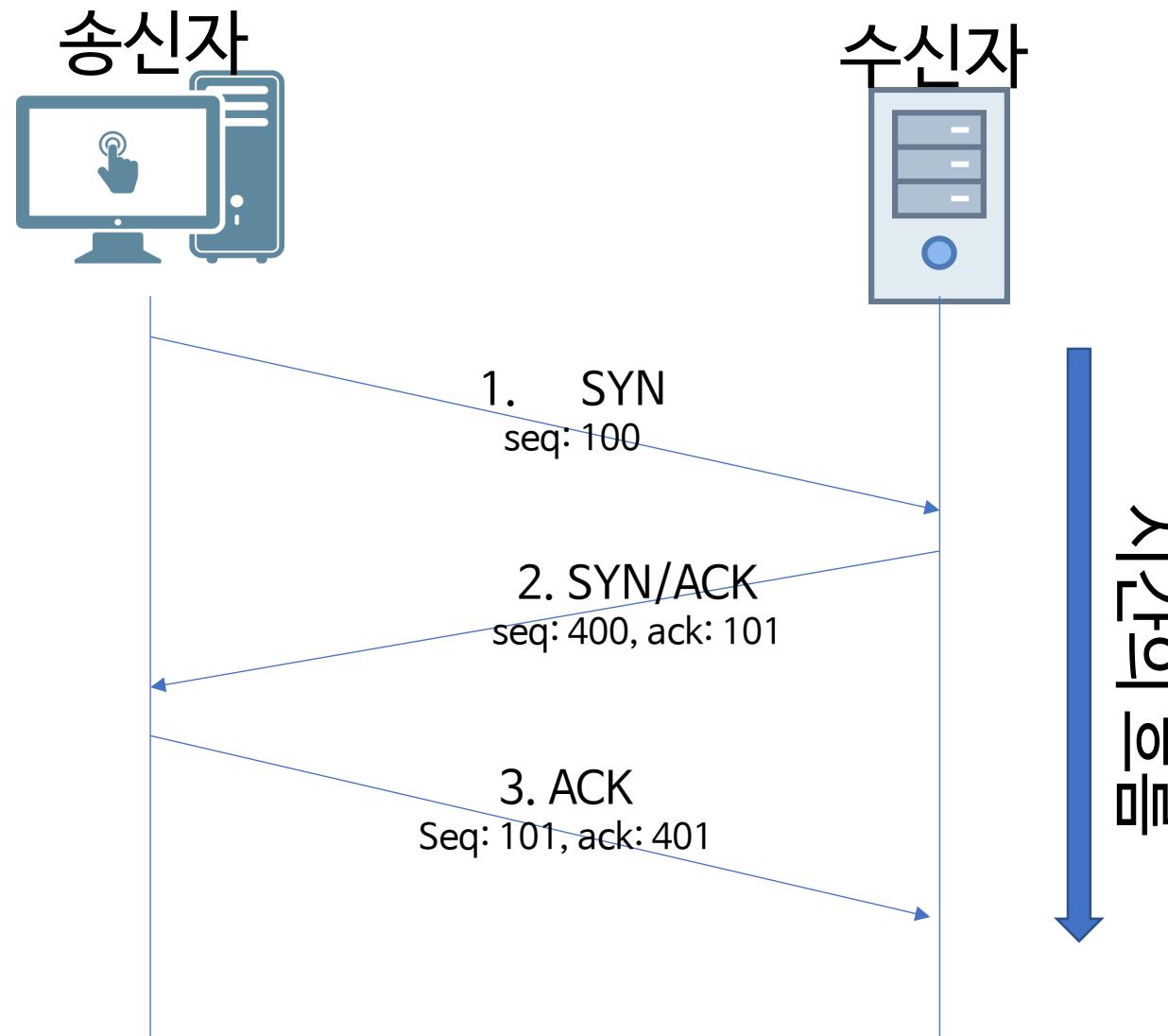
시간: 3분

웹 프로토콜

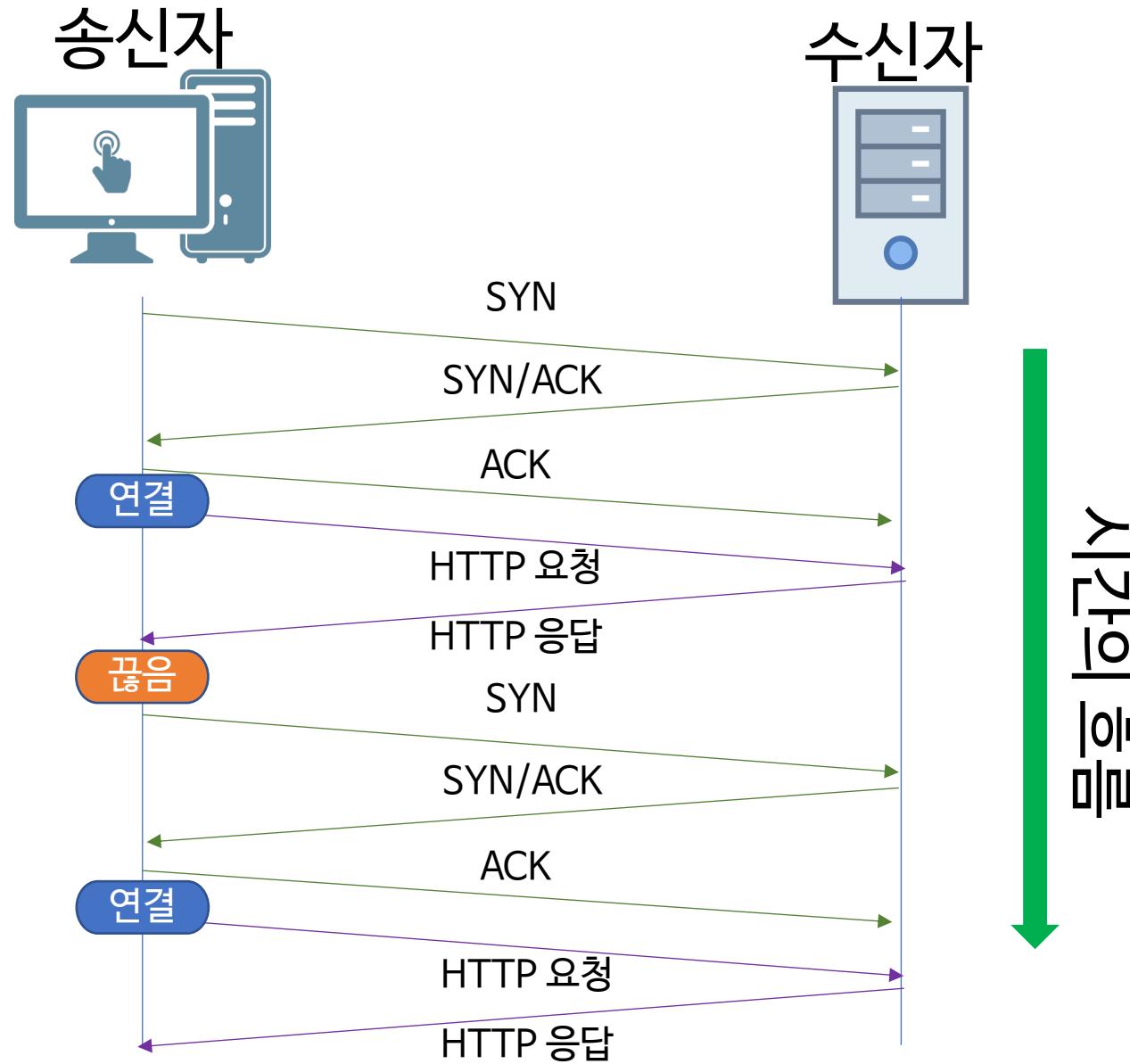
HTTP 버전의 태생



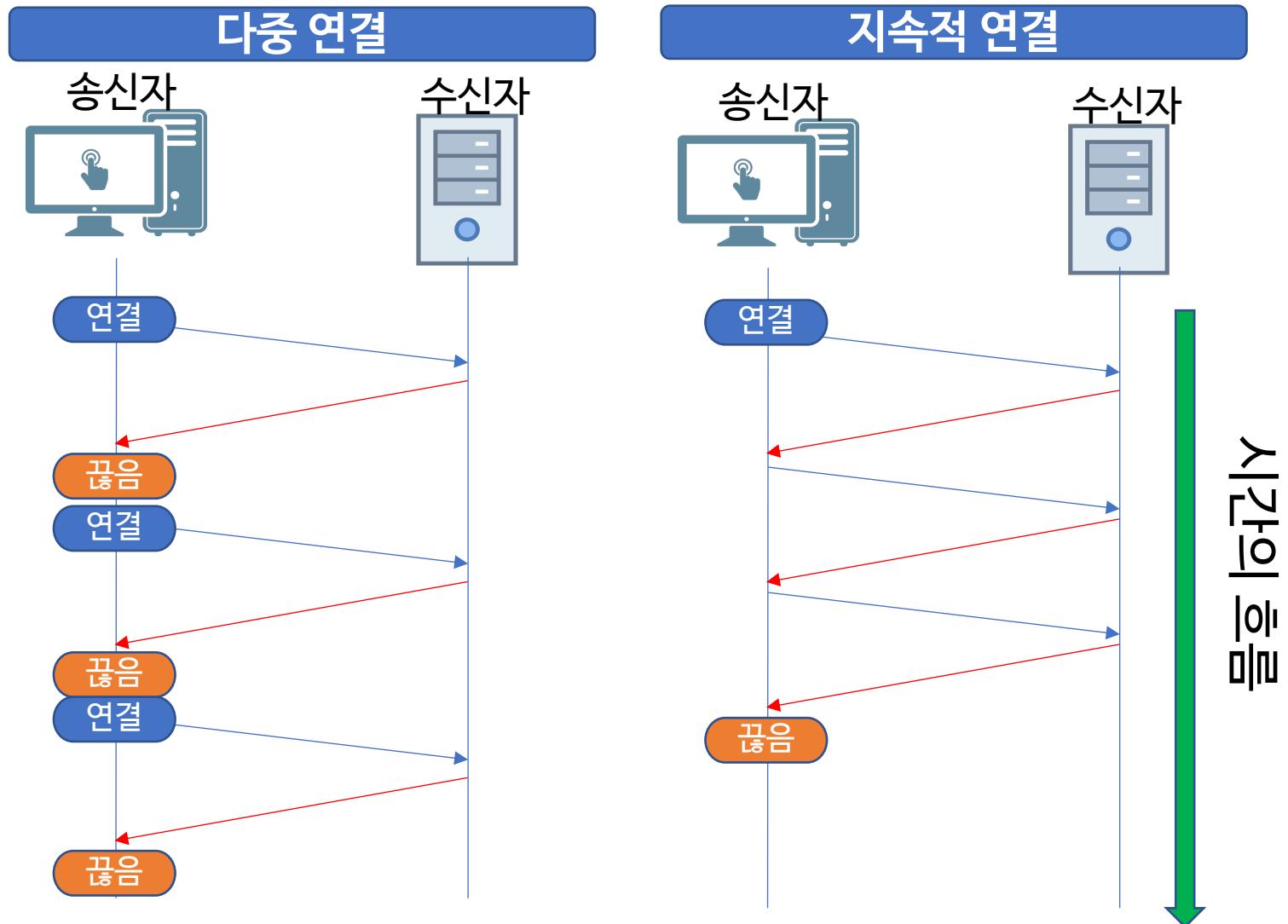
TCP 3-Way 핸드셰이크



TCP 3-Way 핸드셰이크



HTTP Persistent Connection

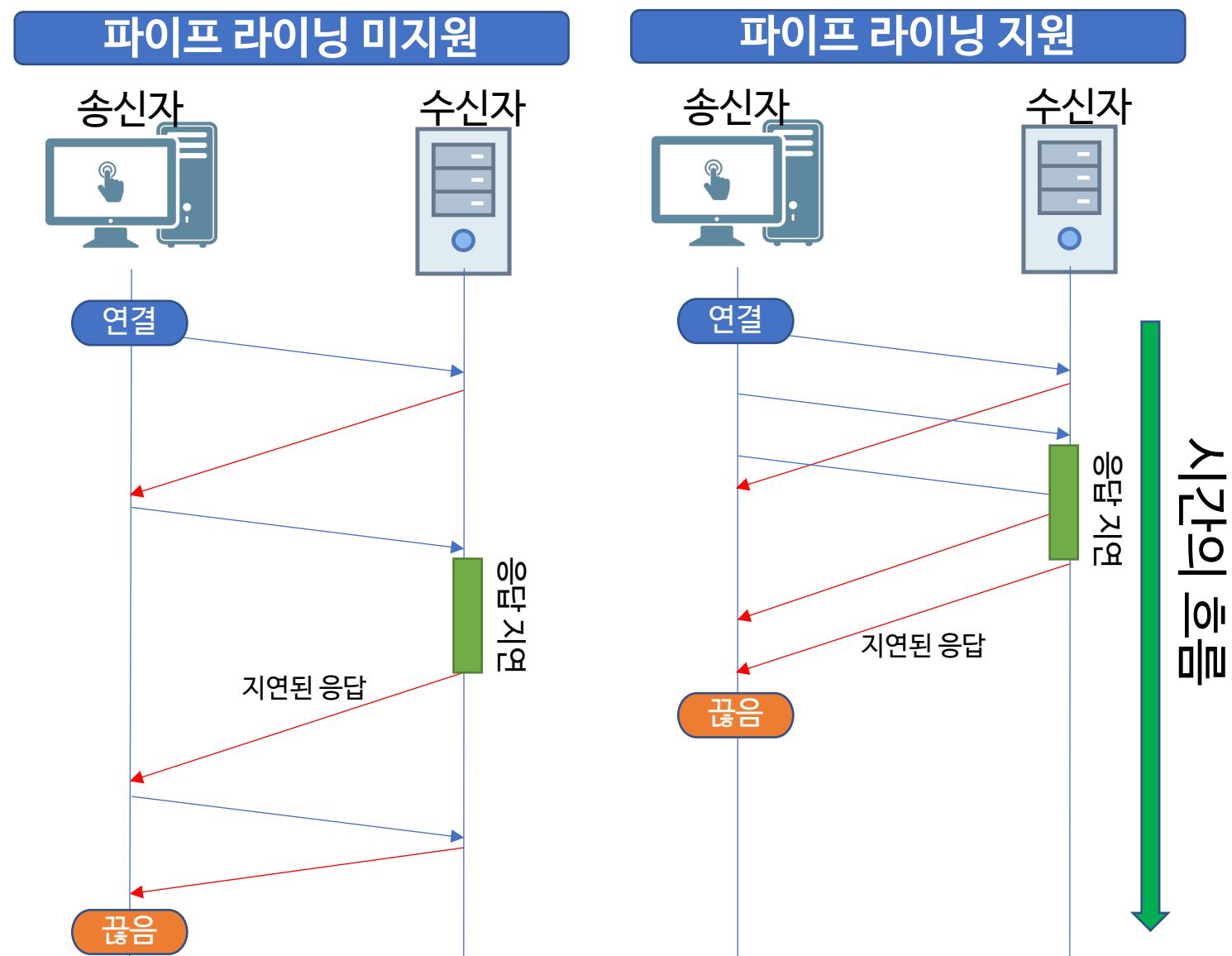


실습 4)

- 본인의 블로그 웹 페이지 리소스의 connection 헤더 정보 조회하기
- keep-alive, Close 쓰임새 추론해보기

시간: 3분

HTTP Pipelining



브라우저 - 개발 도구 - Waterfall



클라이언트

서버



요청1

응답1

요청2

응답2

요청 3~5

응답 3~5

정상 구간

HOL

HTTP/2 (H2)

HTTP1.1

헤더
...
cache-control: max-age=600
content-encoding: gzip
content-length: 34735
content-type: text/html
... .

페이지

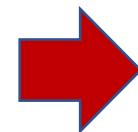
...
<li class="last">
<a href="/kr/ko/our-thinking/"
class="utility-item">참고 자료

... .

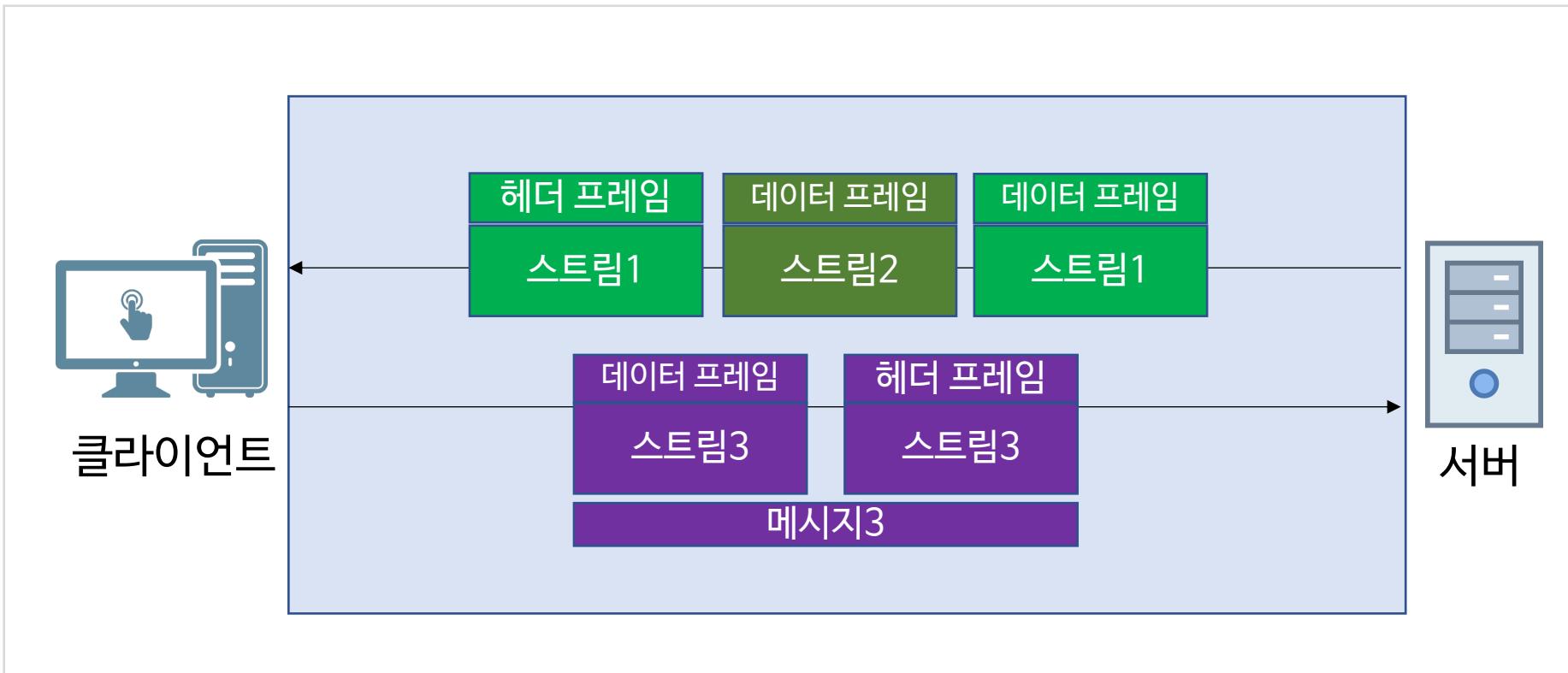
HTTP/2

헤더 프레임

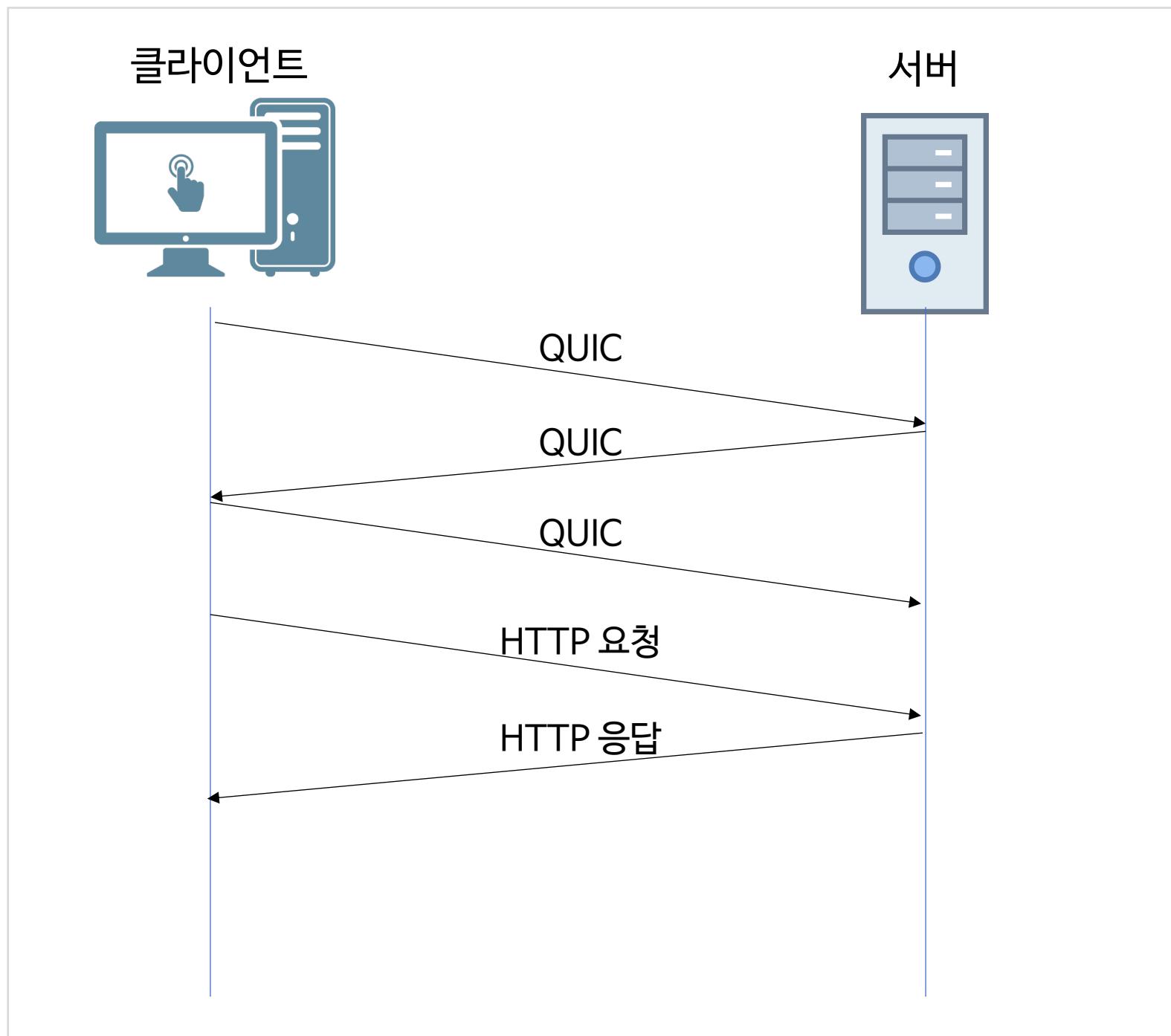
데이터 프레임



HTTP/2 (H2)



HTTP/3



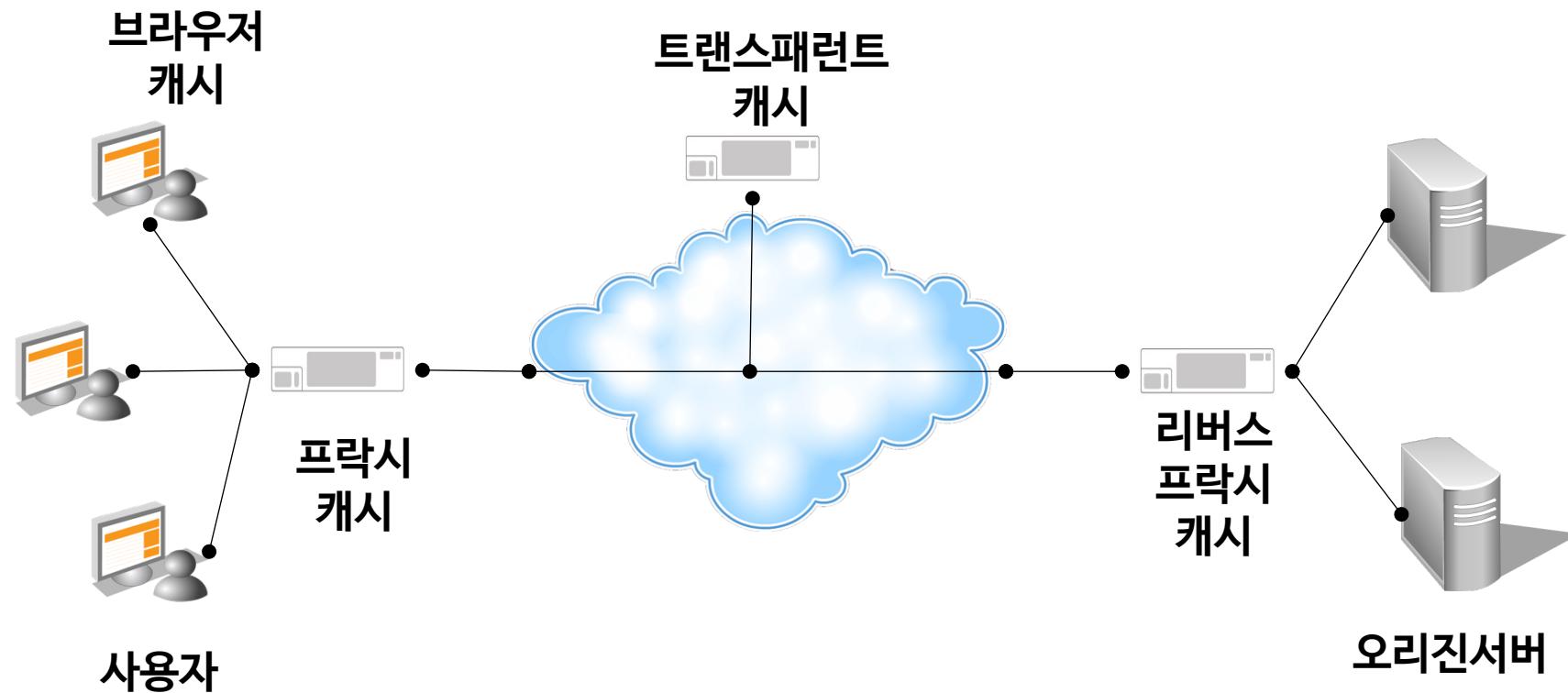
실습 5)

- YouTube, Google, Naver, Coupang 사이트의 HTTP 버전 정보 확인하기
- 왜 구글 서비스는 상위 버전일까 추론해보기

시간: 3분

캐싱(Caching)과 CDN(Contents Delivery Network)

다양한 캐시 구간



캐시 구현을 위한 S/W

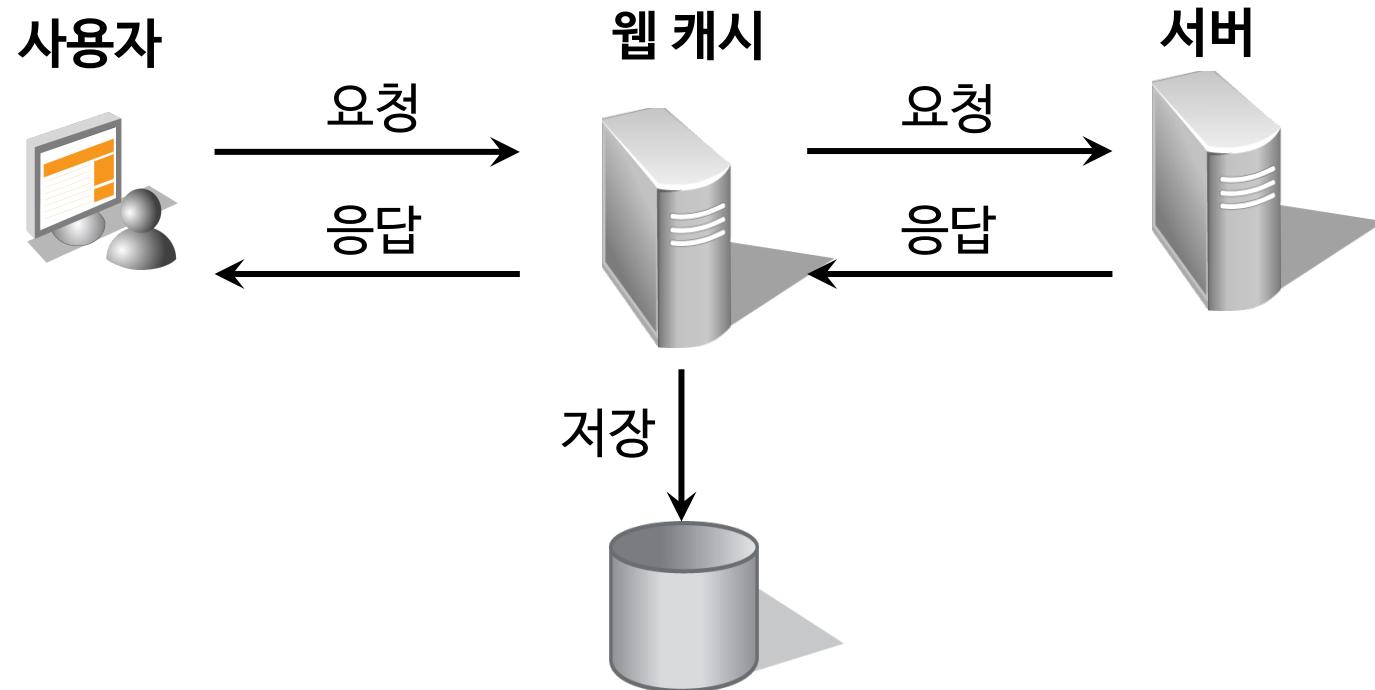
traffic[■]server™

••• VARNISH CACHE

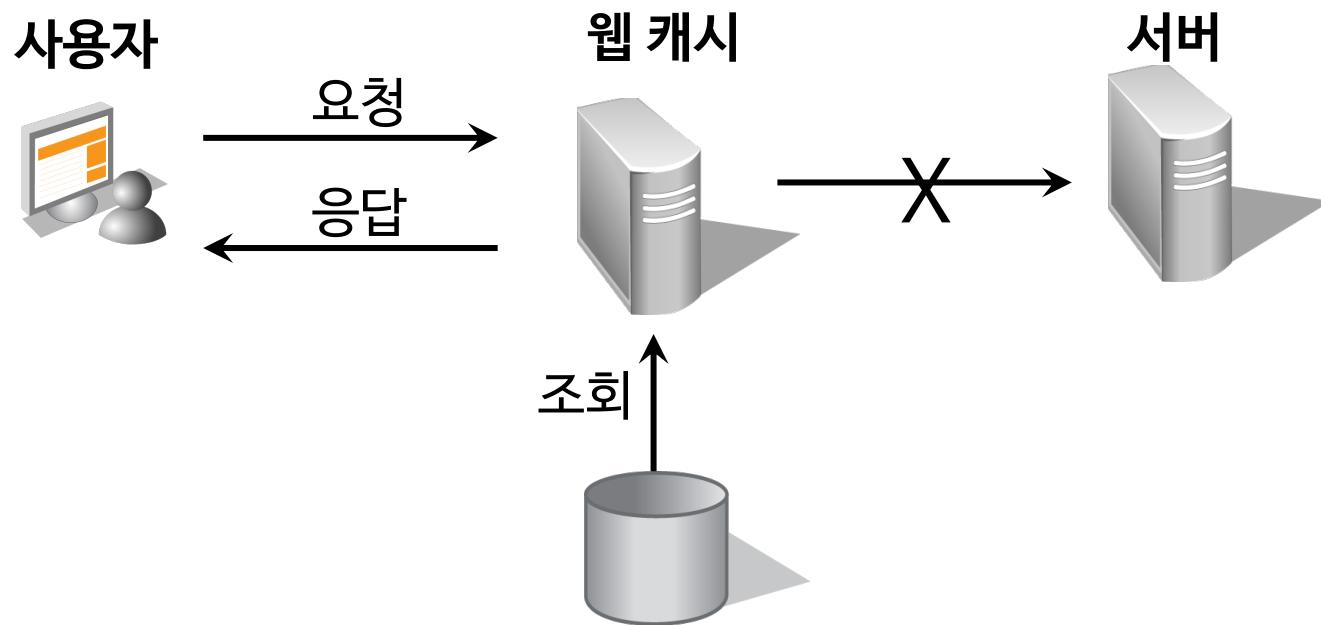
NGINX



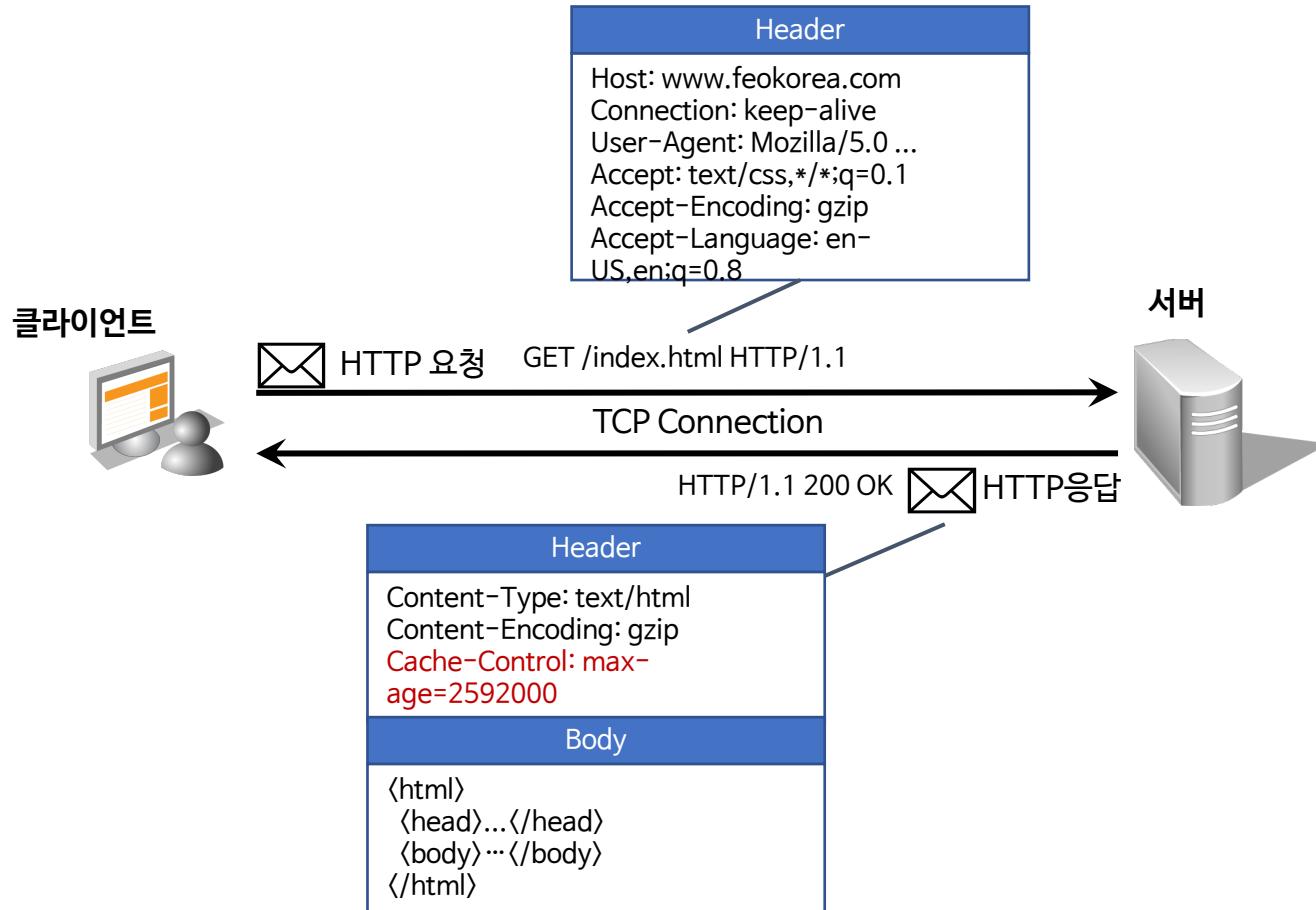
최초요청에 대한 Cache 동작



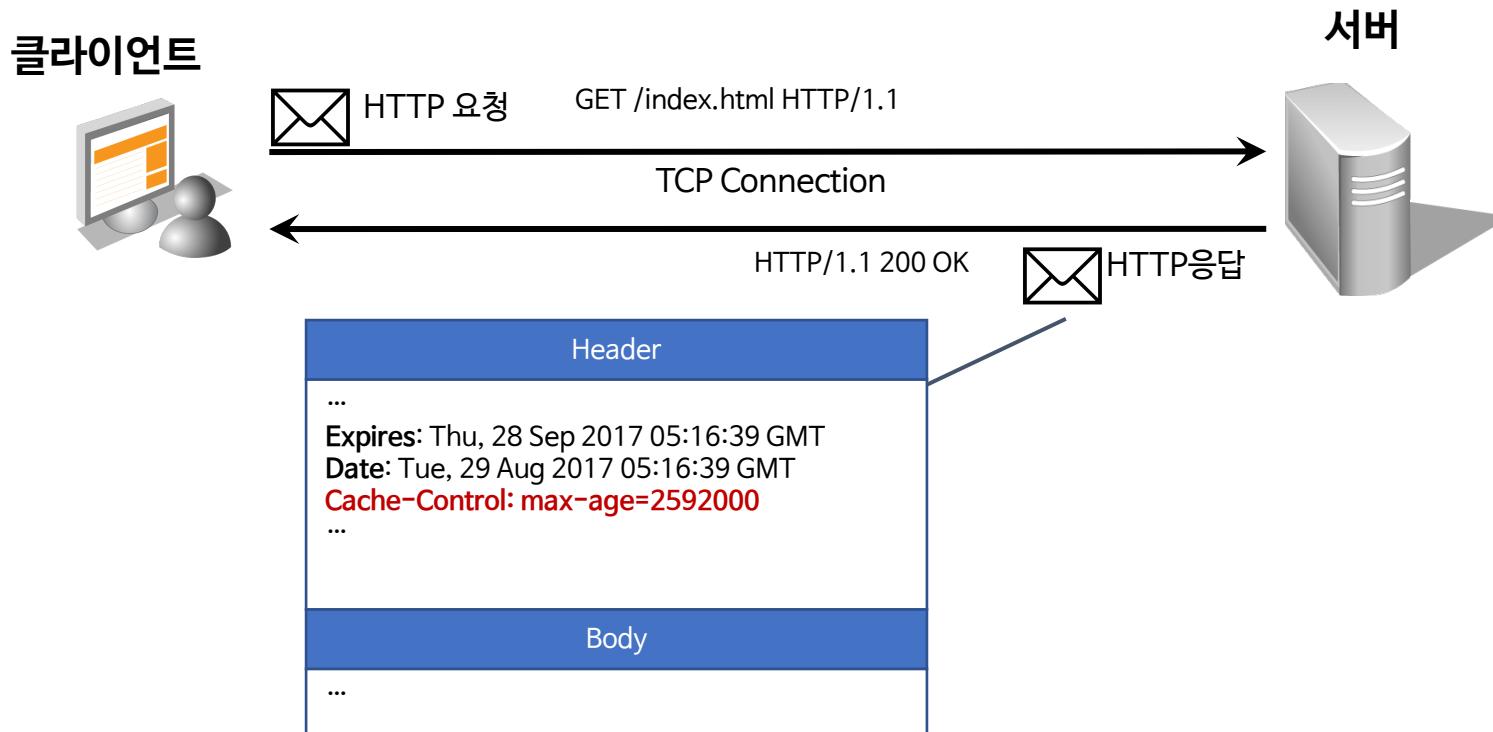
재요청에 대한 Cache 동작



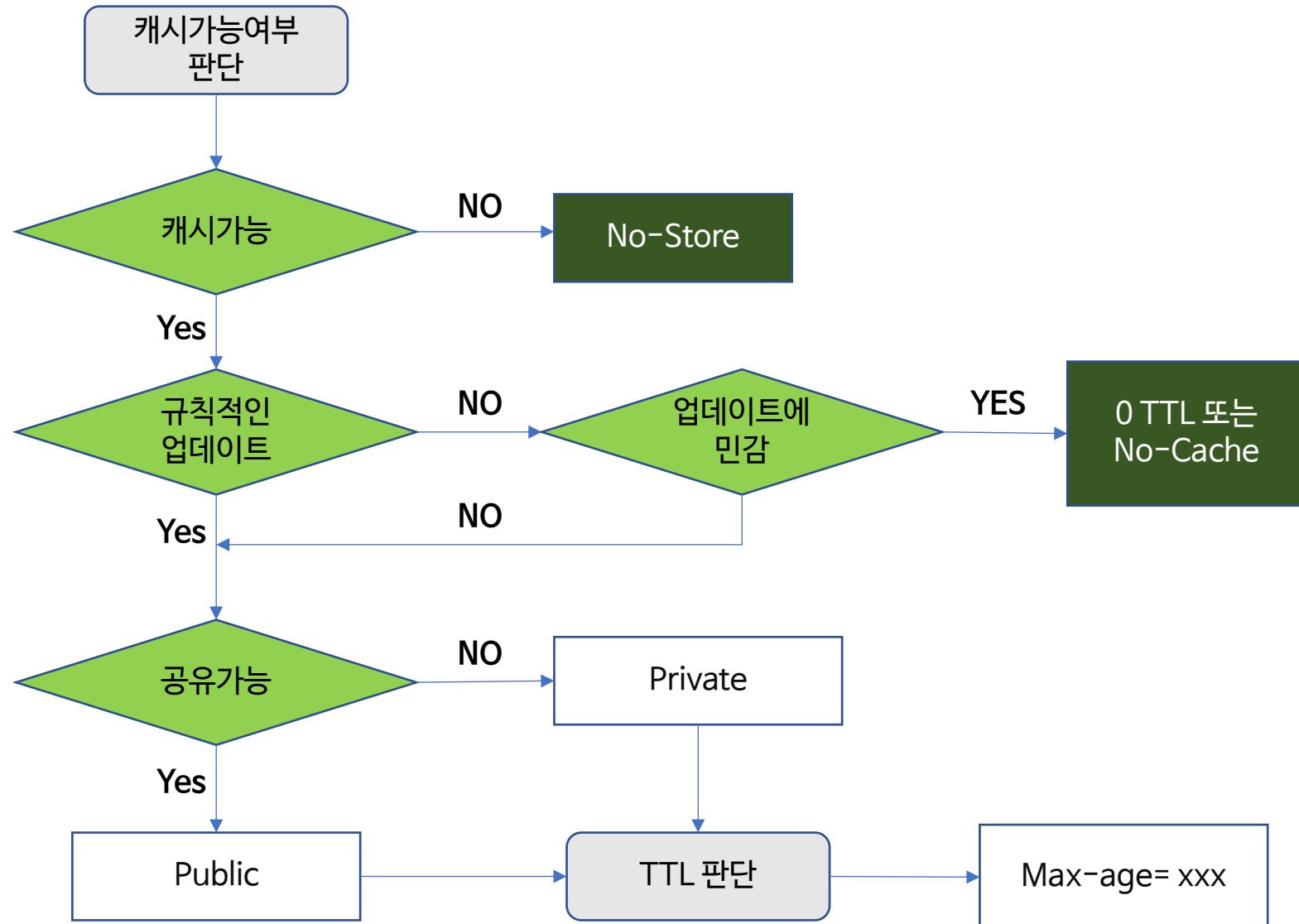
HTTP 요청/응답 메시지



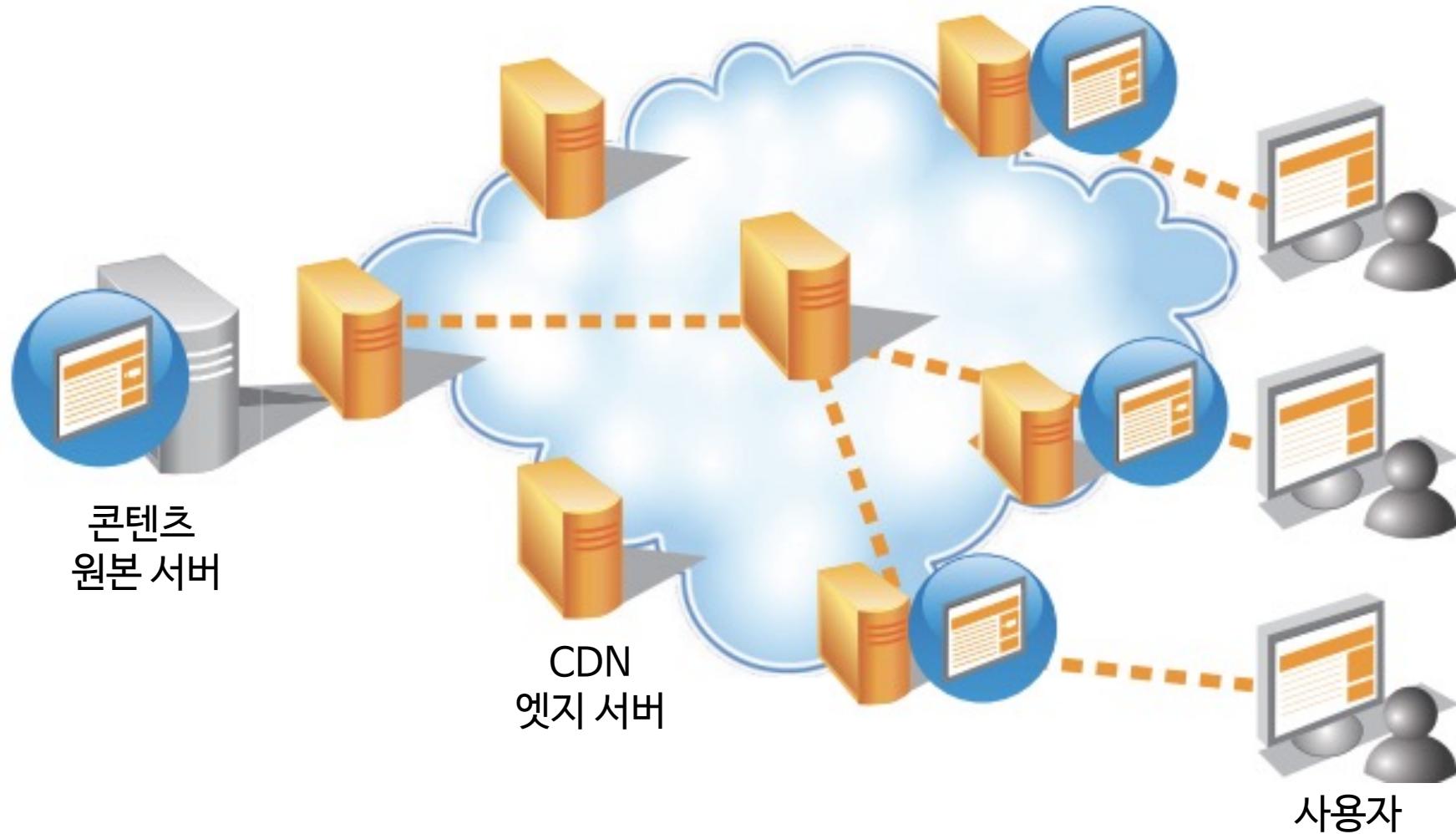
Expire / Cache-Control: max-age 헤더



Cache-Control 정책 의사결정 트리



CDN(Content Delivery Network)



CDN(Content Delivery Network)



CDN(Content Delivery Network)

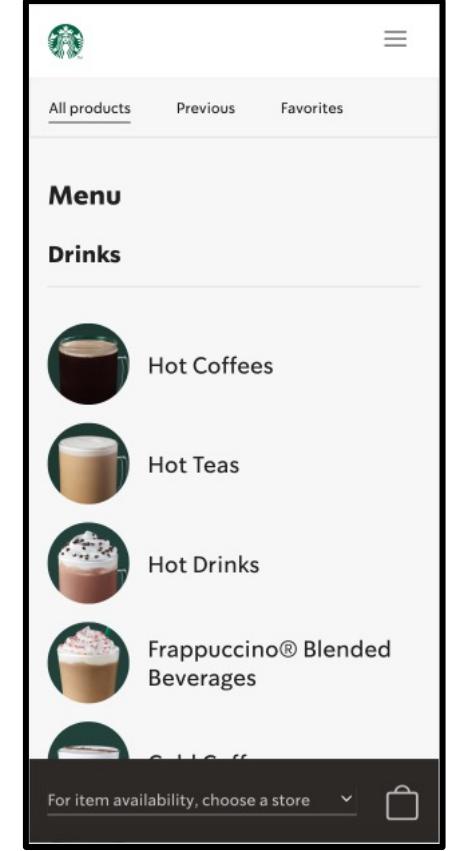
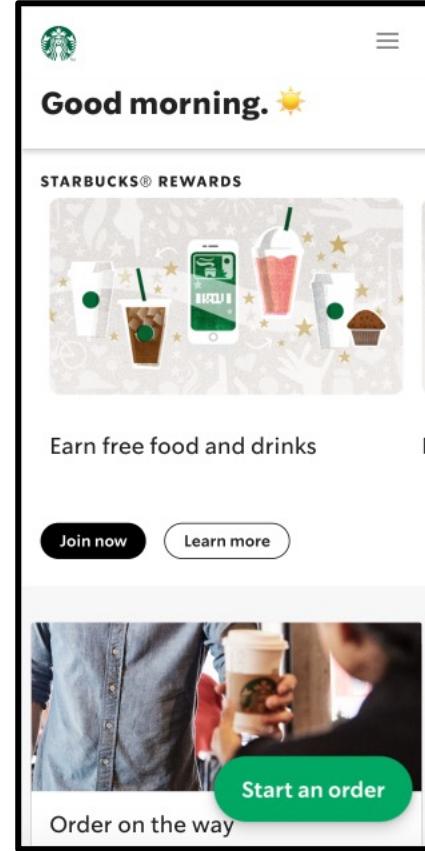
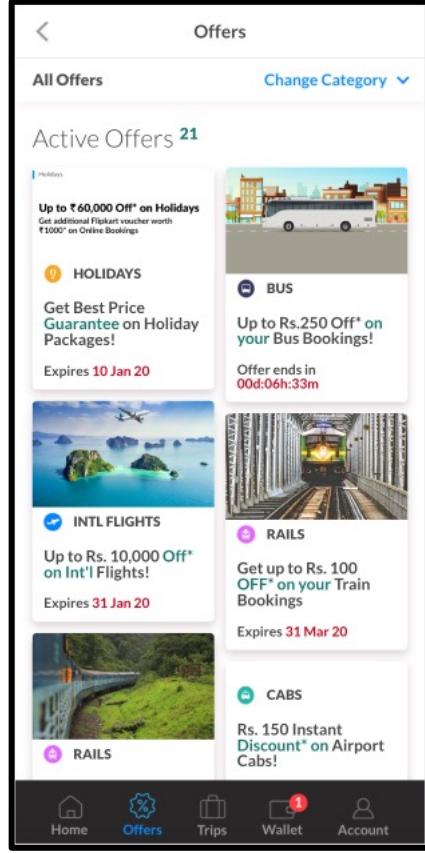
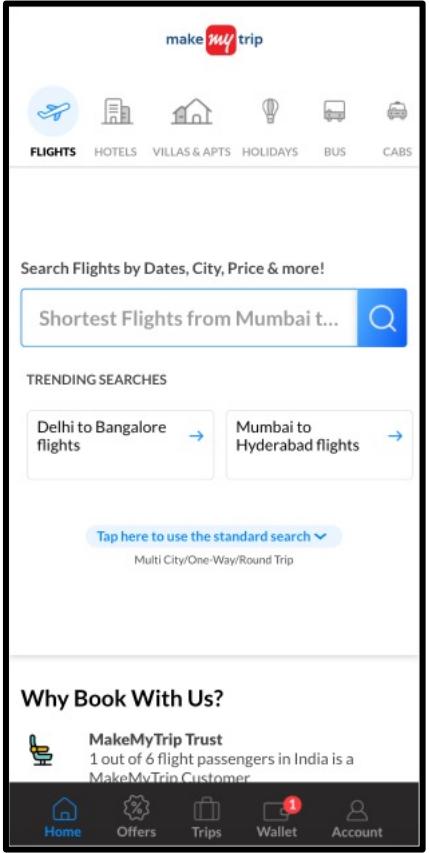


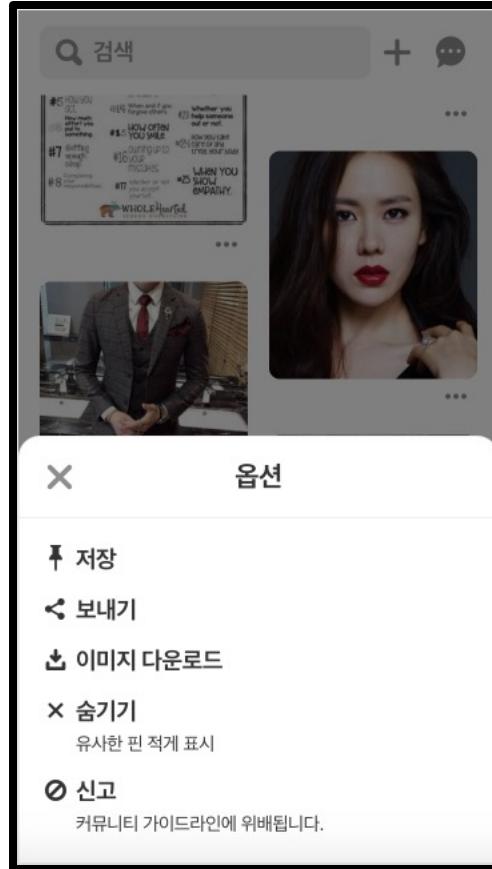
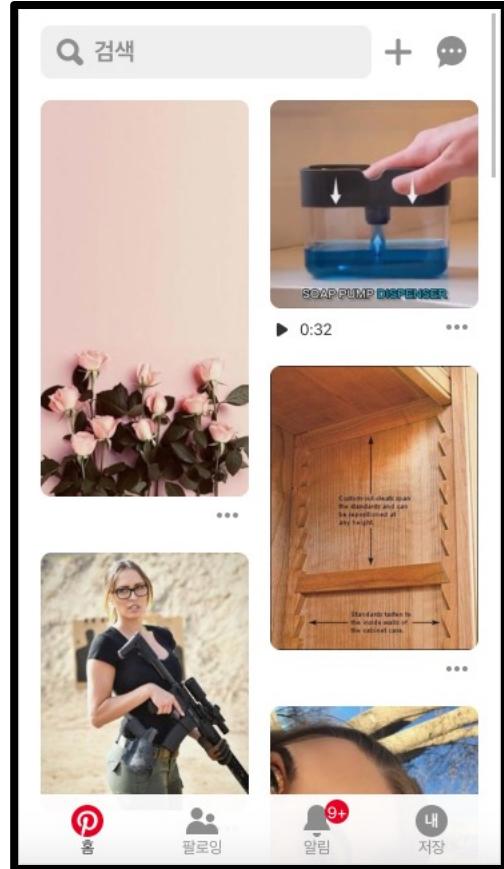
실습 6)

- CDN 회사를 검색하여 어떤 서비스인지 다시 확인하기
- <https://dnschecker.org/> 에 접속하여 유명한 국내 사이트 조회하기
- DNS A 레코드와 CNAME 레코드 모두 확인해보기
- 국가별로 다른 값은 왜 일지 생각해보기

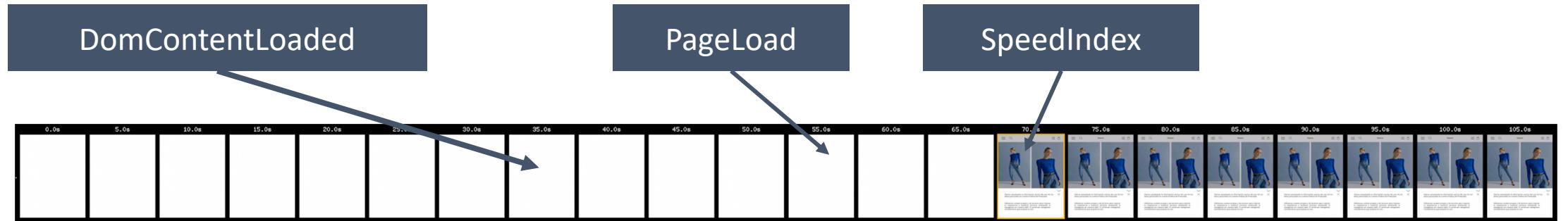
시간: 5분

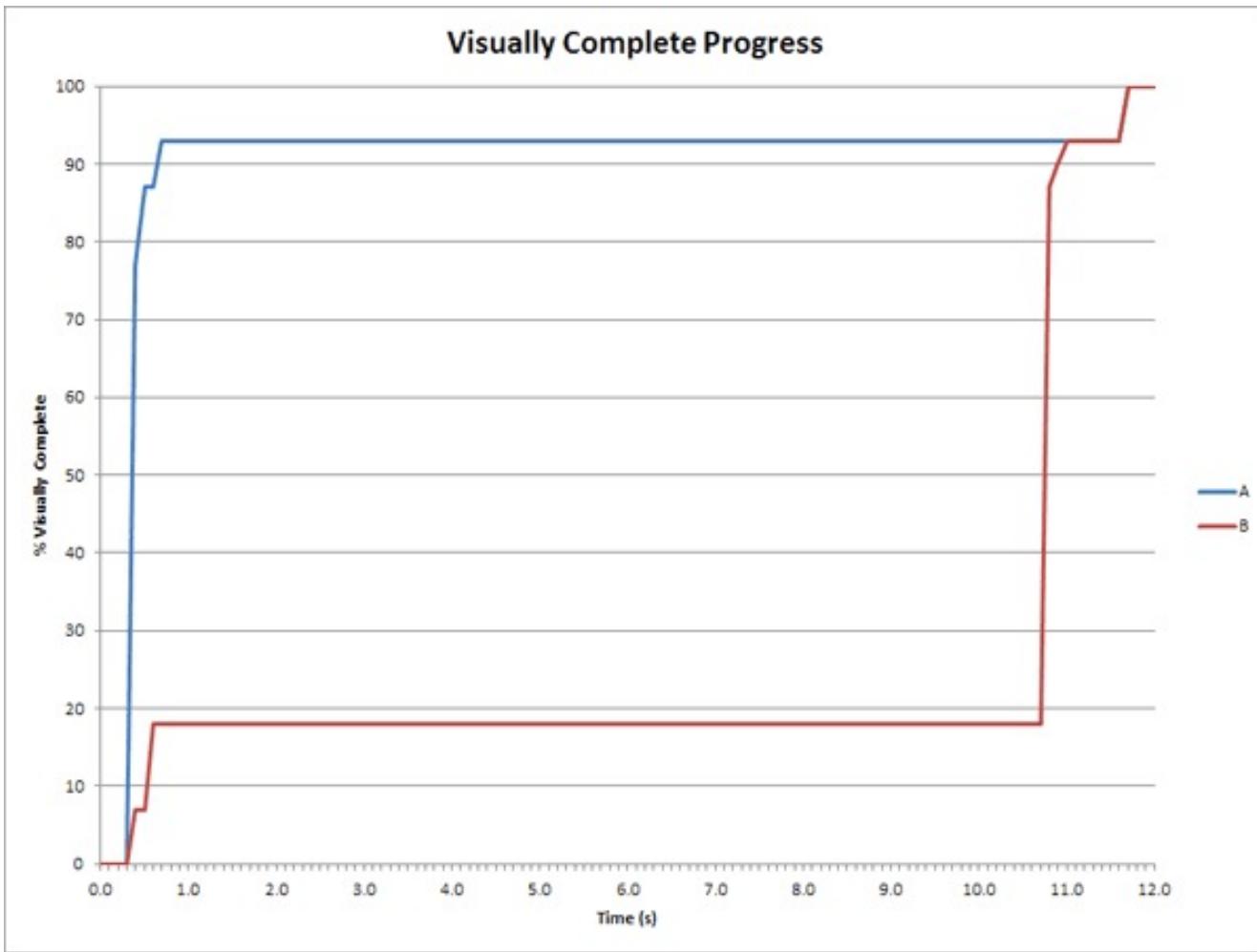
모바일 환경





```
<!DOCTYPE html>
<html ⚡>
  <head>
    <meta charset="utf-8" />
    <title>Sample document</title>
    <link rel="canonical" href="./regular-html-version.html" />
    <meta
      name="viewport"
      content="width=device-width,minimum-scale=1,initial-scale=1"
    />
    <style amp-custom>
      h1 {
        color: red;
      }
    </style>
    <script type="application/ld+json">
    {
      "@context": "http://schema.org",
      "@type": "NewsArticle",
      "headline": "Article headline",
      "image": ["thumbnail1.jpg"],
      "datePublished": "2015-02-05T08:00:00+08:00"
    }
    </script>
    <style amp-boilerplate>
      body {
        -webkit-animation: -amp-start 8s steps(1, end) 0s 1 normal both;
        -moz-animation: -amp-start 8s steps(1, end) 0s 1 normal both;
        -ms-animation: -amp-start 8s steps(1, end) 0s 1 normal both;
        animation: -amp-start 8s steps(1, end) 0s 1 normal both;
      }
      @-webkit-keyframes -amp-start {
        from {
          visibility: hidden;
        }
      }
    </style>
    <noscript>
      <><style amp-boilerplate>
        body {
          -webkit-animation: none;
          -moz-animation: none;
          -ms-animation: none;
          animation: none;
        }
      </style></noscript
      >
      <script async src="https://cdn.ampproject.org/v0.js"></script>
    </head>
    <body>
      <h1>Sample document</h1>
      <p>
        Some text
        <amp-img src="sample.jpg" width="300" height="300"></amp-img>
      </p>
    </body>
  </html>
```







Multimedia



Semantics



Offline & Storage



Performance



Device Access



Connectivity



Graphics & 3D

=



API

CSS



=



RWD

HTML





Device Characteristics Detected:

ajax_preferred_geoloc_api	is_tablet	preferred_markup
none	false	html_web_5_0
ajax_support_javascript	is_wireless_device	resolution_height
true	false	800
brand_name	jpg	resolution_width
Firefox	true	1280
cookie_support	marketing_name	viewport_initial_scale
true	Firefox 58	viewport_width
device_os	max_image_height	width_equals_max_image_width
Mac OS X	600	

device_os_version

max_image_height

<http://edc.edgesuite.net/>

실습 7)

- <http://edc.edgesuite.net/> 에 접속하여 본인의 디바이스 정보 확인하기
- Chrome - Device Spoofing으로 다시 한번 확인하기
- 이 서비스의 구현 원리를 추론해보기

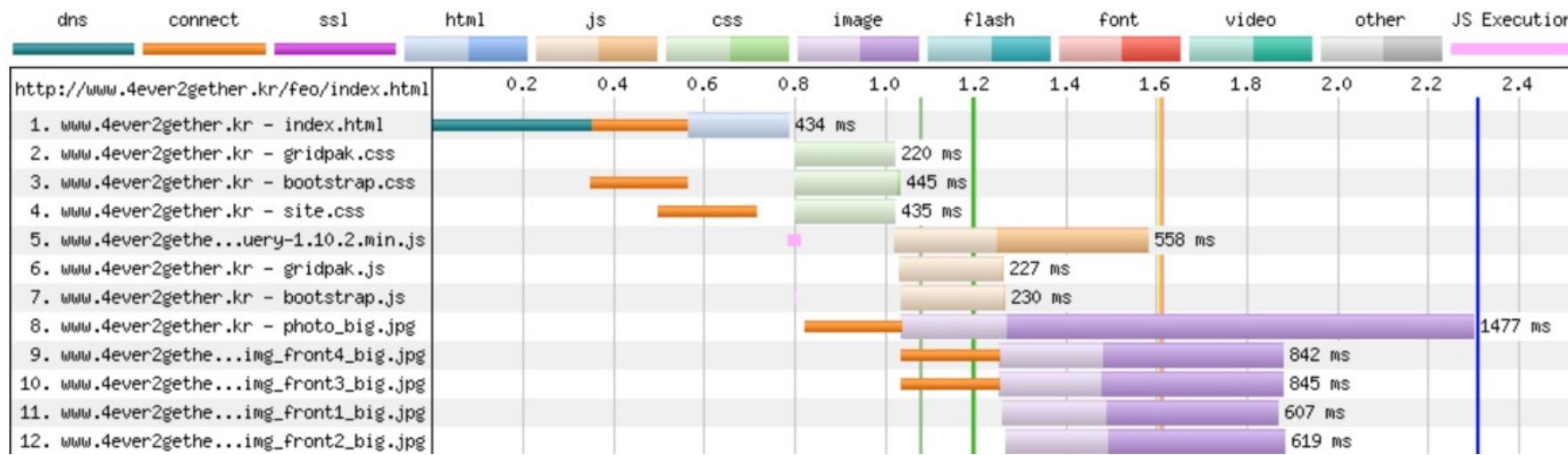
시간: 5분

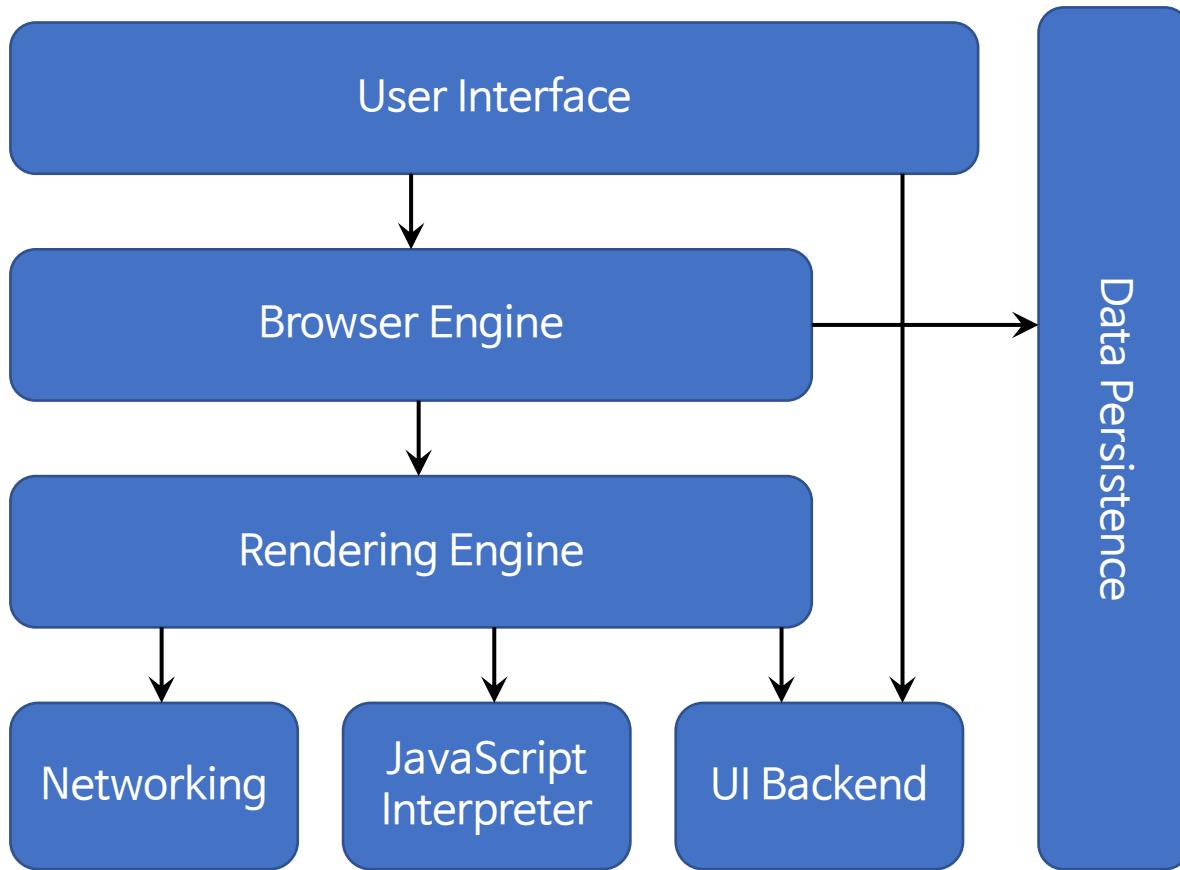
실습 8)

- <https://awesometechstack.com/>에서 블로그의 웹 개발 스택 확인하기
- 이 서비스의 구현 원리를 추론해보기

시간: 3분

이미지





Critical Rendering Path

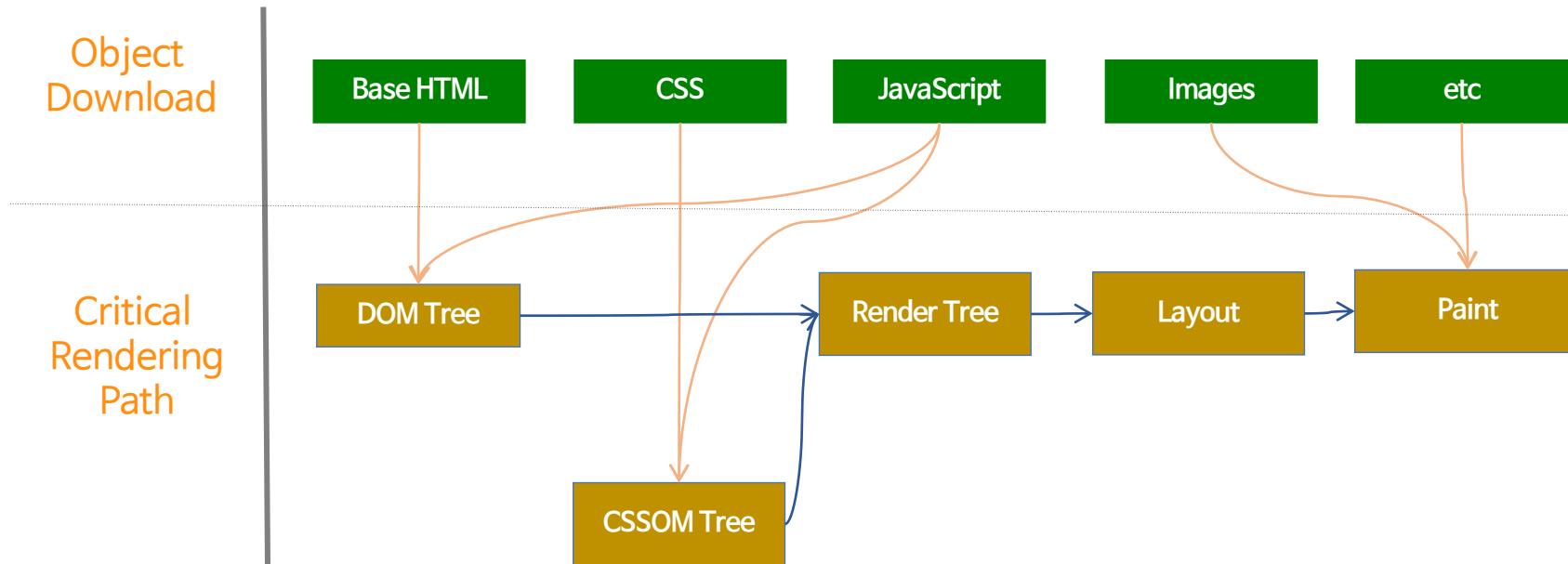
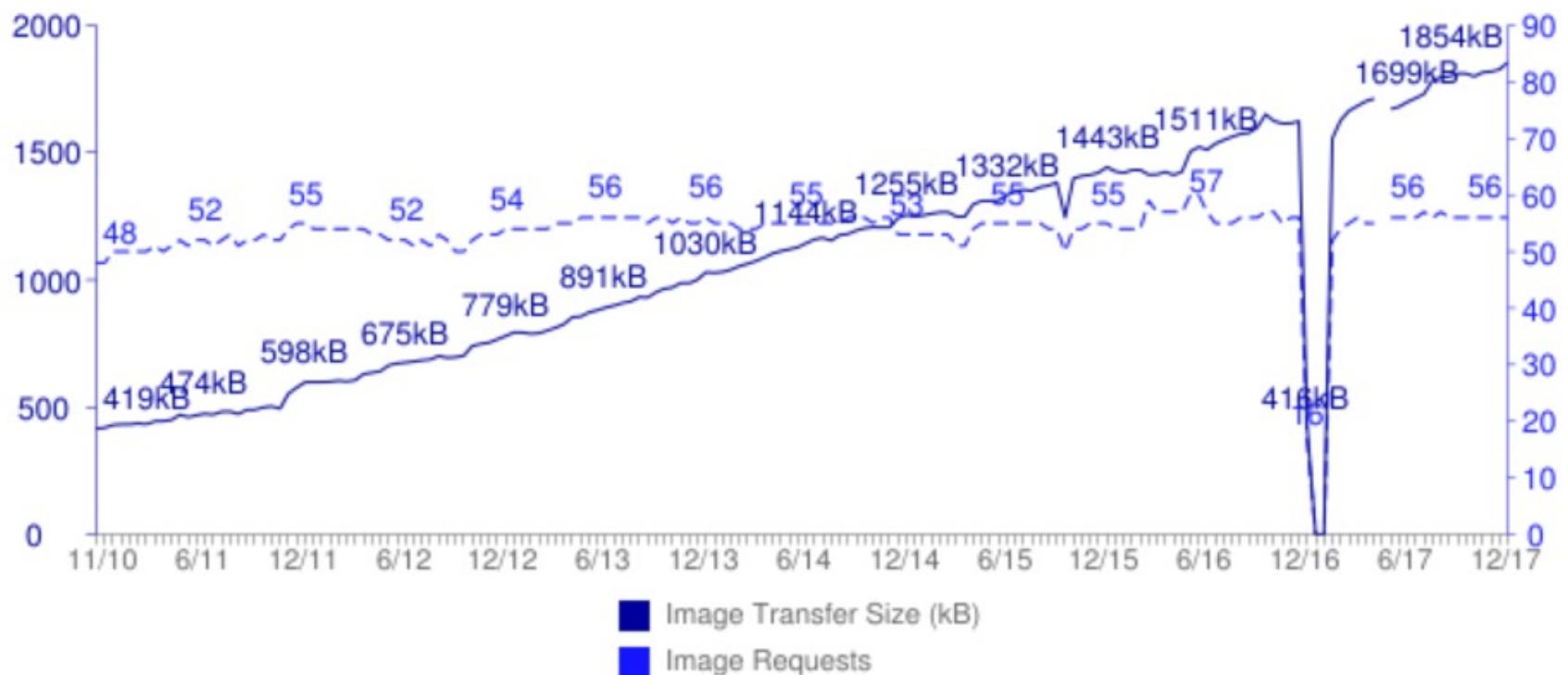


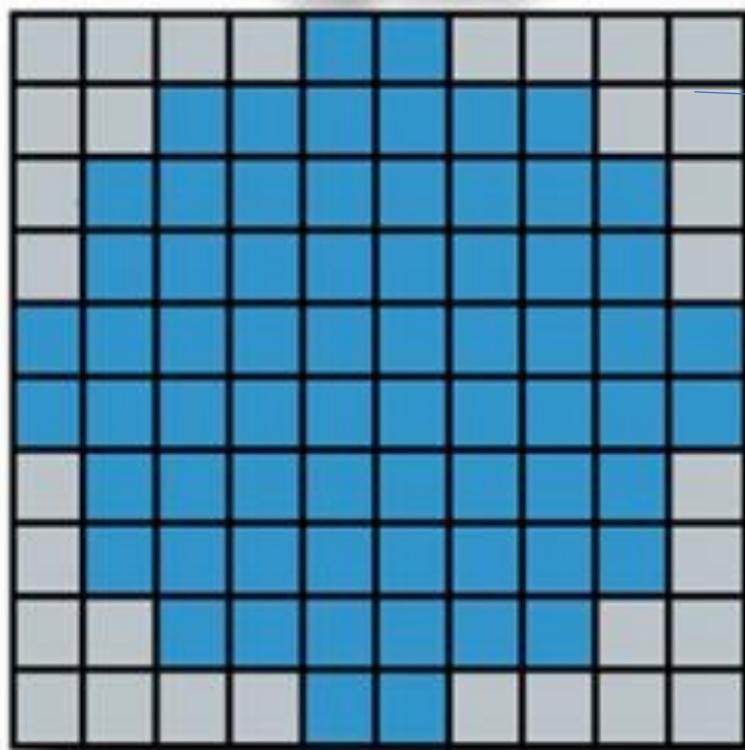
Image Transfer Size & Image Requests



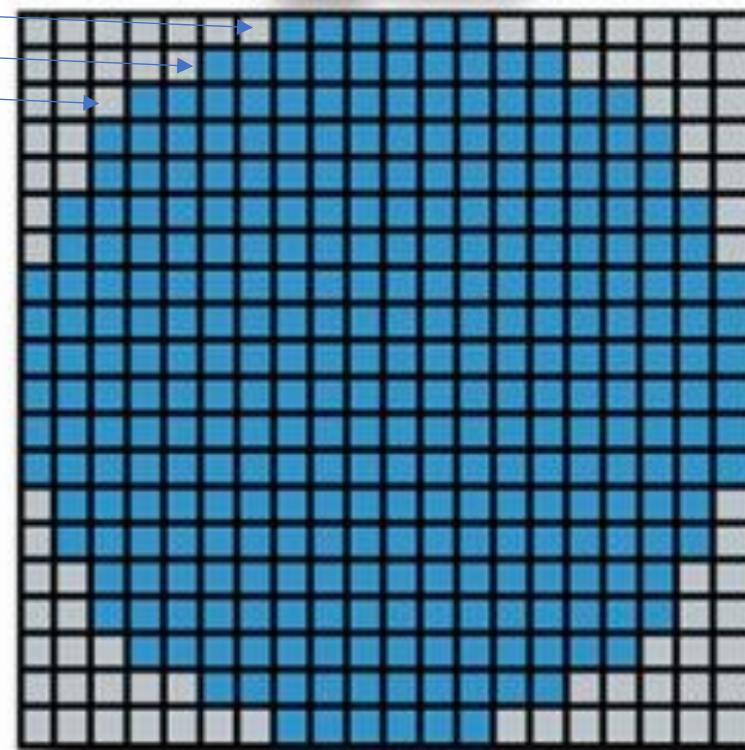


출처 expertreviews.co.uk

10 PPI



20 PPI



사용자 환경별 이미지 다운로드 소요시간

- Desktop Cable : 4372 ms
- Desktop 3G Fast : 15918 ms
- Mobile 3G Normal : 21485 ms

23.	- gnb_clientlib.js	49 ms
24.	...l_clientlib.min.js	39 ms
25.	...videoOverlay.min.js	45 ms
26.	- homepage.min.js	48 ms
27.	...if_rg-webfont.woff	513 ms
28.	...vestreamHeros22116	2162 ms
29.	...VrBundleAltv222116	1239 ms
30.	- SPay_031116	1673 ms
31.	...odule_030116%20(1)	2548 ms
32.	...esign_image_021716	4372 ms
33.	...coveExperiences.js	554 ms
34.	- utag.sync.js	810 ms
35.	...w-samsung-logo.png	267 ms
36.	- oo_icon.gif	285 ms



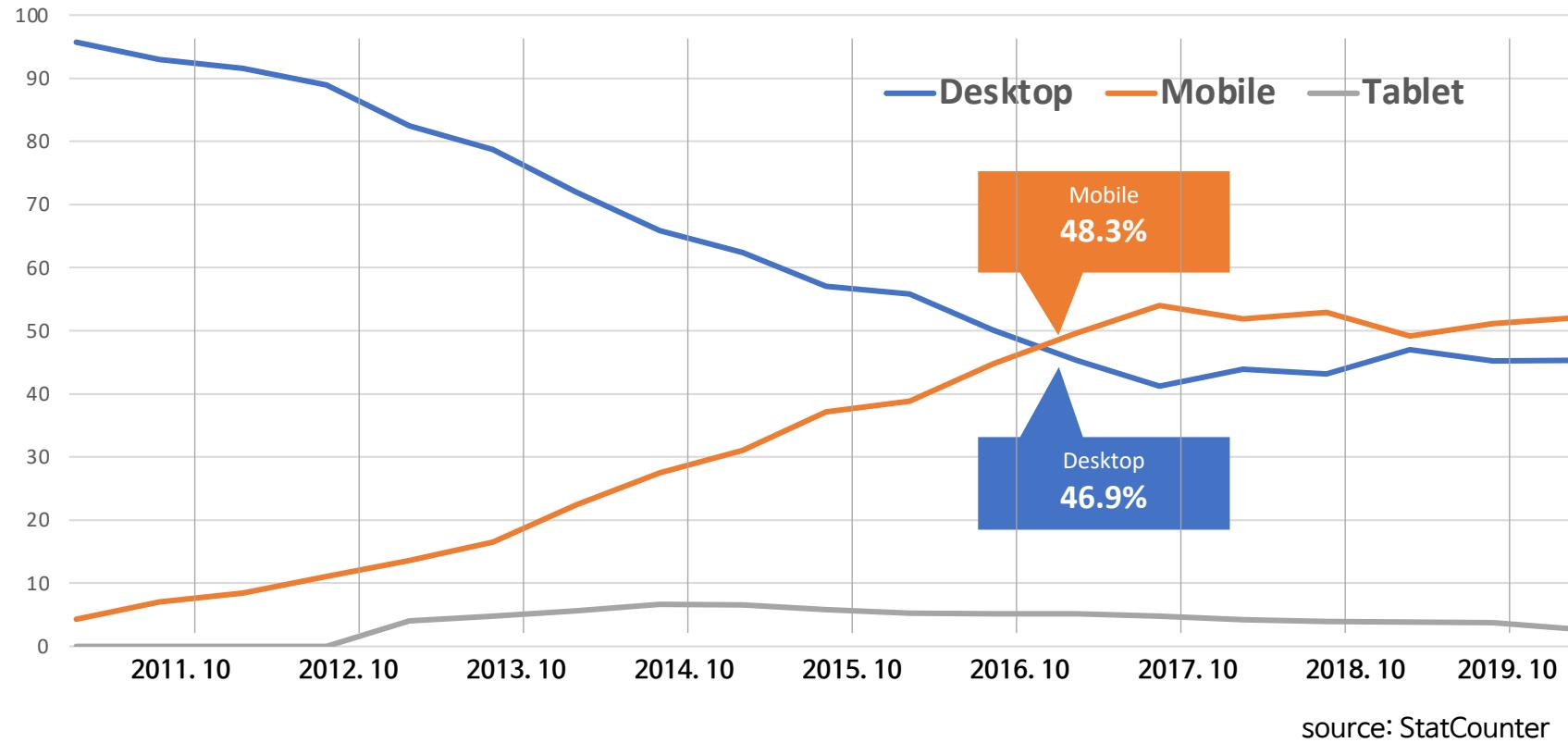
실습 9)

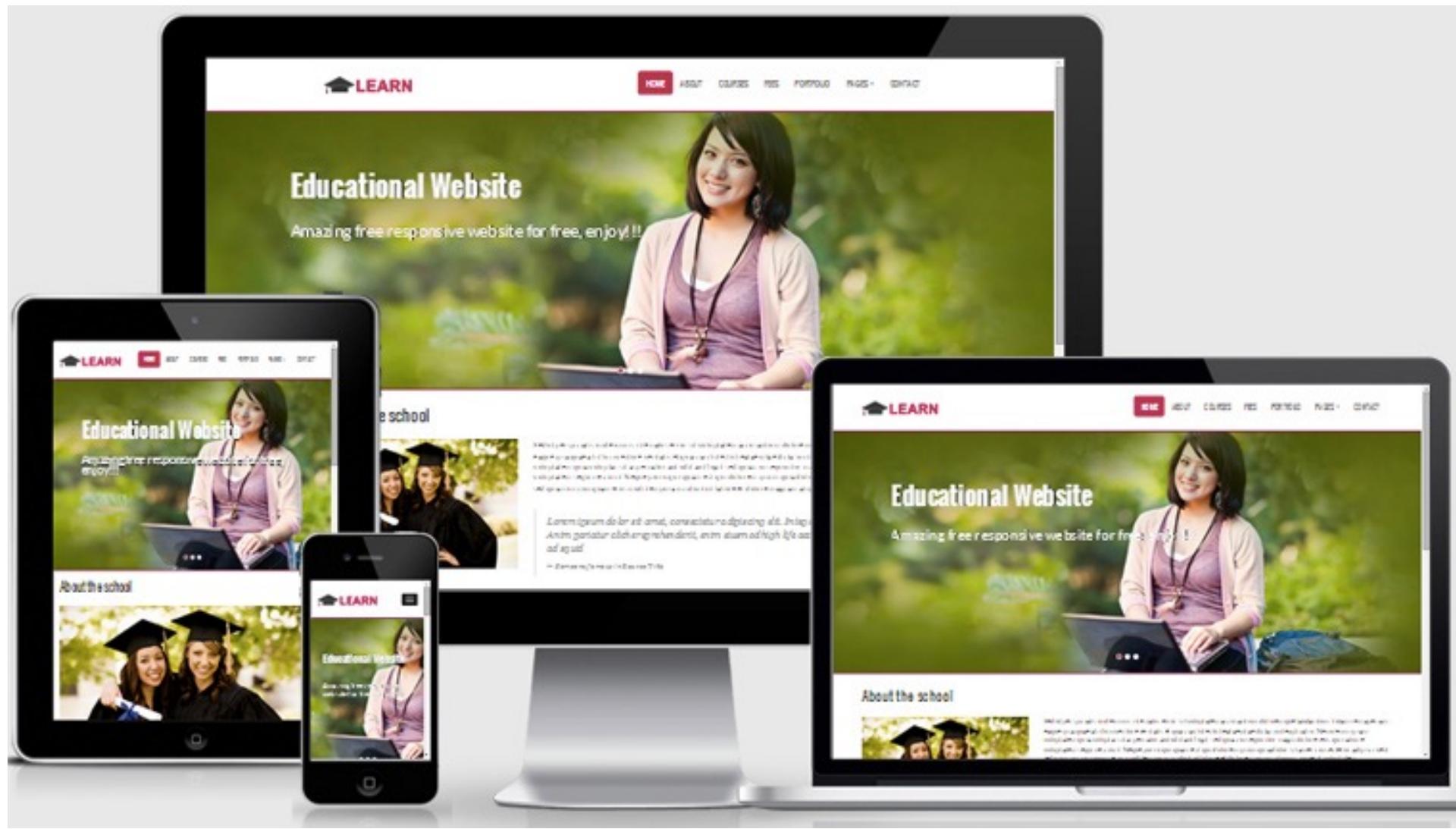
- <https://unsplash.com/>에서 본인이 좋아하는 고화질 이미지 다운로드
- <https://tinypng.com/>에서 이미지 압축 전후 파일 크기 비교하기
- 이미지 압축 원리를 추론해보기

시간: 5분

반응형 웹

Internet Usage Worldwide





Download and Shrink



http://c.s-microsoft.com/en-us/CMSImages/SpringPromo_LastFrameBG_1600x540_EN_US.jpg?version=f77413db-c3db-675e-1ff8-faa31c3d5c30

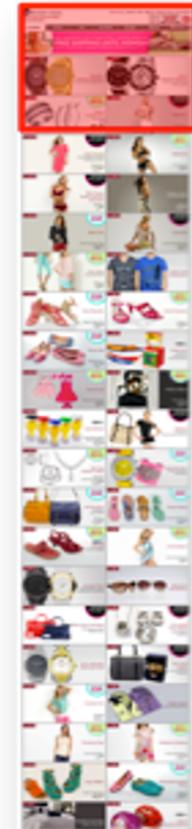
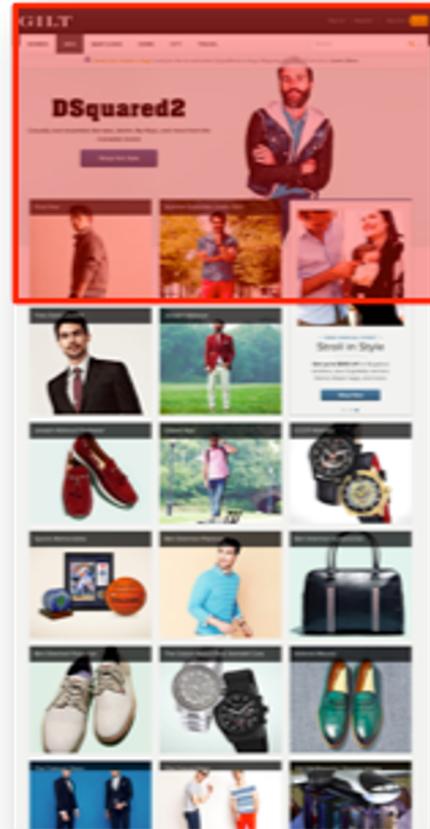
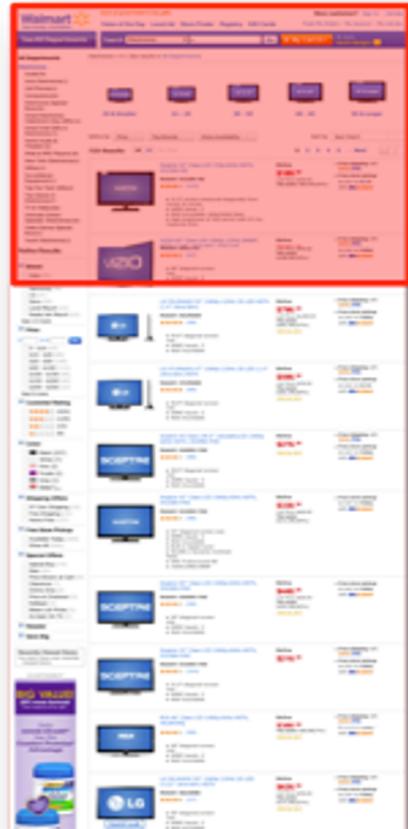
Download and Hide

The screenshot shows a product page for a "TORI TANK" top. The top is blue, paired with wide-leg beige trousers. The page includes a search bar, account and cart links, and a sidebar for related products. An orange circle highlights the "RELATED PRODUCTS" section.

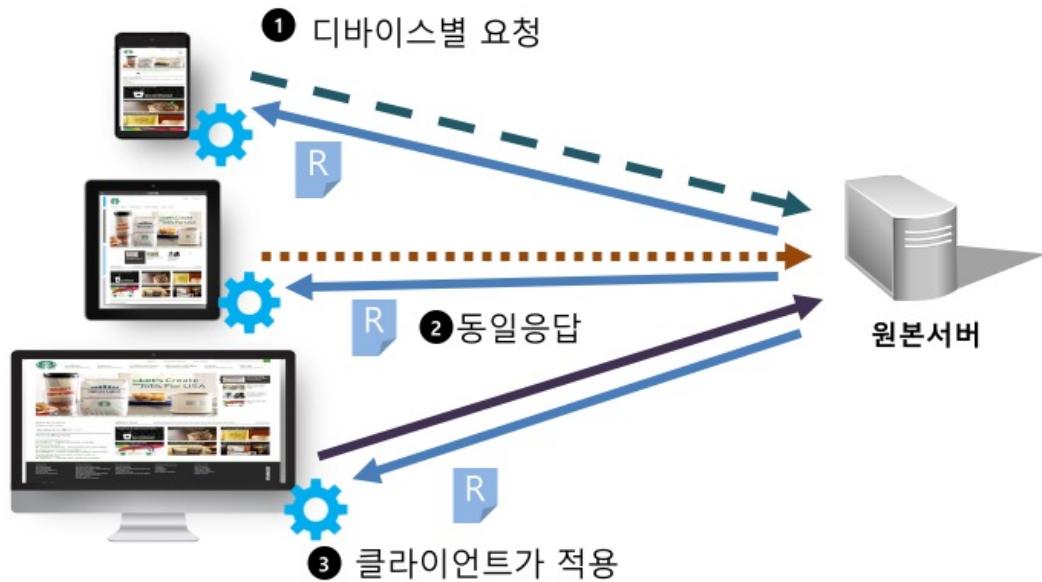
```
@media only screen and (max-width: 771px)
.block-related {
    display: none;
}
```

The screenshot shows the same product page for the "TORI TANK" top, but the "RELATED PRODUCTS" section is now hidden, as indicated by the orange arrow pointing from the first screenshot. The page layout is simplified.

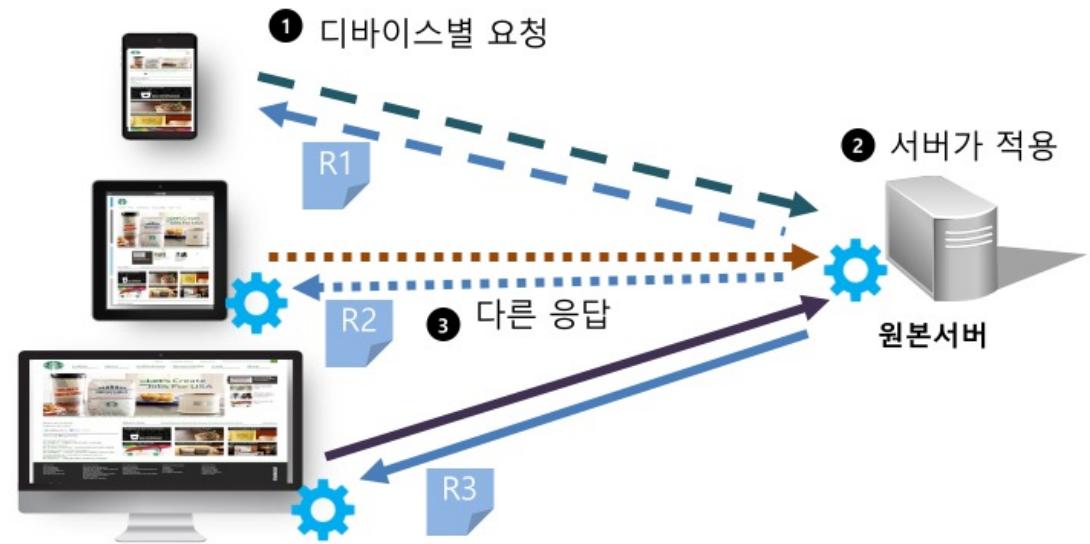
Images Below the Fold



반응형 웹



서버측 반응형 웹





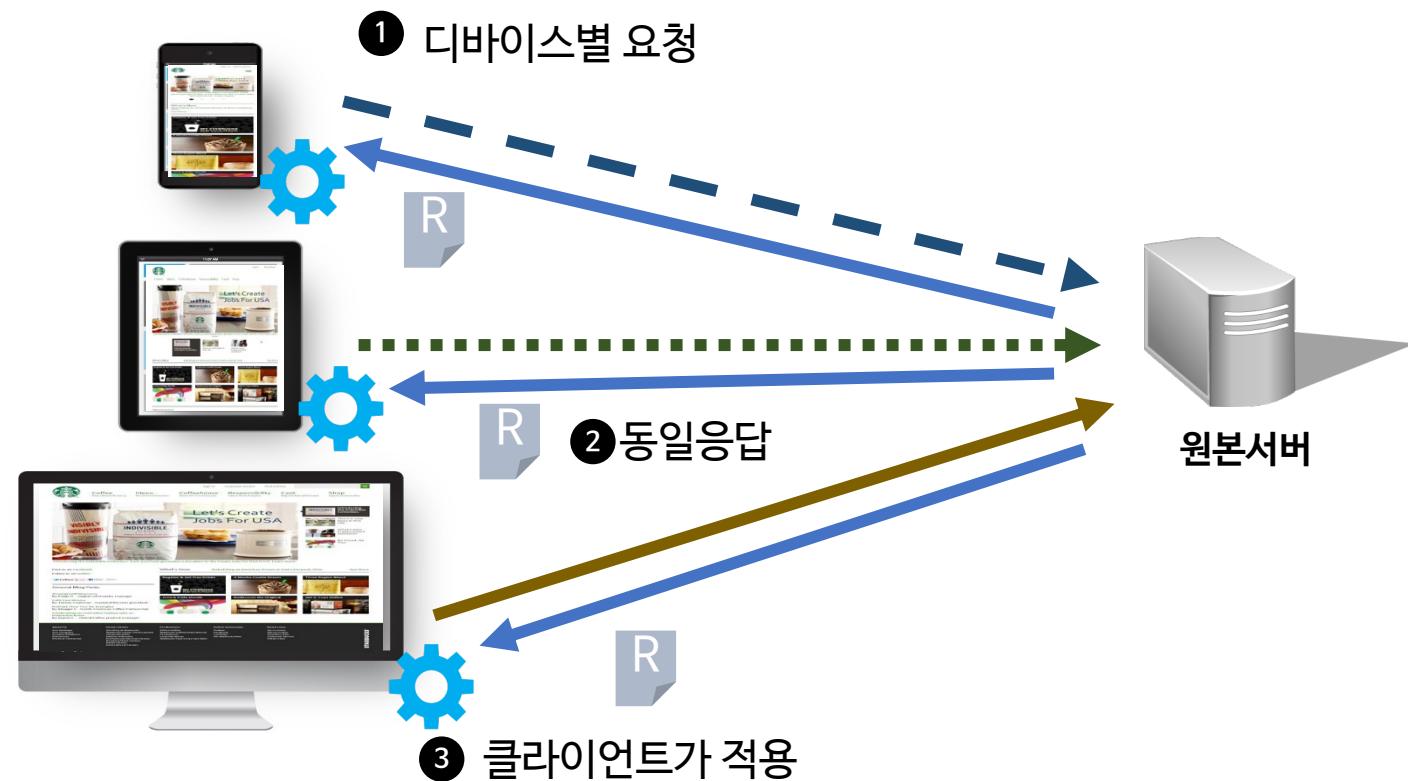
According to the latest and greatest WURFL PHP API 1.9.2.0 (WURFL.xml from 2018-03-03), your device with User-Agent
Mozilla/5.0 (iPhone; CPU iPhone OS 10_3 like Mac OS X) AppleWebKit/602.1.50 (KHTML, like Gecko) CriOS/56.0.2924.75 Mobile/14E5239e Safari/602.1
is identified as
Apple iPhone
[Link to this result](#)

ⓘ Capabilities

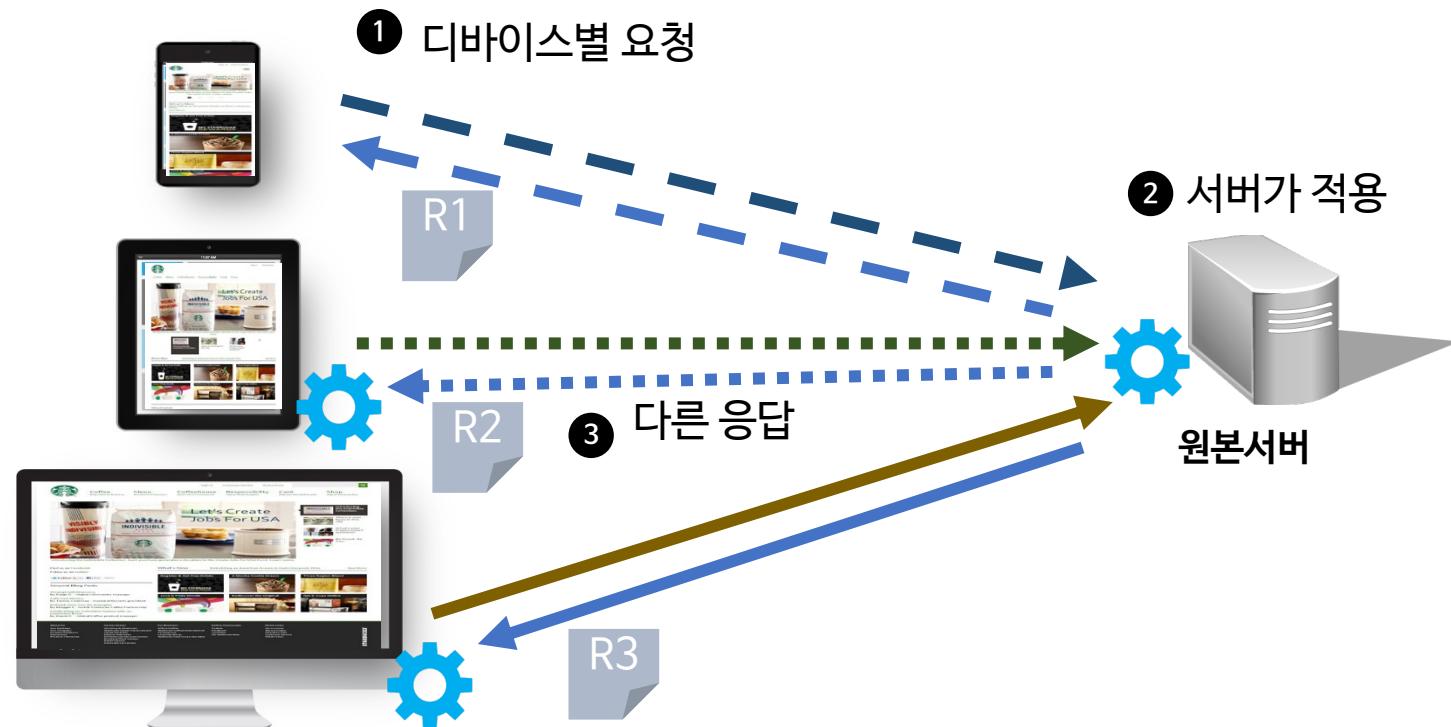
📱 <code>is_tablet</code>	<code>false</code>
🖱️ <code>pointing_method</code>	<code>touchscreen</code>
↔️ <code>resolution_width</code>	<code>640</code>
↑️ <code>resolution_height</code>	<code>1136</code>

This is just a partial list of capabilities. Licensees have access to over **500** capabilities.

반응형 웹



서버측 반응형 웹



실습 10)

- <https://web.wurfl.io/#wurfl-js> 내용 확인하기

시간: 3분

웹 성능 테스트

<https://www.webpagetest.org/>



Test History

API

Forums

Docs

Blog

About

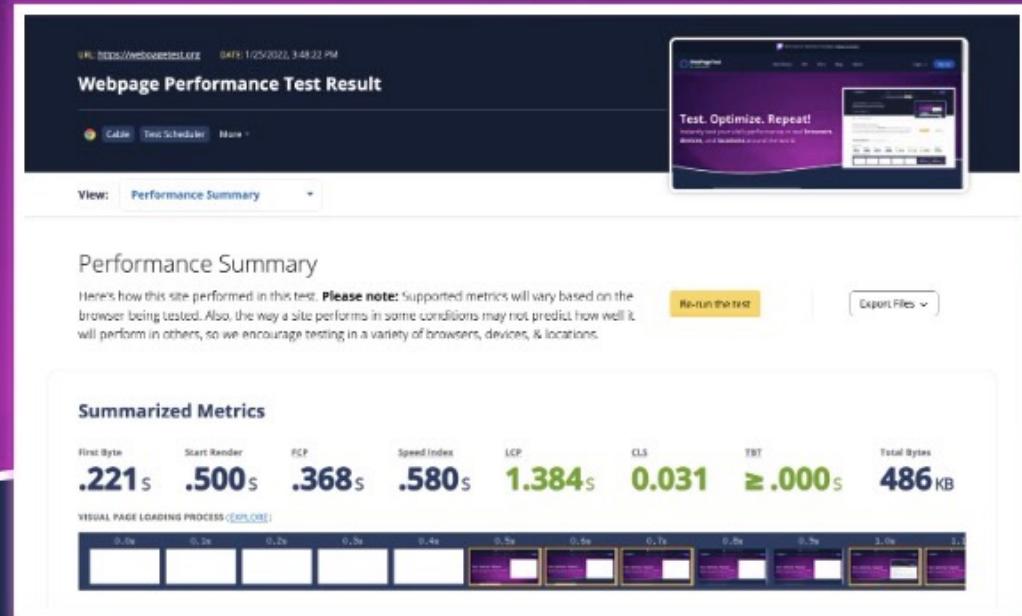
Login →

Sign-up

Test. Optimize. Repeat!

Instantly test your site's performance in real **browsers**,
devices, and **locations** around the world.

Start a **Site Performance** ▾ **Test!**

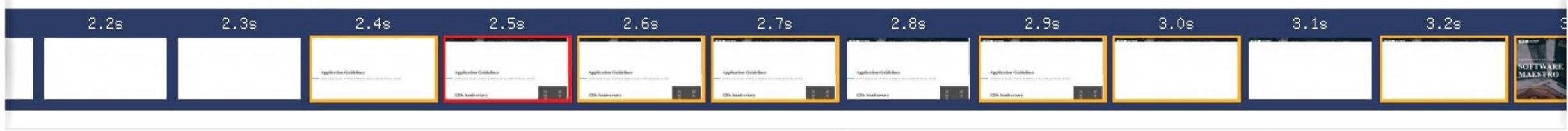


Observed Metrics (Based on Median Run by SpeedIndex)

FIRST VIEW (RUN 2)

First Byte	Start Render	FCP	Speed Index	LCP	CLS	TBT	Total Bytes
.373 s	2.400 s	2.374 s	3.222 s	2.439 s	.009	.000 s	2,711 KB

VISUAL PAGE LOADING PROCESS ([EXPLORE](#))

[Compare First Views](#)[Plot Full Results](#)

Performance Optimization Overview

A detailed view of this site's asset optimization and related opportunities.

[Re-run the test](#)

Optimization Summary

Quickly jump to the sections below:

B Security score

A First Byte Time

A Keep-alive Enabled

F Compress Transfer

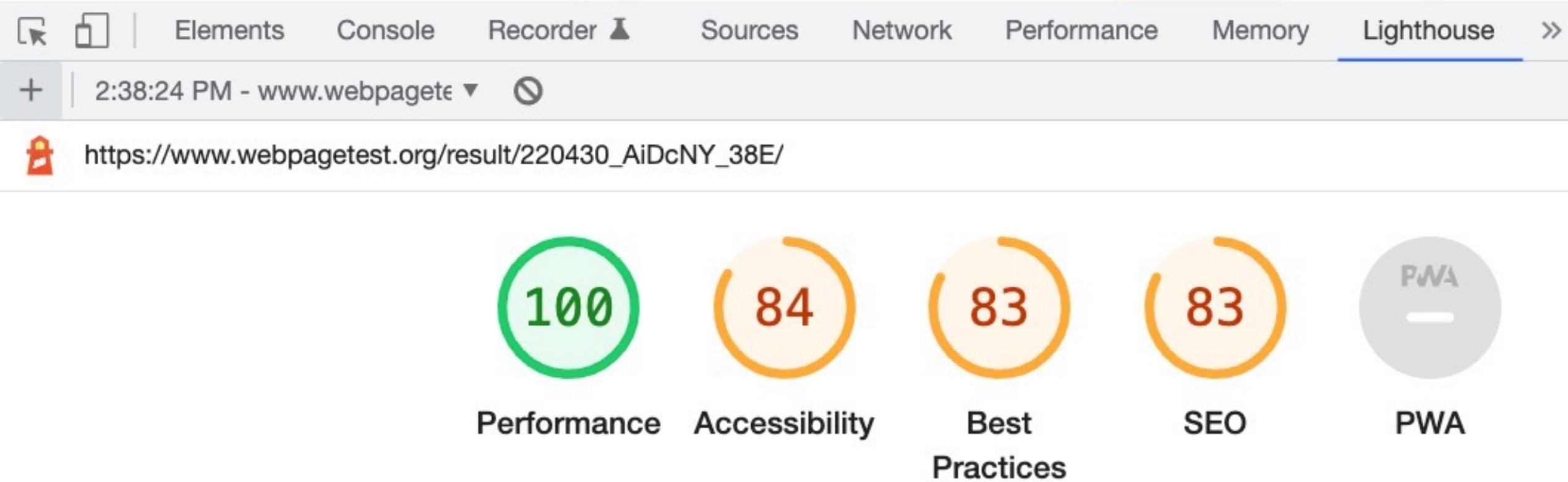
F Compress Images

F Progressive JPEGs

F Cache static content

✓ Effective use of CDN

Google - Chrome - LightHouse



실습 11)

- <https://www.webpagetest.org/>에서 본인 블로그의 웹 성능 확인하기
- Google Lighthouse 구글링해보고, 실행해보기
- 웹 성능 점수 확인하여 어떤 부분을 개선할지 생각하기
- SEO(Search Engine Optimization)을 개선할 수 있는 방법은?

시간: 5분



감사합니다.