Fastcampus

Computer Science School

Network Basic(2)

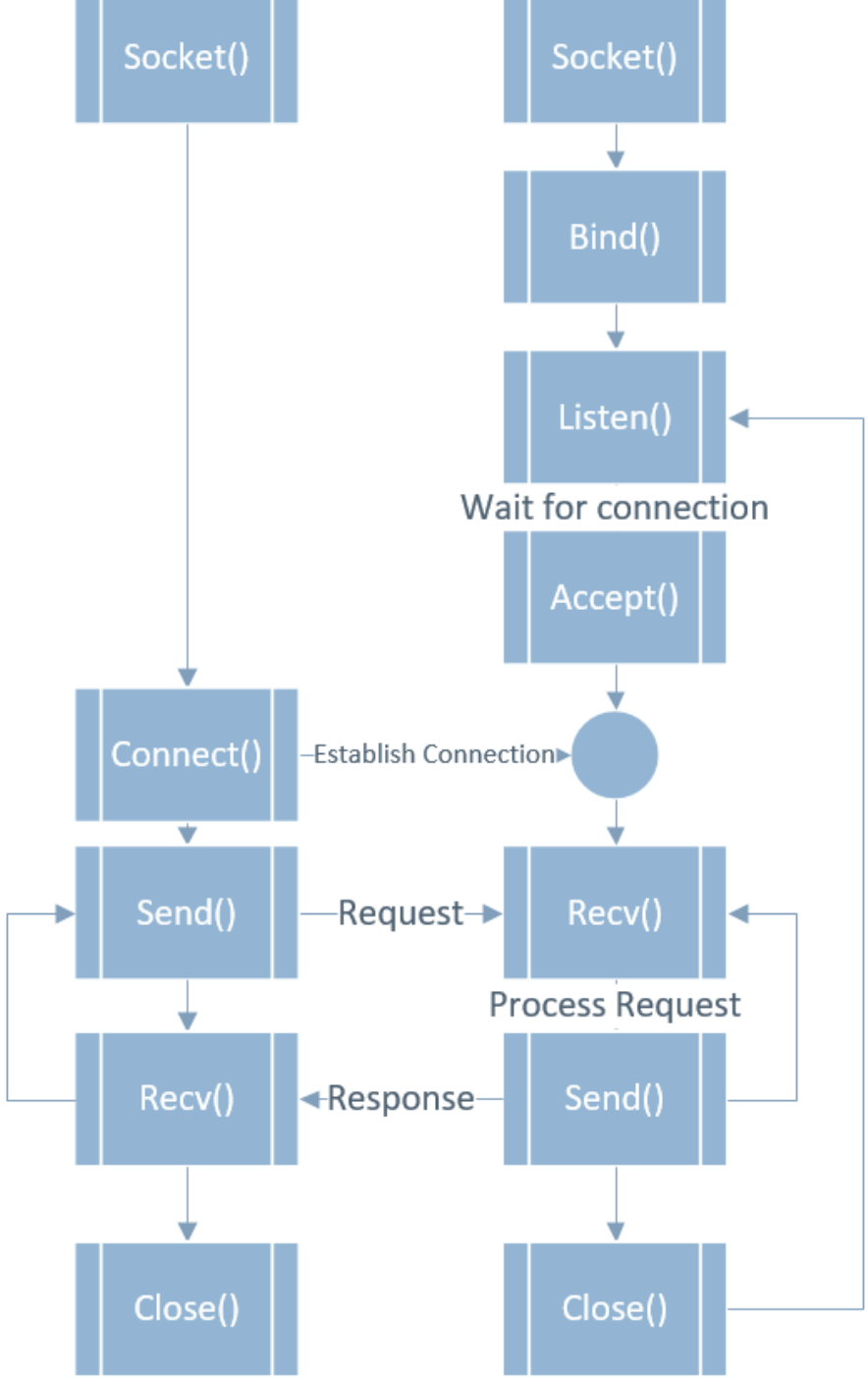
Socket

Socket

- `Virtual End Point` where entities can perform inter-process communication.

So, Socket is ..

> 떨어져 있는 두 컴퓨터를 연결해주는 과정


Socket()
Socket()
Bind()
Listen()
Wait for connection
Accept()
Connect()
Establish Connection
Send()
Request
Recv()
Process Request
Recv()
Response
Send()
Close()
Close()

Websocket

Websocket

> 웹사이트가 사용자와 상호작용하기 위해 만들어진 기술

W3C가 API를 관리
port:80, HTTP1.1

Before Websocket

- HTTP Request, Response
- Hidden Frame
- Long Polling

Differences between Socket, Websocket

Socket - HTTP run over TCP/IP

Websocket - run from web browser

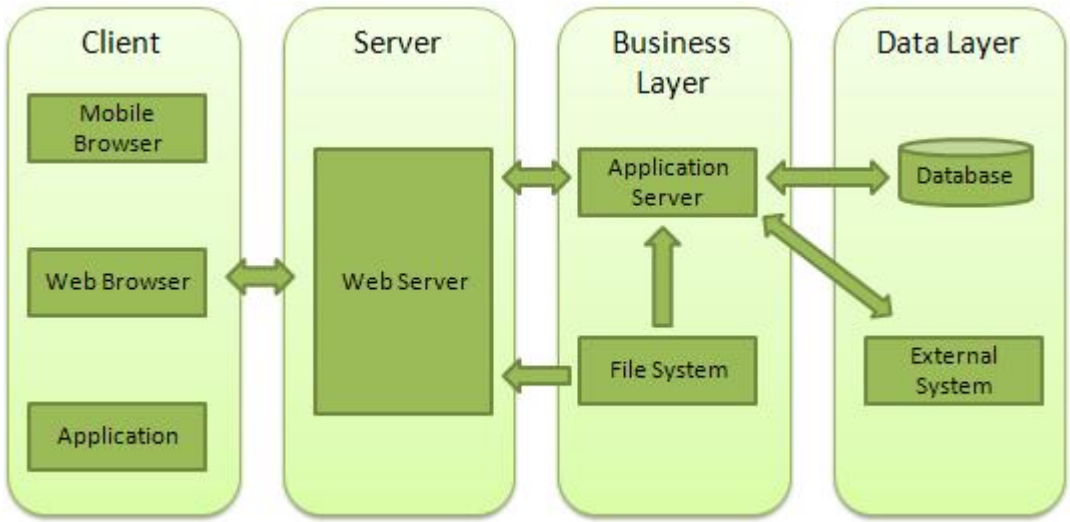
Socket.io

> browser 와 상관없이 js를 이용해 실시간 통신을 지원

- 브라우저와 웹 서버의 종류와 버전을 분석해 가장 적절한 기술로 통신
- WebSocket, FlashSocket, AJAX Long Polling, AJAX Multi part Streaming, IFrame, JSONP Polling을 추상화한 기술

Web Programming

Web architecture



웹 개발 패턴의 변화

```
<html>
<head></head>
<body>
<h1>Static Header</h1>
<div>Static Contents</div>
</body>
</html>
```

- 1991 ~ 1999: Sir Timothy John "Tim" Berners-Lee가 하이퍼텍스트 기반의 프로젝트를 제안한 이후 정적인 컨텐츠들을 중심으로 한 웹 기술이 발달

웹 개발 패턴의 변화

```
<html>
<head></head>
<body>
<h1>{% Dynamic Header %}</h1>
<div>{% Dynamic Contents %}</div>
</body>
</html>
```

- 1999 ~ 2009: Linux, Apache, Mysql, Php 중심의 동적인 서버, 정적인 클라이언트 모델이 지속됨

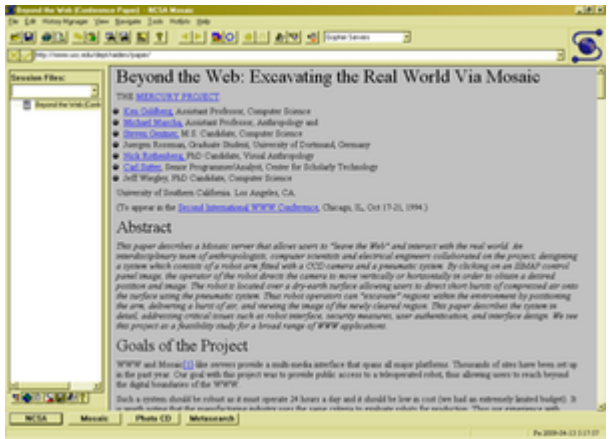
웹 개발 패턴의 변화

```
<html>
<head>
<script src="https://unpkg.com/vue"></script>
</head>
<body>
<h1>{{ header }}</h1>
<div id="app">
  {{ message }}
</div>
<script>
var app = new Vue({
  el: '#app',
  data: {
    message: '안녕하세요 Vue!'
  }
})
</script>
</body>
</html>
```

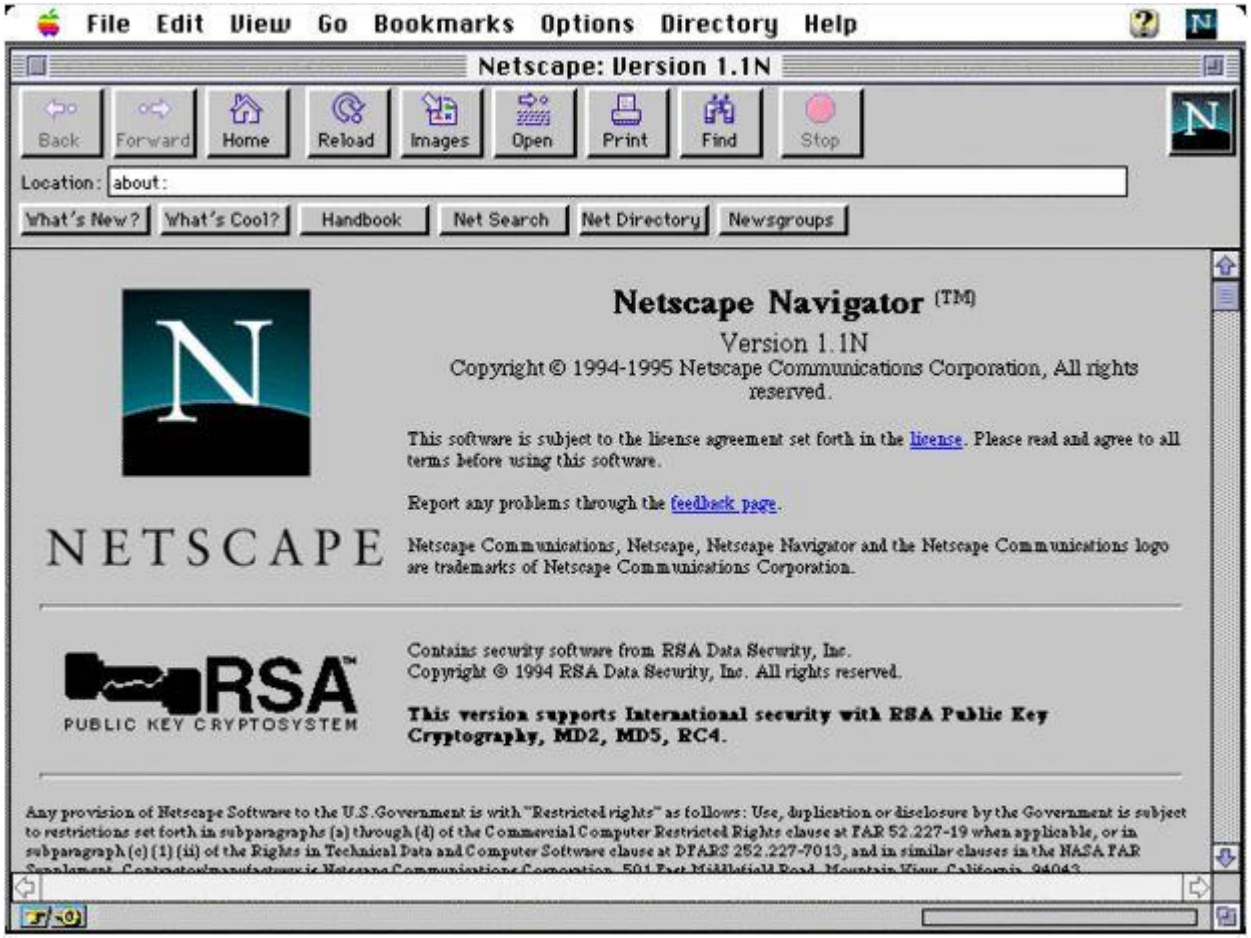
- 2010 ~ 현재: javaScript!! (Dynamic Web Client)

Web Browser

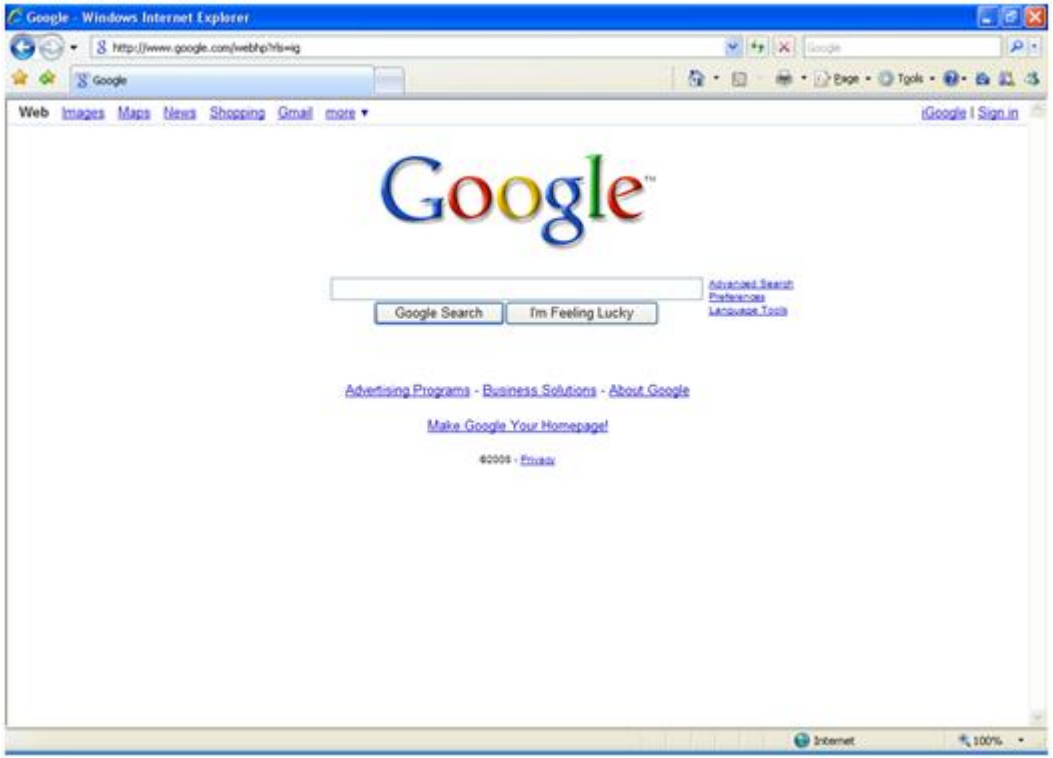
Mosaic(1993)


Beyond the Web: Excavating the Real World Via Mosaic
Abstract
Goals of the Project

Netscape(1994)

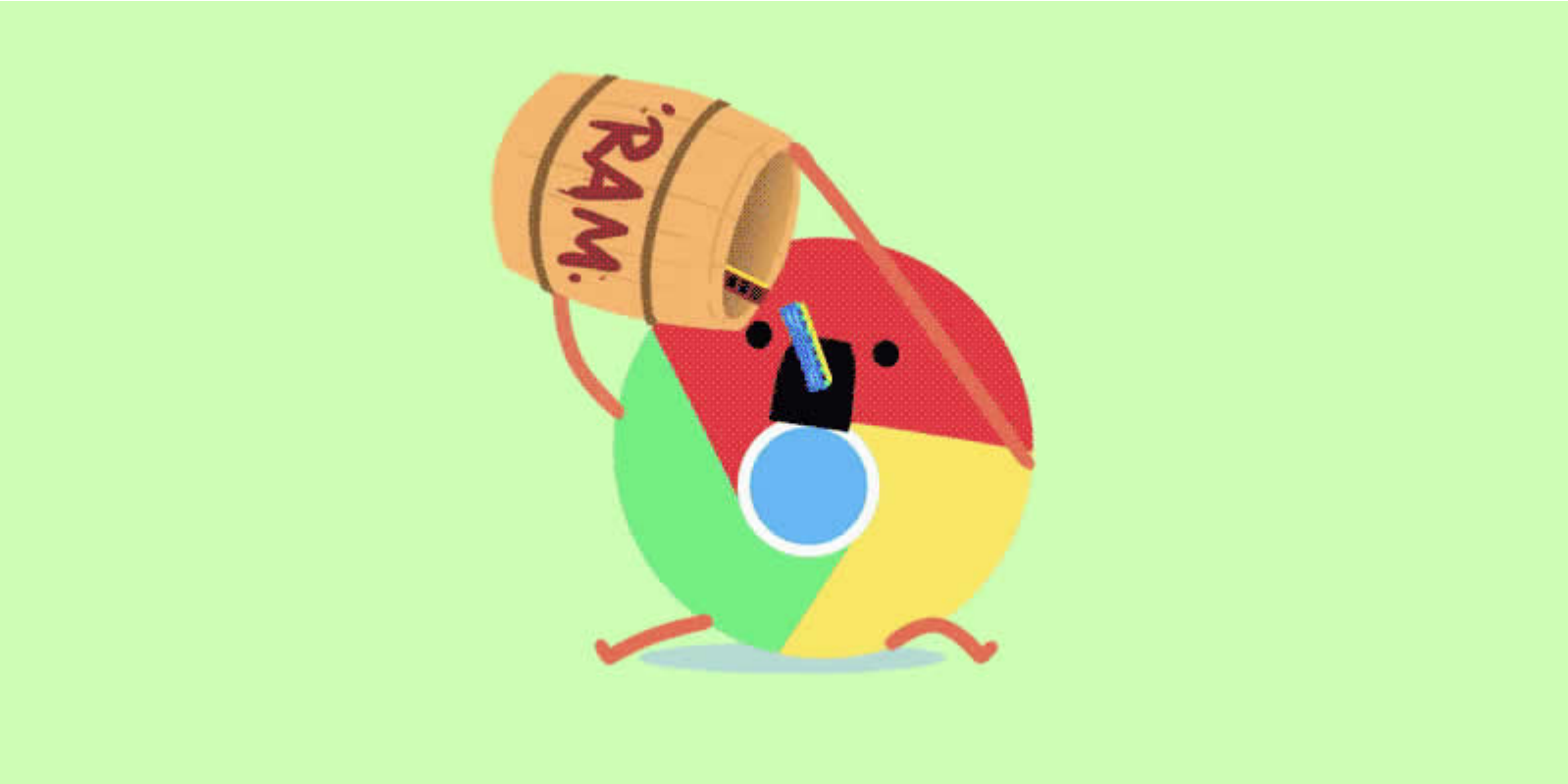


Internet Explorer(1995)



FireFox(2004)

Chrome(2008)



웹 개발의 현재

javaScript

Client-side

- HTML/CSS, javaScript
- jQuery, AJAX
- Front-end Web Framework
  - AngularJS
  - React.js
  - Vue.js
- CSS Framework
  - Bootstrap
  - Foundation

Server-side

- Depends on Language
  - PHP: Laravel
  - javaScript: Node.js(Express.js)
  - Java: Spring
  - C++, C#: ASP.net
  - Python: Django, Flask
  - Golang: itself
  - Ruby: Ruby on Rails

Database

- RDBMS
  - MySQL
  - PostgreSQL
  - MariaDB
- noSQL
  - MongoDB
  - CouchDB
  - Redis

etc

- celery (for Distributed Task Queue)
- github, Bitbucket, gitlab (for SCM)
- travis CI or jenkins (for Continuous Integration)
- slack, trello

URI, URL, URN

URI

- Uniform Resource Information
- `https://www.example.com/post/how-to-make-url`

URL

- Uniform Resource Locator
- `https://www.example.com/post/`

URN

- Uniform Resource Name
- `www.example.com/post/how-to-make-url`

API

> Application Program Interface

- 응용프로그램에서 사용할 수 있도록 운영체제나 프로그래밍 언어가 제공하는 기능을 제어할 수 있게 만든 인터페이스
- Windows API
- python/C API

Web API

> 웹서버 혹은 웹브라우저를 위한 API

REST API

`RE` presentational `S` tate `T` ransfer
`A` pplication `P` rogramming `I` nterface

`Resource` - URI
`Verb` - HTTP method
`Representations` - 표현

So, REST is

> HTTP URI + HTTP method

Yahoo Finance
json api

Roy Fielding

- 2000년 UC Irvine의 박사 학위 논문 "Architectural Styles and the Design of Network-based Software Architectures" 발표

Characteristics of REST

- 범용성(HTTP가 가능하면 OK)
- 리소스 중심 API 명세(URI를 읽는 것으로 이해 가능)
- Stateless(클라이언트의 상태를 신경쓰지 않음)

pros and cons of REST

pros:

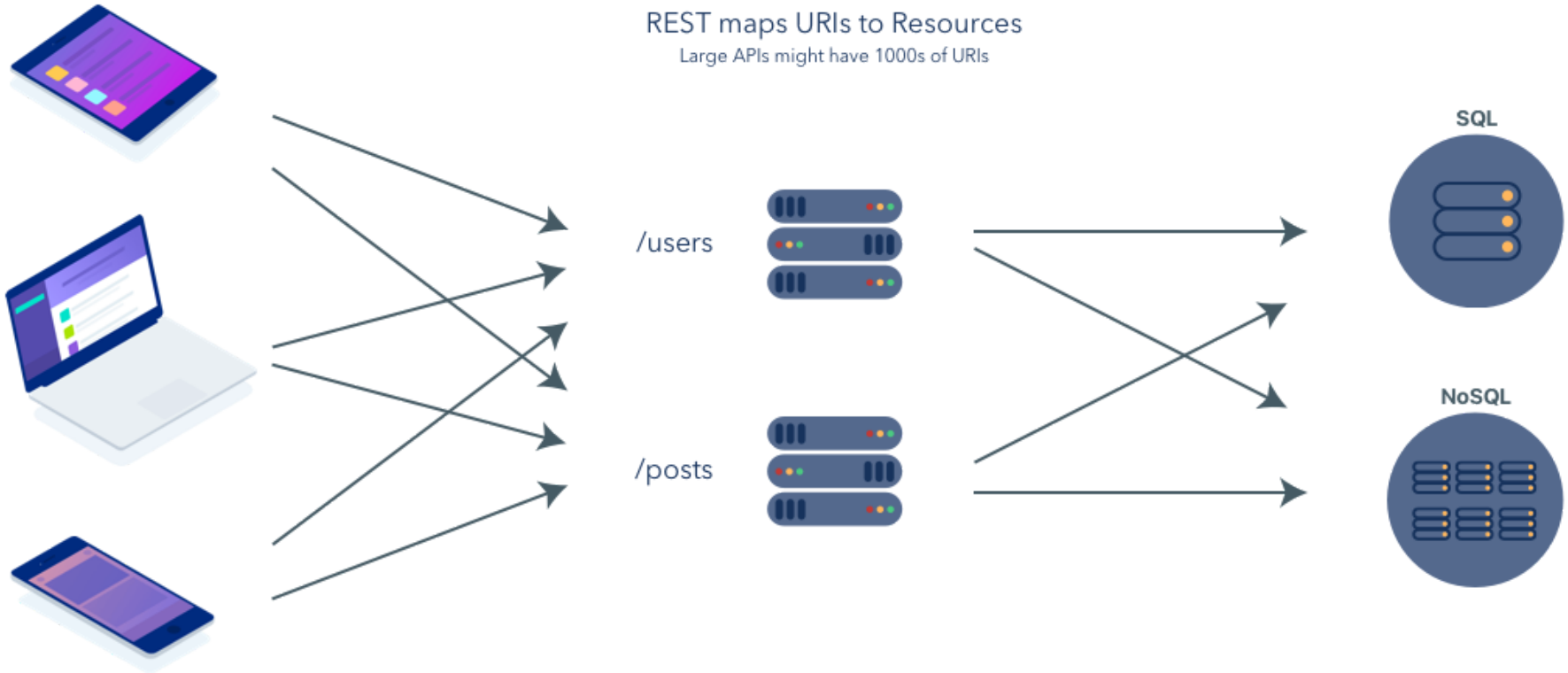
- 스펙없이 기존의 HTTP를 이용해 요청을 처리할 수 있다.

cons:

- 사용할 수 있는 메소드가 4개다
- 표준이 없다

Before REST


Web Server fetches
data & outputs HTML
SQL
SELECT * …
<HTML />
SQL Results


REST maps URIs to Resources
Large APIs might have 1000s of URIs
/users
/posts
SQL
NoSQL

CRUD

Create

Read

Update

Delete

REST API 설계시 주의할 점

- 버전관리 https://api.foo.com/v1/bar
- 명사형 사용 https://foo.com/showid/ --> https://foo.com/user/
- 반응형 https://foo.com/m/user/, https://m.foo.com/user/ (x)
- 언어코드 https://foo.com/kr/, https://kr.foo.com/ (x)
- 응답상태 코드 (200, 400, 500)

HTTP Response code

200, 201 - Success
400, 404 - Not found
500 - Server error

more info..


BUT IT'S NOT
"RESTful" IF YOU...
ENOUGH!

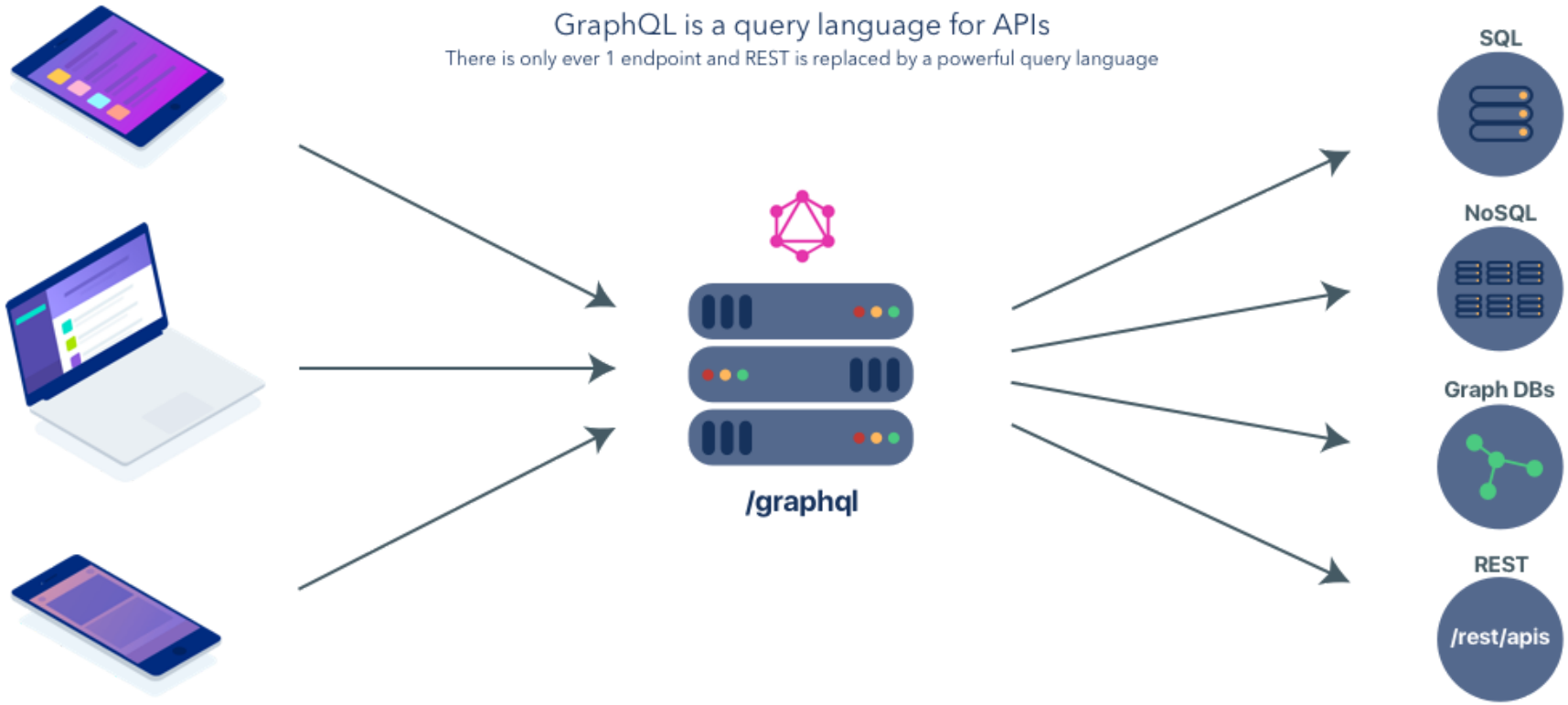
API의 미래

GraphQL

GraphQL

- Open-sourced by Facebook
- Alternative to REST for building APIs
- create strong contract between Client and Server

GraphQL


GraphQL is a query language for APIs
There is only ever 1 endpoint and REST is replaced by a powerful query language
/graphql
SQL
NoSQL
Graph DBs
REST
/rest/apis

Querying with GraphQL

```
query MoviesAndActors {
  movies {
    title
    image
    actors {
      image
      name
    }
  }
}
```

schema of GraphQL

```
schema {
    query: Query
}

type Query {
    movies: [Movie]
    actors: [Actor]
    movie(id: Int!): Movie
    actor(id: Int!): Actor
    searchMovies(term: String): [Movie]
    searchActors(term: String): [Actor]
}
```

```
type Movie {
    id: Int
    title: String
    image: String
    release_year: Int
    tags: [String]
    rating: Float
    actors: [Actor]
}

type Actor {
    id: Int
    name: String
    image: String
    dob: String
    num_credits: Int
    movies: [Movie]
}
```

Flask

Web Framework

- 웹서비스를 제공하기 위해 필요한 기능들을 모아둔 클래스와 라이브러리의 모임

Web Frameworks built with python

- Full-stack
  - Django
  - Pyramid
  - Web2py
- Microframework
  - **Flask**
  - Bottle
- Async
  - Tornado
  - Sanic

Simple Server Framework: Flask

```
$ pip install flask
```

```
from flask import Flask


app = Flask(__name__)

@app.route('/')
def index():
        return 'hello world!'

if __name__ == '__main__':
        app.run(host='0.0.0.0')
```

c9.io

```
from flask import Flask
import os

app = Flask(__name__)

@app.route('/')
def index():
    return 'hello world!'

app.run(host=os.getenv('IP', '0.0.0.0'),port=int(os.getenv('PORT
```

Flask - route

```
from flask import Flask


app = Flask(__name__)

@app.route('/')
def index():
        return 'hello'

@app.route('/about')
def about():
        return 'about'

if __name__ == '__main__':
        app.run(host='0.0.0.0', port=8080, debug=True)
```

Flask - render

```
from flask import Flask, render_template


app = Flask(__name__)

@app.route('/')
def index(name=None):
        return render_template('index.html', name=name)

@app.route('/about')
def about(name=None):
        return render_template('about.html', name=name)

if __name__ == '__main__':
        app.run(host='0.0.0.0', port=8080, debug=True)
```

Flask - render

```
/
  server.py
  /templates
    index.html
    about.html
```

Flask with BeautifulSoup

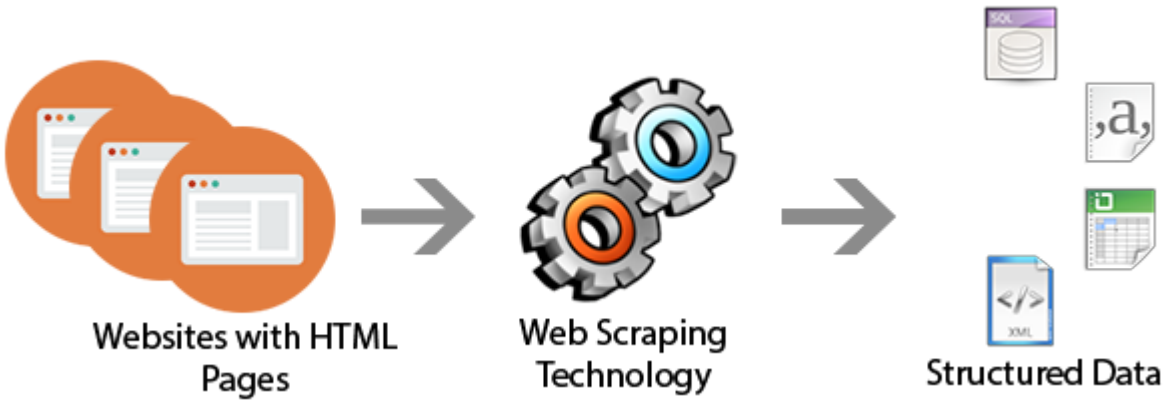
```
from bs import BeautifulSoup

def index():
    ...
    .(some code).
    ...
```

Web Crawling with Python

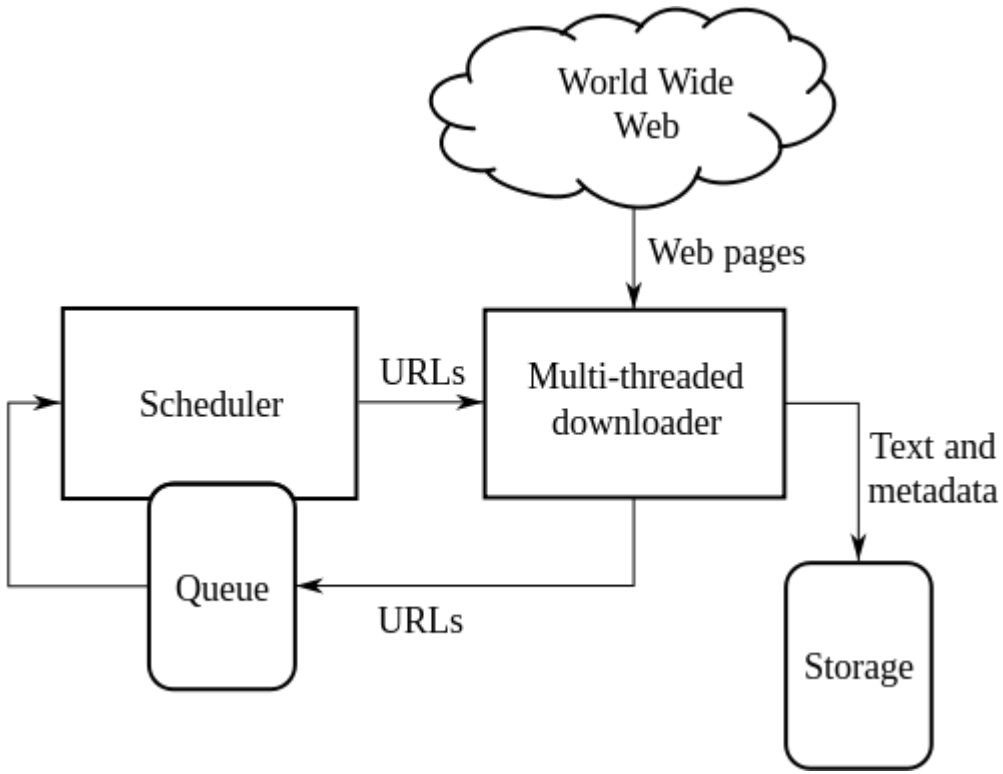
Scraping vs Crawling vs Parsing

Scraping: 데이터를 수집하는 행위



Scraping vs Crawling vs Parsing

Crawling: 조직적 자동화된 방법으로 월드 와이드 웹을 탐색하는 것



Scraping vs Crawling vs Parsing

Parsing: 문장 혹은 문서를 구성 성분으로 분해하고 위계관계를 분석하여 문장의 구조를 결정하는 것

Caution!!

저작권 침해 위반 소지

- 웹사이트 운영자의 크롤링 금지 룰을 어길경우
- 월권하여 데이터베이스에 접근
- 타인의 경제적 이익을 침해할 경우
- 개인정보를 수집할 경우(전화번호, 주소, ..)

Beautiful Soup

Web Scraping with Beautiful Soup

```
$ pip install beautifulsoup4
```

```
$ pip install beautifulsoup4
Collecting beautifulsoup4
  Downloading beautifulsoup4-4.5.1-py3-none-any.whl (83kB)
    100% |████████████████████████████████| 92kB 153kB/s
Installing collected packages: beautifulsoup4
Successfully installed beautifulsoup4-4.5.1
```

Web Scraping with Beautiful Soup

```
$ pip list
DEPRECATION: The default format will switch to
 the [list] section) to disable this warning.
beautifulsoup4 (4.5.1)
pip (9.0.1)
setuptools (20.10.1)
urllib3 (1.19.1)
```

Web Scraping with Beautiful Soup

```
>>> import urllib
>>> from bs4 import BeautifulSoup
>>> html = """
... <html><head><title>The Dormouse's story</title></head>
... <body>
... <p class="title"><b>The Dormouse's story</b></p>
...
... <p class="story">Once upon a time there were three little sisters; and their names were
... <a href="http://example.com/elsie" class="sister" id="link1">Elsie</a>,
... <a href="http://example.com/lacie" class="sister" id="link2">Lacie</a> and
... <a href="http://example.com/tillie" class="sister" id="link3">Tillie</a>;
... and they lived at the bottom of a well.</p>
...
... <p class="story">...</p>
... """
>>> soup = BeautifulSoup(html, 'html.parser')
>>> print(soup.prettify())
```

Web Scraping with Beautiful Soup

```
import urllib
from bs4 import BeautifulSoup
html = """

uglified html code

"""
soup = BeautifulSoup(html, "html.parser")
print(soup.prettify())
```

Web Scraping with Beautiful Soup

```
curl https://www.rottentomatoes.com
```

```
import urllib.request
from bs4 import BeautifulSoup


url = "https://www.rottentomatoes.com"
html = urllib.request.urlopen(url)
source = html.read()
html.close()

soup = BeautifulSoup(source, "html.parser")
print(soup)

table = soup.find(id="Top-Box-Office")
print(table)
```

Web Scraping with Beautiful Soup

```
all_tr = table.find_all("tr")

for tr in all_tr:
     all_td = tr.find_all("td")
     score = all_td[0].find("span", attrs={"class":"tMeterScore"
     movie_name = all_td[1].a.text
     amount = all_td[2].a.text
     print(score, movie_name, amount)
```

Web Scraping with Beautiful Soup

```
>>> import urllib.request
>>> from bs4 import BeautifulSoup
>>> url = "https://www.rottentomatoes.com"
>>> html = urllib.request.urlopen(url)
>>> source = html.read()
>>> html.close()
>>> soup = BeautifulSoup(source, "html.parser")
>>> table = soup.find(id="Top-Box-Office")
>>> all_tr = table.find_all("tr")
>>> for tr in all_tr:
...     all_td = tr.find_all("td")
...     score = all_td[0].find("span", attrs={"class":"tMeterScore"}).text
...     movie_name = all_td[1].a.text
...     amount = all_td[2].a.text
...     print(score, movie_name, amount)
```

Web Scraping with Beautiful Soup

```
...
69% Sing
                    $41.5M

95% Fences
                    $10.2M

40% Why Him?
                    $10.1M

16% Assassin's Creed
                    $8.1M

12% Collateral Beauty
                    $4.1M

73% Fantastic Beasts and Where to Find Them
                    $4.0M
```

So, Let's Scrap Naver