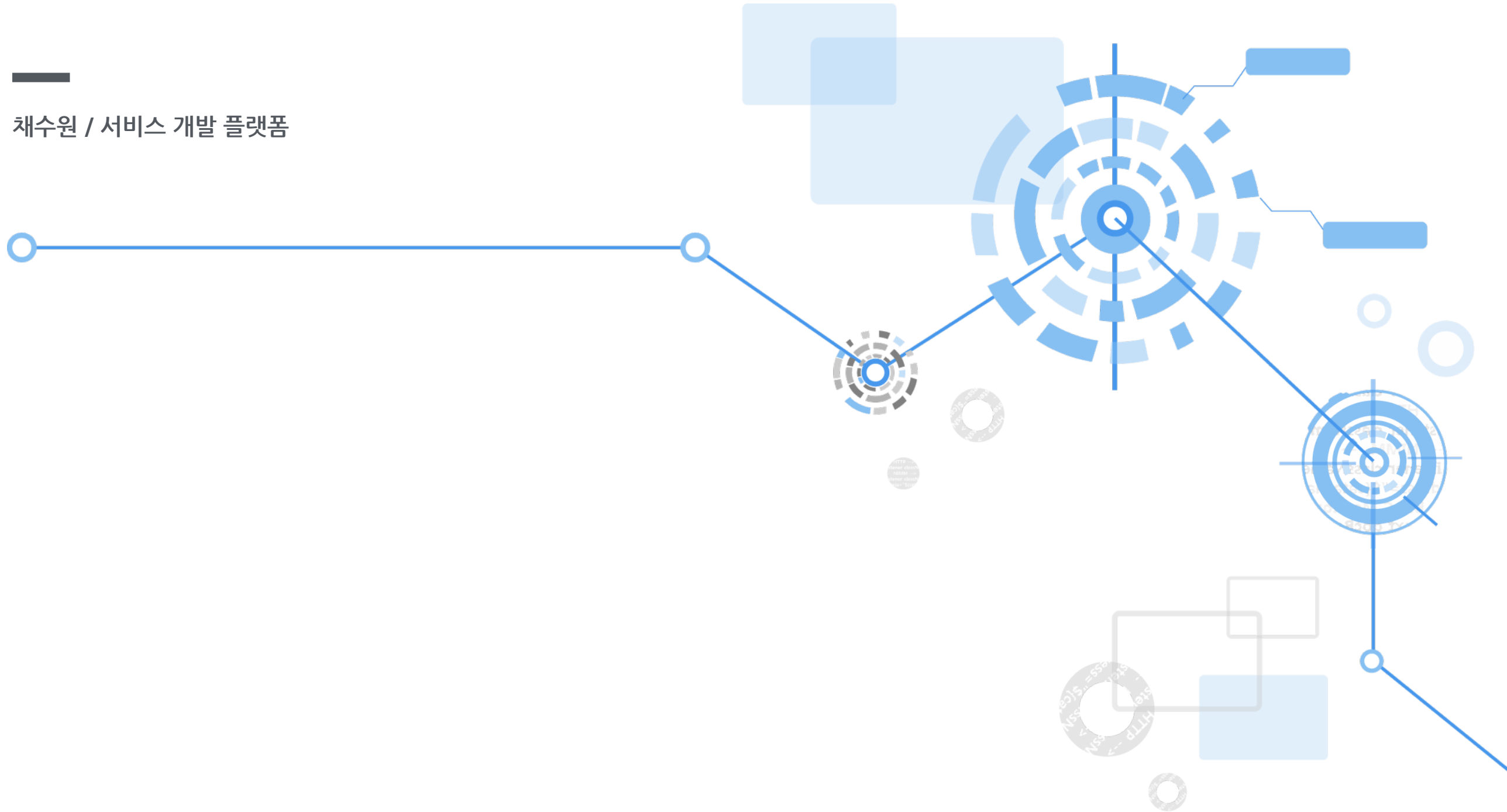


HTTP



채수원 / 서비스 개발 플랫폼



1. HTTP basic



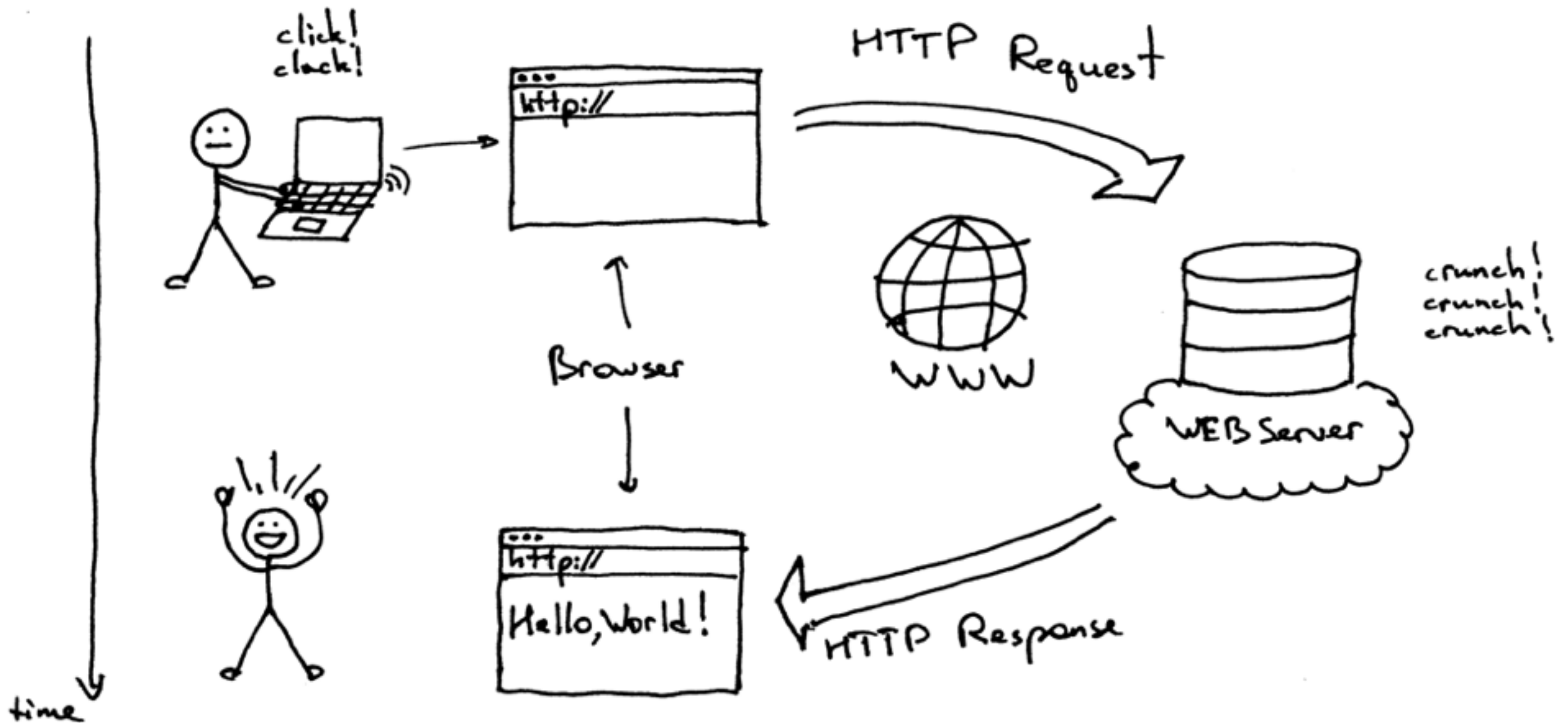
- HTTP V0.9 (1991)
- HTTP V1.0 (1996)
 - <http://tools.ietf.org/html/rfc1945>
 - more method, more header field
- HTTP V1.1 (1997)
- HTTP V1.2
- HTTP V2.0 (2015.5)
 - <https://tools.ietf.org/html/rfc7540>



- Hyper Text Transfer Protocol
- HTML 전송을 위한 프로토콜
 - Application Layer
 - BGP DHCP DNS FTP HTTP IMAP LDAP MGCP NNTP
NTP POP OPC/RPC RTP RTSP RIP SIP SMTP SNMP SSH
Telnet TLS/SSL XMPP
- URL 지정시 HTTP:// 를 사용
- Web Brower?
 - User Agent

2. 용어

HTTP Client <--> HTTP Server



HTTP Client <--> HTTP Server



```
request >
UA ===== 0
< response
```

MIME (Multi-Purpose Internet Mail Extensions)



- for Browser
- Primary Object Type / specific subtype
 - text/plain, text/html
 - image/jpeg, image/png, image/gif
 - application/json, application/pdf, application/xml
- charset이 파라미터로 붙기도 한다
 - Content-Type: application/xml;charset=utf-8

<http://www.iana.org/assignments/media-types/media-types.xhtml>

URI (Uniform **Resource** identifier)



- for world wide web
- protocol(scheme), server(internet address), resource
 - <http://yobi.navercorp.com/naveru/studybook>
- URI = URL(Uniform **Resource** Locator)
- URN (... Name) 무시..
- resource
 - path(path segment), query parameter, fragment(#)
 - Query String

URL



`<scheme>://<host>:<port>/<path>?<query>#<fragment>`

?

Resource

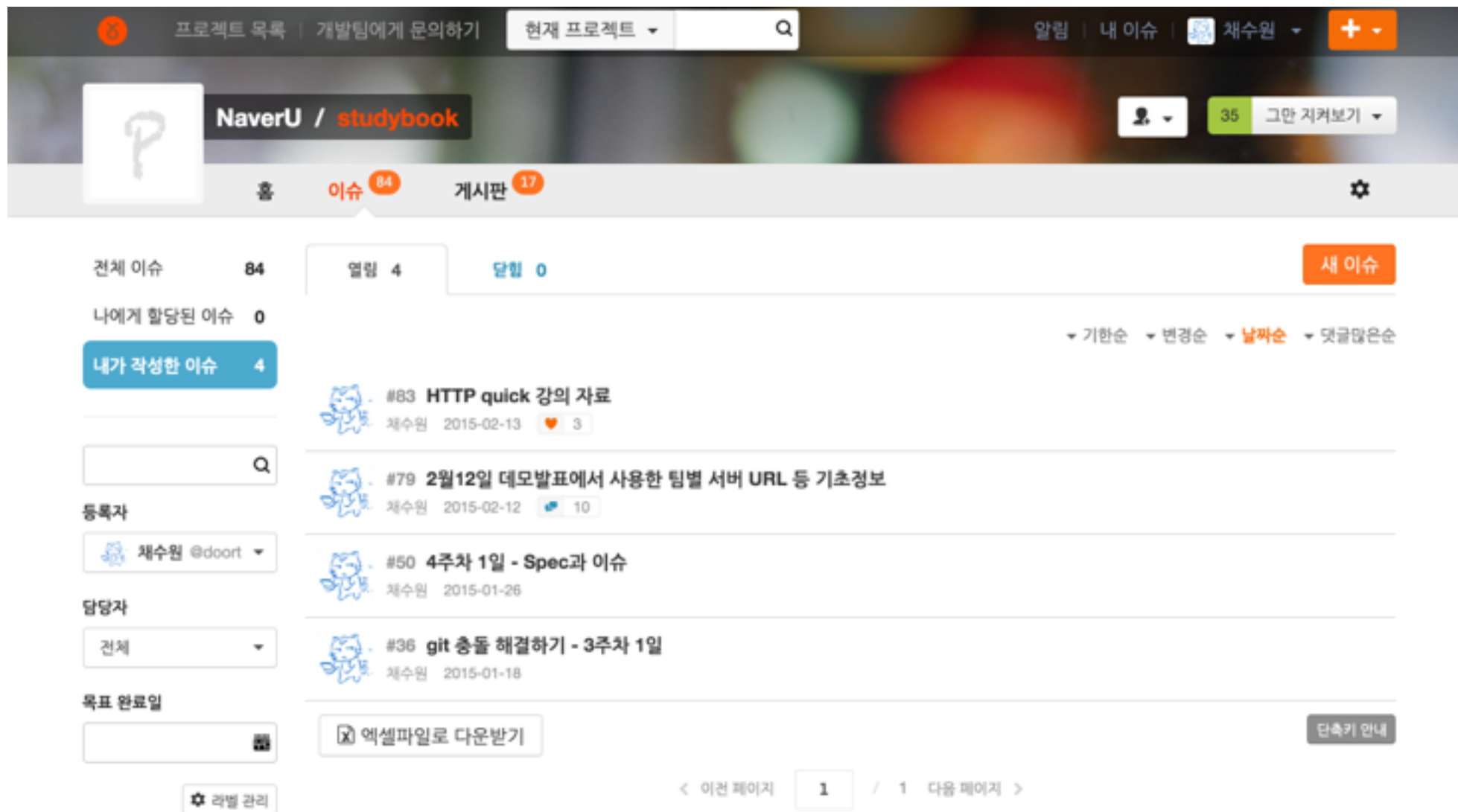
URI (Uniform Resource identifier)



- Alphanumeric `-.~:@!$&'()`
- URI/URL encoding = percent encoding

URI (Uniform Resource identifier)

- <http://yobi.navercorp.com/NaverU/studybook/issues?orderBy=createdDate&state=open&authorId=65>



The screenshot shows the NaverU studybook issues page. The header includes navigation links like '프로젝트 목록', '개발팀에게 문의하기', and '현재 프로젝트'. The main content area displays a list of issues with details such as issue number, title, author, and date. The left sidebar contains filters for '전체 이슈', '나에게 할당된 이슈', and '내가 작성한 이슈'. The bottom of the page features a footer with copyright information: 'Copyright © NAVER Corp. Supported by D2 Program'.

전체 이슈 84
나에게 할당된 이슈 0
내가 작성한 이슈 4

등록자: 채수원 @doort
담당자: 전체
목표 완료일: [input field]

이슈 목록:

- #83 HTTP quick 강의 자료 (채수원, 2015-02-13, 3 likes)
- #79 2월12일 데모발표에서 사용한 팀별 서버 URL 등 기초정보 (채수원, 2015-02-12, 10 likes)
- #50 4주차 1일 - Spec과 이슈 (채수원, 2015-01-26)
- #36 git 충돌 해결하기 - 3주차 1일 (채수원, 2015-01-18)

엑셀파일로 다운로드하기 (단축키 안내)

이전 페이지 1 / 1 다음 페이지

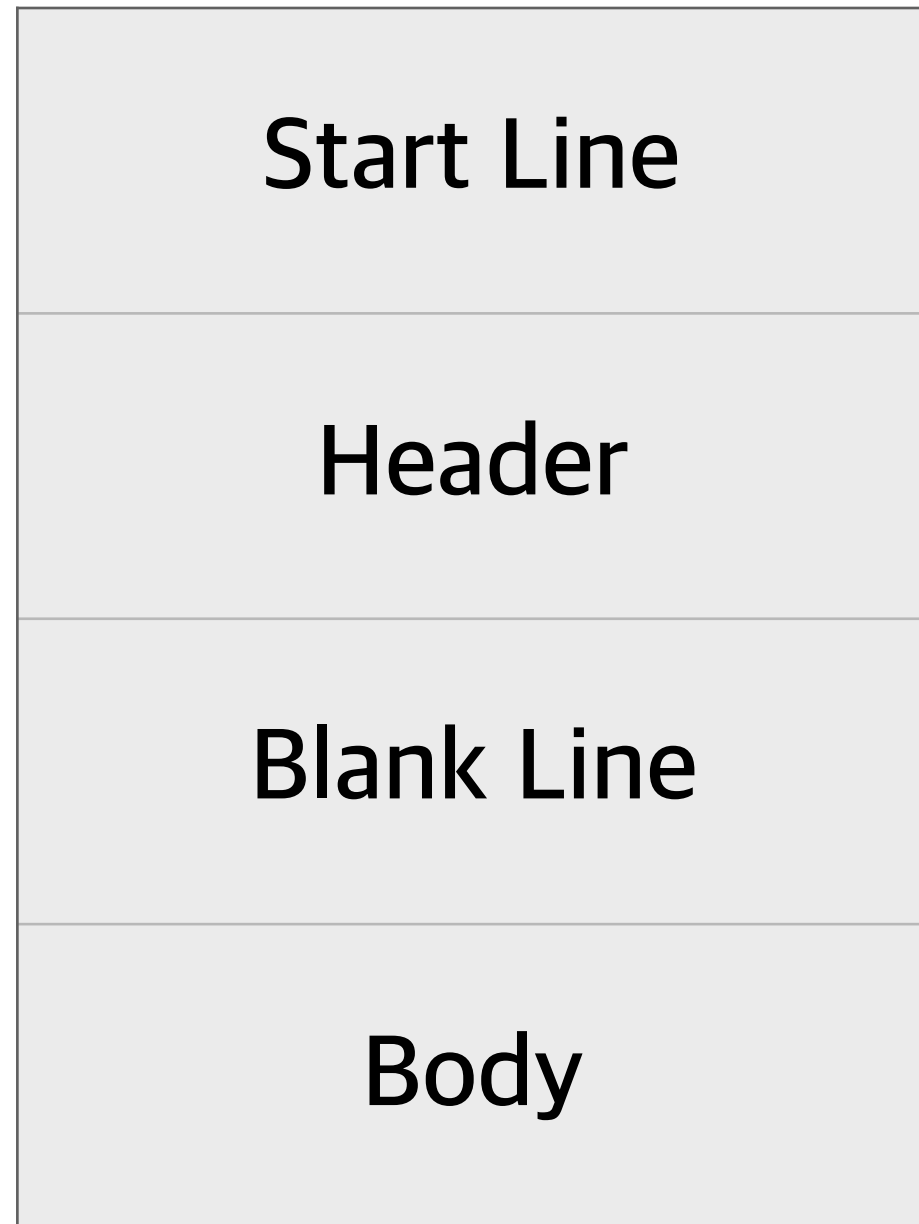
Transaction

- Request -> Response
- Stateless



2. HTTP Message

HTTP Message Structure



Start Line

- start-line = request-line or status-line





- A request line
- Request header fields
 - http://en.wikipedia.org/wiki/List_of_HTTP_header_fields#Request_fields
- An empty line.
- message body (optional)

Request Line



method	SP	request-target	SP	HTTP-version	CRLF
--------	----	----------------	----	--------------	------

```
GET /hello.txt HTTP/1.1
```

Request Message 예



```
<form action="/sign-up" method="POST">  
  <input type="text" name="loginId">  
  <input type="text" name="email">  
  <input type="submit">  
</form>
```

```
POST /sign-up HTTP/1.1  
Host: example.com  
Connection: keep-alive  
Pragma: no-cache  
Cache-Control: no-cache
```

```
loginId=doortts&email=sw.chae@navercorp.com
```



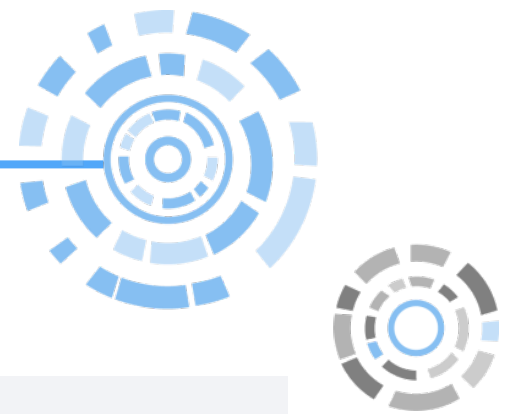
- A Status-Line
- Response header fields
- An empty line
- message body (optional)

Status Line



HTTP-version	SP	status-code	SP	reason-phrase	CRLF
--------------	----	-------------	----	---------------	------

HTTP/1.1 404 Not Found



```
HTTP/1.1 200 OK
Date: Sat, 19 Dec 2015 13:04:18 GMT
Cache-Control: no-cache
Content-Type: text/html; charset=utf-8
Vary: Accept
Content-Length: 36278
Connection: close
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
...
```



safe	GET	
	HEAD	get header only
idempotent	PUT	업데이트
	POST	생성
	TRACE	echo back
	OPTIONS	check server capabilities
	DELETE	resource 삭제요청
추가	PATCH	부분적으로 업데이트



- 1xx Informational
- 2xx Success
- 3xx Redirection
- 4xx Client Error
- 5xx Server Error

http://en.wikipedia.org/wiki/List_of_HTTP_status_codes



- Header-Name: header value

```
general-header = Cache-Control  
                | Connection  
                | Date  
                | Pragma  
                | Trailer  
                | Transfer-Encoding  
                | Upgrade  
                | Via  
                | Warning
```

<https://tools.ietf.org/html/rfc2616#section-4.5>

Request Header



```
request-header = Accept
                  Accept-Charset
                  Accept-Encoding
                  Accept-Language
                  Authorization
                  Expect
                  From
                  Host
                  If-Match
                  If-Modified-Since
                  If-None-Match
                  If-Range
                  If-Unmodified-Since
                  Max-Forwards
                  Proxy-Authorization
                  Range
                  Referer
                  TE
                  User-Agent
```

<https://tools.ietf.org/html/rfc2616#section-5.3>

Request Header



```
GET /specs/rfc7234.html HTTP/1.1
Host: httpwg.github.io
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_2) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/47.0.2526.106 Safari/537.36
Accept-Encoding: gzip, deflate, sdch
Accept-Language: ko-KR,ko;q=0.8,en-US;q=0.6,en;q=0.4
```



```
response-header = Accept-Ranges  
                  Age  
                  ETag  
                  Location  
                  Proxy-Authenticate  
                  Retry-After  
                  Server  
                  Vary  
                  WWW-Authenticate
```

Response Header

```
HTTP/1.1 200 OK
Server: GitHub.com
Content-Type: text/html; charset=utf-8
Last-Modified: Mon, 09 Nov 2015 22:25:33 GMT
Access-Control-Allow-Origin: *
Expires: Sat, 19 Dec 2015 16:50:02 GMT
Cache-Control: max-age=600
Content-Encoding: gzip
X-GitHub-Request-Id: 2BF94823:448E:16D524DC:56758862
Content-Length: 41595
Accept-Ranges: bytes
Date: Sat, 19 Dec 2015 16:43:15 GMT
Via: 1.1 varnish
Age: 0
Connection: keep-alive
X-Served-By: cache-nrt6123-NRT
X-Cache: MISS
X-Cache-Hits: 0
X-Timer: S1450543395.287607,VS0,VE232
Vary: Accept-Encoding
X-Fastly-Request-ID: 96ff0bed8180ae3ce3c446a8487fac5b87a49993
```

3. HTTP Method / Status code



GET

- 서버에 영향을 주지 않음
- GET으로 리소스를 생성하지 말것

POST



- Resource 생성에 사용
- 200 OK 대신 201 Created 를 주로 사용함
- 이때 Location 헤더로 생성된 resource url을 알려주는 것이 일반적



```
telnet www.example.com 80
Trying 93.184.216.34...
Connected to www.example.com.
Escape character is '^]'.
OPTIONS / HTTP/1.1
Host: www.example.com

HTTP/1.1 200 OK
Allow: OPTIONS, GET, HEAD, POST
Cache-Control: max-age=604800
Date: Sat, 19 Dec 2015 16:19:55 GMT
Expires: Sat, 26 Dec 2015 16:19:55 GMT
Server: EOS (lax004/2816)
x-ec-custom-error: 1
Content-Length: 0
```

4. Cookie



- Set-Cookie 헤더를 이용

Browser

```
GET /index.html HTTP/1.1
Host: www.example.org
...
```

Server

```
HTTP/1.0 200 OK
Content-type: text/html
Set-Cookie: theme=light
Set-Cookie: sessionId=abc123; Expires=Wed, 09 Jun 2021 10:18:14 GMT
...
```

Browser

```
GET /spec.html HTTP/1.1
Host: www.example.org
Cookie: theme=light; sessionId=abc123
...
```



- session cookie
 - 브라우저 닫으면 사라짐
- persistent cookie
 - domain 지정여부에 따라 동작이 다름

```
HTTP/1.0 200 OK
```

```
Set-Cookie: LSID=DQAAAK; Path=/accounts; Expires=Wed, 13 Jan 2021 22:23:01 GMT;
```

```
Set-Cookie: HSID=AYQEVn; Domain=.foo.com; Path=/; Expires=Wed, 13 Jan 2021 22:23:01 GMT
```

```
Set-Cookie: SSID=Ap4P; Domain=foo.com; Path=/; Expires=Wed, 13 Jan 2021 22:23:01 GMT;
```

```
...
```

5. Cache Related Headers



- 캐시 억제를 위해 사용
- Pragma header 자체는 1.0 호환을 위해 사용
- Pragma: no-cache



- Cache 유효기간을 표시
- HTTP 1.0 Spec

```
HTTP/1.1 200 OK
Date: Sat, 19 Dec 2015 19:01:42 GMT
Server: Apache/2.2.22 (Debian)
Content-Location: rfc7234.html
Vary: negotiate,Accept-Encoding
Last-Modified: Fri, 16 Oct 2015 02:01:57 GMT
ETag: "3ceb35-1f588-5222f2e30c546;52744d1ca19d2"
Cache-Control: max-age=604800
Expires: Sat, 26 Dec 2015 19:01:42 GMT
Content-Encoding: gzip
Content-Length: 29665
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8
```



- HTTP 1.1 Spec
- Pragma: no-cache == Cache-Control: no-cache
- Expires의 절대시각 대신 상대시간 표시가능

```
HTTP/1.1 200 OK
Date: Sat, 19 Dec 2015 19:01:42 GMT
Last-Modified: Fri, 16 Oct 2015 02:01:57 GMT
ETag: "3ceb35-1f588-5222f2e30c546;52744d1ca19d2"
Cache-Control: max-age=604800
Content-Encoding: gzip
Content-Length: 29665
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8
```




- Resource 갱신일자를 조건으로 지정
- Last-Modified 로 응답

```
GET /index.html HTTP/1.1  
Host: www.example.org  
If-Modified-Since: Sat, 19 Dec 2015 16:19:55 GMT  
...
```



```
HTTP/1.1 304 Not Modified  
Content-Type: application/json  
Last-Modified: Sat, 19 Dec 2015 16:19:55 GMT  
...
```



- ETag 값을 지정해서 다시 body를 받을지 정한다

```
GET /index.html HTTP/1.1
Host: www.example.org
If-None-Match: ab120310
...
```



```
HTTP/1.1 304 Not Modified
Content-Type: application/json
ETag: ab120310
...
```

6. Authentication

A decorative graphic consisting of a blue line with circles at its endpoints and several intermediate points. The line starts horizontally, then zig-zags downwards and to the right, ending at a large, complex circular pattern made of concentric rings of blue segments. There are also several smaller, faint circular patterns in the background.



- 시작 시퀀스

Browser

```
GET /user/issues HTTP/1.1  
Host: yobi.navercorp.com
```

Server

```
HTTP/1.1 401 Unauthorized  
WWW-Authenticate: Basic realm="yobi.navercorp.com"
```

- 이후 id/pw를 :로 연결한 다음 base64 encoding해서 헤더에 넣어 매 요청시마다 서버로 보냄

```
Authorization: Basic QWxhZGRpbjpvcGVuIHNlc2FtZQ==
```

- 사용안함

7. 기타 주제

SSL/TLS layer



- 443 port
- SSL Handshake
 - protocol number exchange
 - 암호 후보 보내기
 - 선택된 암호와 인증서 보내기
 - 클라이언트가 비밀정보 보내기
 - 클라이언트와 서버는 각각 키를 만들기
 - 이제 서로 암호화 시작한다고 말하기



- http 1.1 compatible
- frame, 1 connection multi stream, multiplexing
- header compression
- prioritization of requests
- server push

흥미로운 참고 자료

- https://www.mnot.net/blog/2014/06/07/rfc2616_is_dead
- <https://httpwg.github.io/>

