

# 인쇄 기능 Prototype

## - 중간발표 -

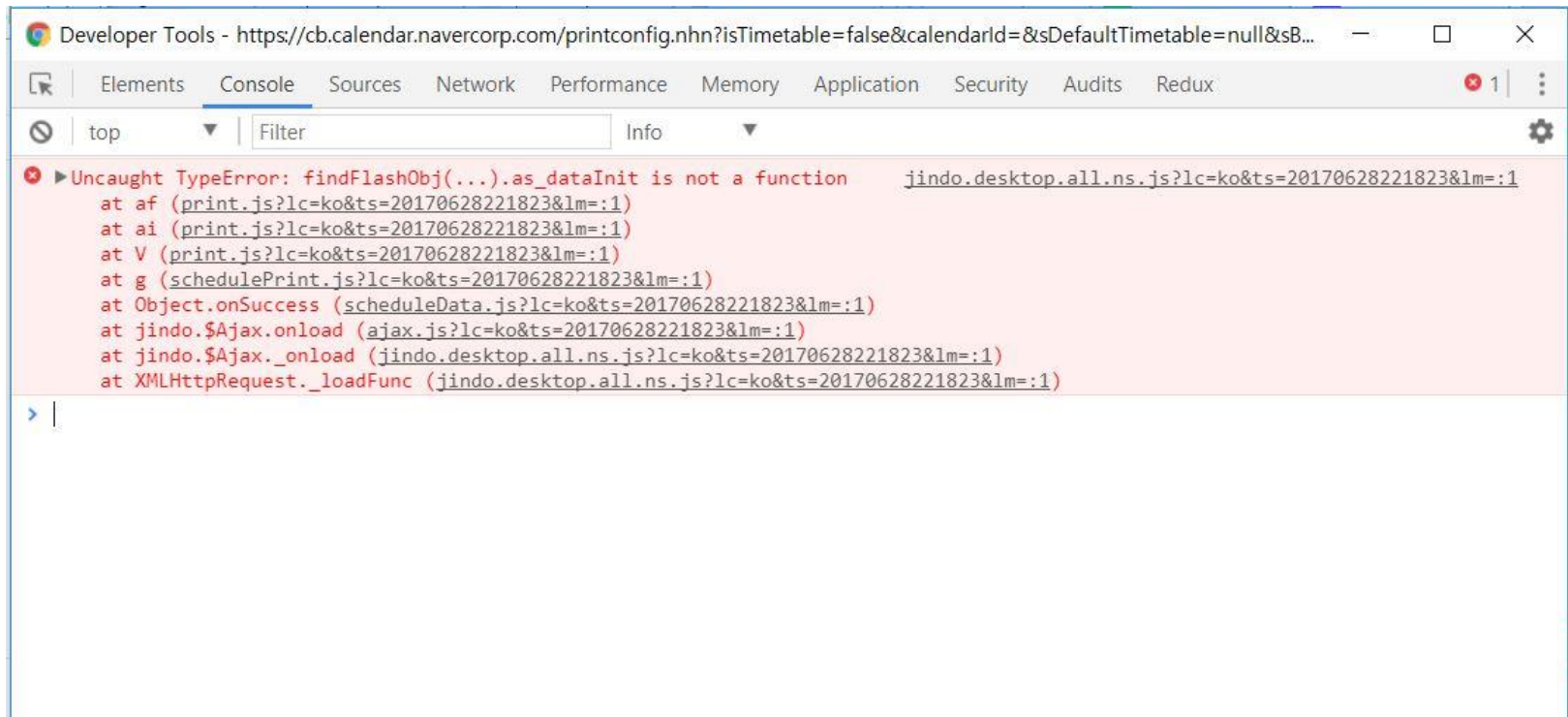
개발 3랩 캘린더 팀  
인턴

이우재, 안상영

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4. 기술 소개
5. 프로토타입 시연
6. 구현
7. 문제점 및 추후 개발 사항

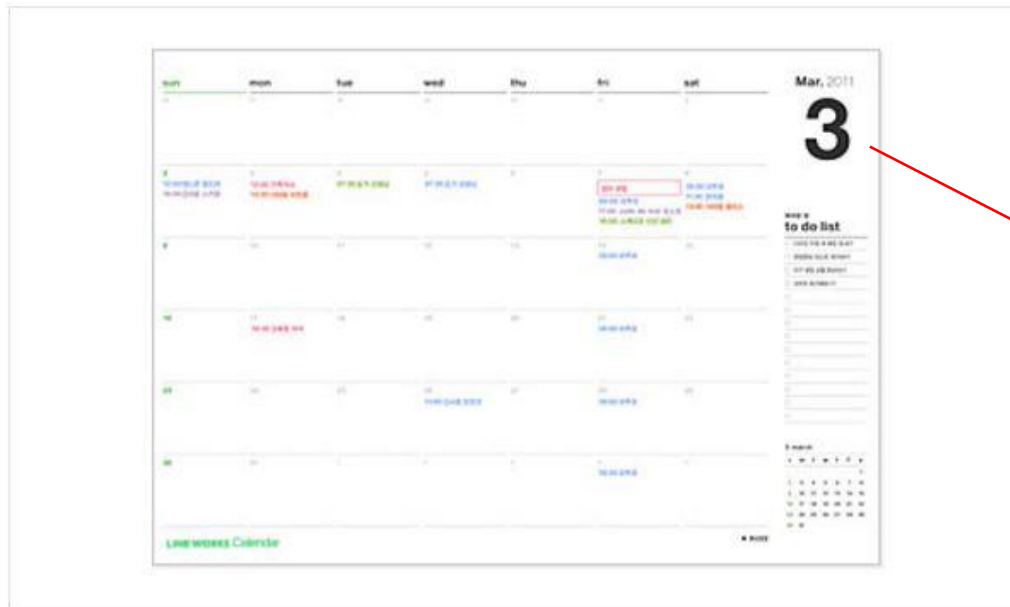
# 문제점 (1) Flash -> 브라우저의 기본 값이 아님



The screenshot shows a web browser window with the URL `https://cb.calendar.navercorp.com/printconfig.nhn?isTimetable=false&calendarId=&sDefaultTimetable=null&sB...`. The developer tools are open, and the console tab is selected. A red error message is displayed: `Uncaught TypeError: findFlashObj(...).as_dataInit is not a function`. The stack trace shows the error occurred in `jindo.desktop.all.ns.js` at line 1, and the call stack includes `af`, `ai`, `V`, `g`, `Object.onSuccess`, `jQuery.ajax`, `jQuery._onload`, and `XMLHttpRequest._loadFunc`.

```
Uncaught TypeError: findFlashObj(...).as_dataInit is not a function    jindo.desktop.all.ns.js?lc=ko&ts=20170628221823&lm=:1
    at af (print.js?lc=ko&ts=20170628221823&lm=:1)
    at ai (print.js?lc=ko&ts=20170628221823&lm=:1)
    at V (print.js?lc=ko&ts=20170628221823&lm=:1)
    at g (schedulePrint.js?lc=ko&ts=20170628221823&lm=:1)
    at Object.onSuccess (scheduleData.js?lc=ko&ts=20170628221823&lm=:1)
    at jQuery.ajax.onload (ajax.js?lc=ko&ts=20170628221823&lm=:1)
    at jQuery._onload (jindo.desktop.all.ns.js?lc=ko&ts=20170628221823&lm=:1)
    at XMLHttpRequest._loadFunc (jindo.desktop.all.ns.js?lc=ko&ts=20170628221823&lm=:1)
```

## 문제점 (2) 고정된 프리뷰 이미지



No match

인쇄 항목 ☒ 전체 ☐ 일정만 ☐ 할 일 ( ☐ 완료 포함 )

레이아웃 ☐ 일간 ☐ 주간 ☒ 월간 ☐ 목록

날짜범위 2017.07.01 - 2017.07.31 ☐ 이번달 입력

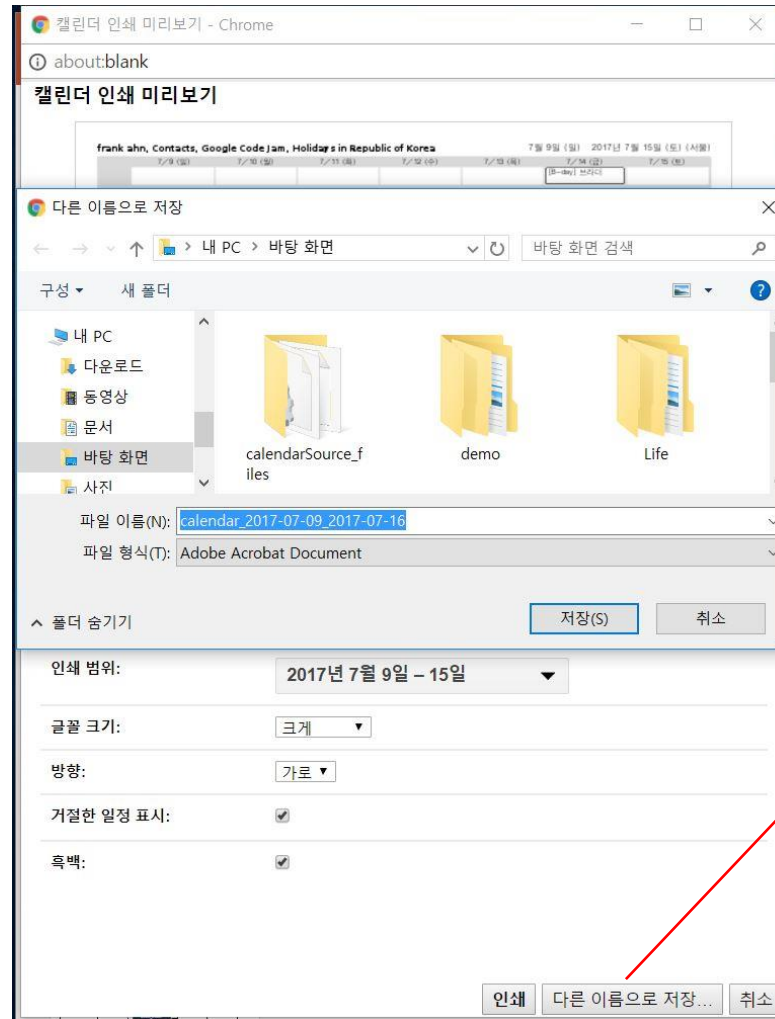
## 문제점 (3) 다른 이름으로 저장 (pdf)

인쇄 크기: A4, A5, B5, 4R, 5R, 6R, 8R, 10R, 12R, 16R, 20R, 24R, 32R, 40R, 48R, 64R, 80R, 96R, 128R, 160R, 192R, 224R, 256R, 320R, 384R, 448R, 512R, 576R, 640R, 704R, 768R, 832R, 896R, 960R, 1024R, 1088R, 1152R, 1216R, 1280R, 1344R, 1408R, 1472R, 1536R, 1600R, 1664R, 1728R, 1792R, 1856R, 1920R, 1984R, 2048R, 2112R, 2176R, 2240R, 2304R, 2368R, 2432R, 2496R, 2560R, 2624R, 2688R, 2752R, 2816R, 2880R, 2944R, 3008R, 3072R, 3136R, 3200R, 3264R, 3328R, 3392R, 3456R, 3520R, 3584R, 3648R, 3712R, 3776R, 3840R, 3904R, 3968R, 4032R, 4096R, 4160R, 4224R, 4288R, 4352R, 4416R, 4480R, 4544R, 4608R, 4672R, 4736R, 4800R, 4864R, 4928R, 4992R, 5056R, 5120R, 5184R, 5248R, 5312R, 5376R, 5440R, 5504R, 5568R, 5632R, 5696R, 5760R, 5824R, 5888R, 5952R, 6016R, 6080R, 6144R, 6208R, 6272R, 6336R, 6400R, 6464R, 6528R, 6592R, 6656R, 6720R, 6784R, 6848R, 6912R, 6976R, 7040R, 7104R, 7168R, 7232R, 7296R, 7360R, 7424R, 7488R, 7552R, 7616R, 7680R, 7744R, 7808R, 7872R, 7936R, 8000R, 8064R, 8128R, 8192R, 8256R, 8320R, 8384R, 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## (1) 반응형 프리뷰 이미지

옵션에 따른 프리뷰 이미지가 **빠른** 속도로 변경

### (2) 다른 이름으로 저장



## Out of Flash + 반응형 프리뷰 이미지 + PDF 저장

1. html을 image 및 pdf로 변환하는 라이브러리 사용
2. 옵션에 따른 반응형 프리뷰 이미지 (like 구글 캘린더)
3. 날짜 범위에 따른 다수의 html 파일을 하나의 pdf로 변환하여 인쇄 구현
4. PDF로 저장기능 구현



# Spring Boot + thymeleaf + jquery + Maven

## 1. Spring boot 1.5.4

- 둘 다 spring 경험이 없기에 빠른 개발을 위해 사용

## 2. Thymeleaf-spring 4.2.1

- 공식 문서의 reference가 주로 Thymeleaf를 통해 작성되어 사용

## 3. Maven 4.0.0

- Reference가 많고 대중적인 것처럼 보여 사용

## 3. Jquery 2.1.1

- 자바스크립트를 빠르고 편리하게 작성하기 위해 사용

## Html to pdf 및 image 라이브러리 리서치

### 1. Openhtmltopdf →

2. Apache PDB box

3. Flyingsaucer

4. Itext

5. Docraptor

6. Grazit

7. Prince

8. DomPdf

9. wkhtmltopdf

- HTML to PDF library for the JVM
- 최신버전 : 0.0.1-RC11(2017-05-21)
- Include Dependencies Using Maven
- GNU Lesser General Public License, version 2.1 or later
- Guide :  
<https://github.com/danfickle/openhtmltopdf/blob/open-dev-v1/docs/integration-guide.md>
- 2783 commits, 32 contributors

## Html to pdf 및 image 라이브러리 리서치

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- HTML to PDF library for the PHP
- 최신 버전 1-RC11(2011년 11월 11일)
- Includes a command line interface
- GNU LGPL license, version 2.1 or later
- Guide : <http://www.openhtmltopdf.com/guide/>
- 2783 commits, 32 contributors

## Wkhtmltopdf Library

\* 왜 openhtmltopdf을 버렸는가?

### 문제

- Html to image 불가능  
⇒ 추가적인 html to image library 사용해야
- 떨어지는 렌더링 성능  
⇒ CSS3의 일부 스펙 지원

### 해결

1. Openhtmltopdf 개발 문서 공부
2. 다른 대안 리서치  
⇒ wkhtmltopdf

# Wkhtmltopdf Library

## Wkhtmltopdf

Qt Webkit 렌더링 엔진을 사용해 html을 PDF와 Image  
포맷으로 변환시켜주는 오픈소스(LGPLv3) 커맨드 라인 툴

### \* LGPLv3 라이선스

- 누구나 복사 및 배포 가능, 변경은 불허

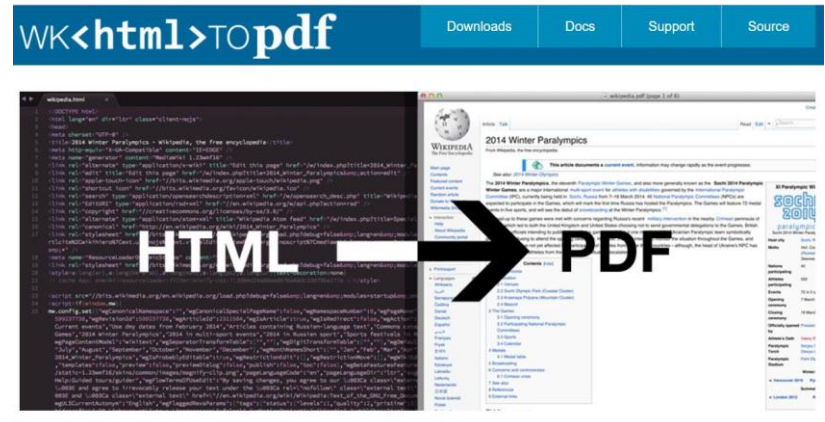
### \* Image 전환 가능

### \* 풍부한 Option 설정 (인쇄방향, 사이즈...)

### \* 강력한 CSS 렌더링

### \* 풍부한 Reference

### \* Pay팀에서도 사용

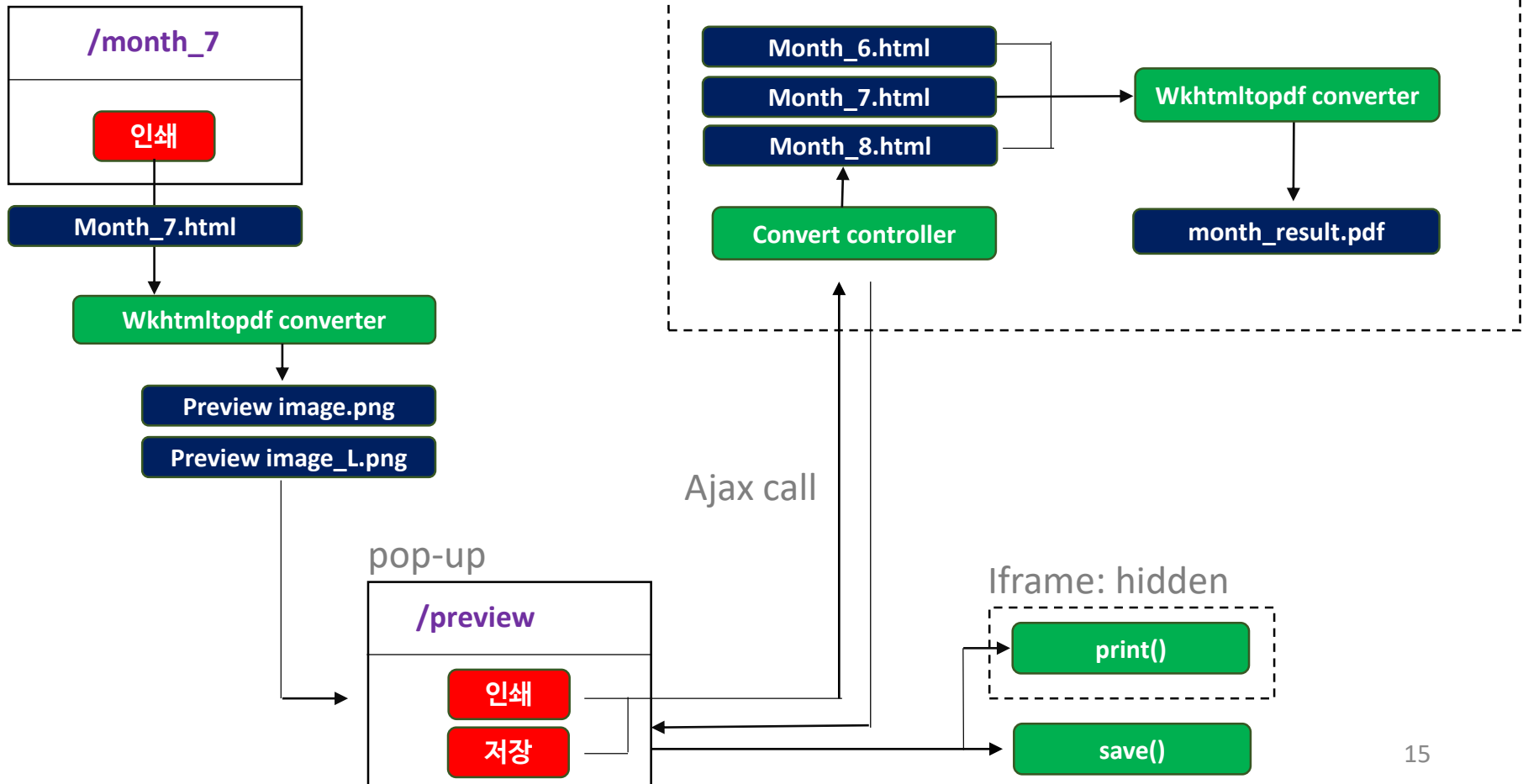


```
C:\Users\NAVER
λ wkhtmltopdf https://naver.com naver.pdf
Loading pages (1/6)
Warning: SSL error ignored
Counting pages (2/6)
Resolving links (4/6)
Loading headers and footers (5/6)
Printing pages (6/6)
Done

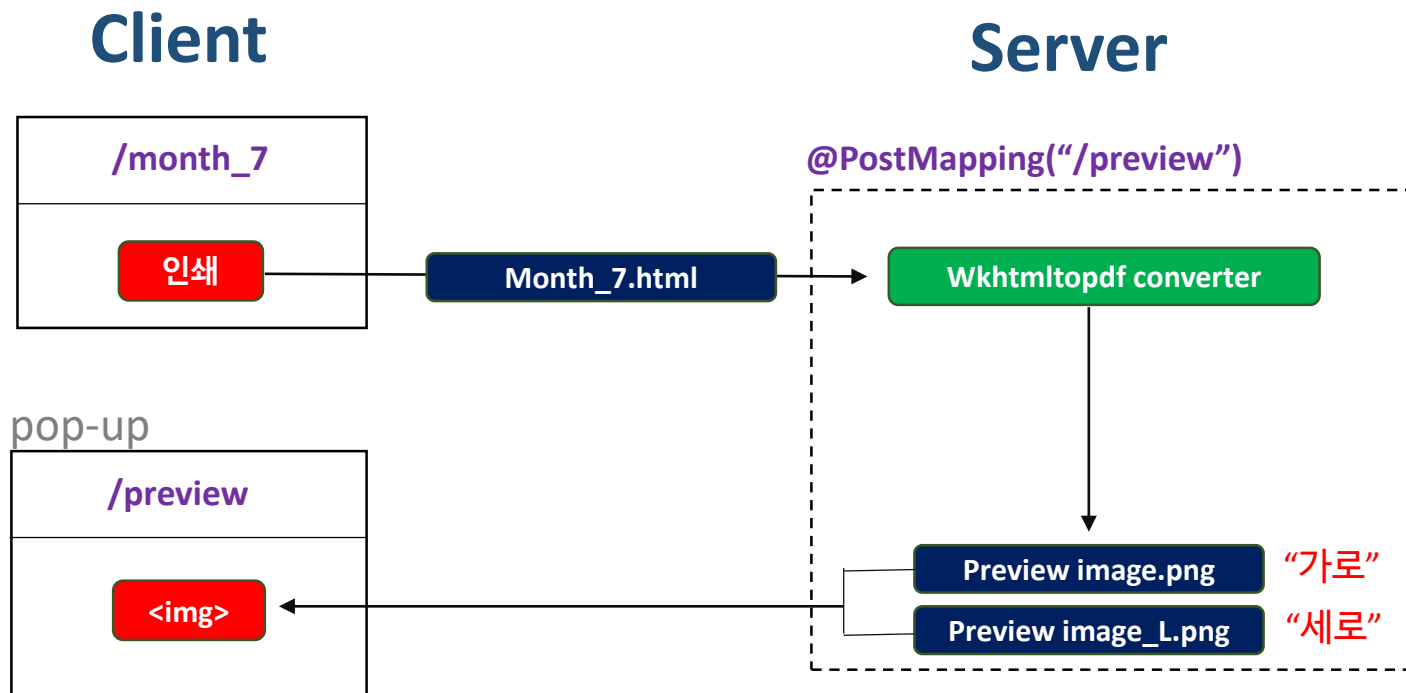
C:\Users\NAVER
λ wkhtmltoimage https://naver.com naver.png
Loading page (1/2)
Warning: SSL error ignored
Rendering (2/2)
Done
```

# 프로토타입 시 연

# 프로토타입 주요 기능 아키텍처



# 기능별 구현: 프리뷰 이미지 생성





## 기능별 구현: 프리뷰 이미지 생성

### “/preview” controller Code example

```
@PostMapping("/preview")
public String viewPreview(@RequestParam String month, Model model){

    PrintRequest print = new PrintRequest();

    String extendIn = "C:/Users/NAVER/Desktop/prototype/target/classes/static/html/month_" + month + ".html";
    String extendOut = "C:/Users/NAVER/Desktop/prototype/target/classes/static/images/sample" + month + ".png";

    print.setIn(extendIn);
    print.setOut(extendOut);

    model.addAttribute("month", month);

    converter.createImage(print);

    //세로방향 미리보기 이미지 생성해둠
    String tempExtendOut = "C:/Users/NAVER/Desktop/prototype/target/classes/static/images/sample_vertical.png";
    print.setOut(tempExtendOut);
    converter.createImageVetical(print);

    return "preview";
}
```

가로 및 세로 이미지 생성

# 기능별 구현: 프리뷰 이미지 생성

## Wkhtmltopdf Converter Code example

```
public class PrintConverter {  
  
    private static final Logger LOG = LoggerFactory.getLogger(PrintConverter.class);  
  
    public void createImage(PrintRequest request) {  
        List<String> pdfCommand = Arrays.asList(  
            "--a: wkhtmltoimage",  
            "--height",  
            "735",  
            request.getIn(),  
            request.getOut()  
        );  
        ProcessBuilder pb = new ProcessBuilder(pdfCommand);  
        Process pdfProcess;  
  
        try {  
            pdfProcess = pb.start();  
            waitForProcessInCurrentThread(pdfProcess);  
        } catch (IOException ex) {  
            LOG.error("Could not create a PDF file because of an error occurred: ", ex);  
            throw new RuntimeException("PDF generation failed");  
        }  
    }  
}
```

Command 생성

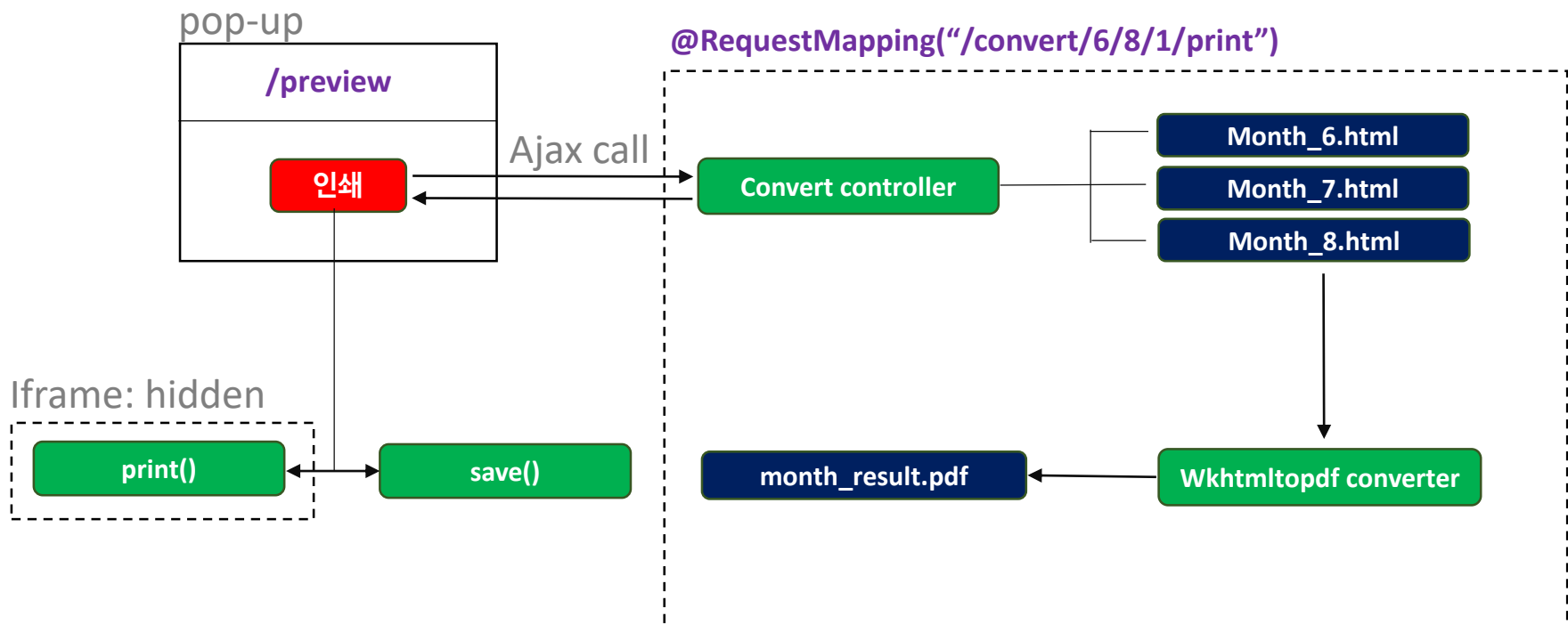
Command 실행

## 기능별 구현: 인쇄하기 + 저장하기



## Client

## Server



# 기능별 구현: 인쇄하기 + 저장하기

## Save feature Code example

```
//convert url request
function save() {

    optionApply();

    $.ajax({
        url: "http://localhost:8080/convert/" + startMonth + "/" + endMonth + "/" + orientation,
        success: function () {

            // 서버 임시 pdf 변환 파일 불러온 후 save box 팝업
            var dataURI = '/tempPdf/month_result.pdf';

            var fileName = 'Calendar';

            var link = document.getElementById("saveLink");

            link.setAttribute("href", dataURI);
            link.setAttribute("download", fileName);
            link.click();

        }
    });
}
```

Ajax 콜 – convert 실행

Save Dialog Box 팝업

# 기능별 구현: 인쇄하기 + 저장하기

## Convert Controller Code example

```
//converter for pdf save and print
@RequestMapping(value = "/convert/{startMonth}/{endMonth}/{orientation}")
public String convert(
    @PathVariable("startMonth") String startMonth,
    @PathVariable("endMonth") String endMonth,
    @PathVariable("orientation") int orientation
){
    int start = Integer.parseInt(startMonth);//시작달
    int end = Integer.parseInt(endMonth);//끝달

    //converting html to pdf - by url
    try {
        converter.makeAPdf(start, end, orientation);
    } catch (InterruptedException e) {
        e.printStackTrace();
    } catch (IOException e) {
        e.printStackTrace();
    }

    return "preview";
}
```

인쇄 기간, 인쇄 방향,  
인쇄 및 저장 타입

Wkhtmltopdf converter call

# 기능별 구현: 인쇄하기 + 저장하기

## 다수의 html 파일 전환 Code example

```
//pdf저장 메소드
final static String url = "http://localhost:8080/month_"; //기본 url뒤에 월을 붙임

public static void makeAPdf(int s, int e, int orientation) throws InterruptedException, IOException {

    // 각 월에 대한 임시 경로 생성
    String temp = "";
    for(int i=s; i<=e; i++){
        temp+=(url+Integer.toString(i)+" ");
    }

    Process wkhtml; // Create uninitialized process
    String command = null;

    String extendedUrl = "wkhtmltopdf" +
        (orientation == 1 ? " -O landscape " : " ") +
        "%s C:/Users/NAVER/Desktop/prototype/target/classes/static/tempPdf/month_result.pdf";

    command = String.format(extendedUrl, temp);

    wkhtml = Runtime.getRuntime().exec(command); // Start process
    IOUtils.copy(wkhtml.getErrorStream(), System.err); // Print output to console
    wkhtml.waitFor(); // Allow process to run
}
```

여러 html 변환

Wkhtmltopdf month\_7.html month\_8.html month\_result.pdf

인쇄 방향 결정

## 문제점

- 변환 속도
  - 소요시간 : 약 3200(ms)
  - 인쇄 범위에 따른 속도는 큰 차이 없음
  - Processbuilder와 Runtime으로 프로세스 실행

```
public void createImage(PrintRequest request) {
    List<String> pdfCommand = Arrays.asList(
        ...a: "wkhtmltoimage",
        "--height",
        "735",
        request.getIn(),
        request.getOut()
    );
    ProcessBuilder pb = new ProcessBuilder(pdfCommand);
    Process pdfProcess;

    try {
        pdfProcess = pb.start();
        waitForProcessInCurrentThread(pdfProcess);
    }
```

```
public static void makeAPdf(int s, int e, int orientation) throws InterruptedException, IOException {
    long startTime = System.nanoTime();

    // 각 월에 대한 임시 경로 생성
    String temp = "";
    for(int i=s; i<=e; i++){
        temp+=(url+Integer.toString(i)+" ");
    }

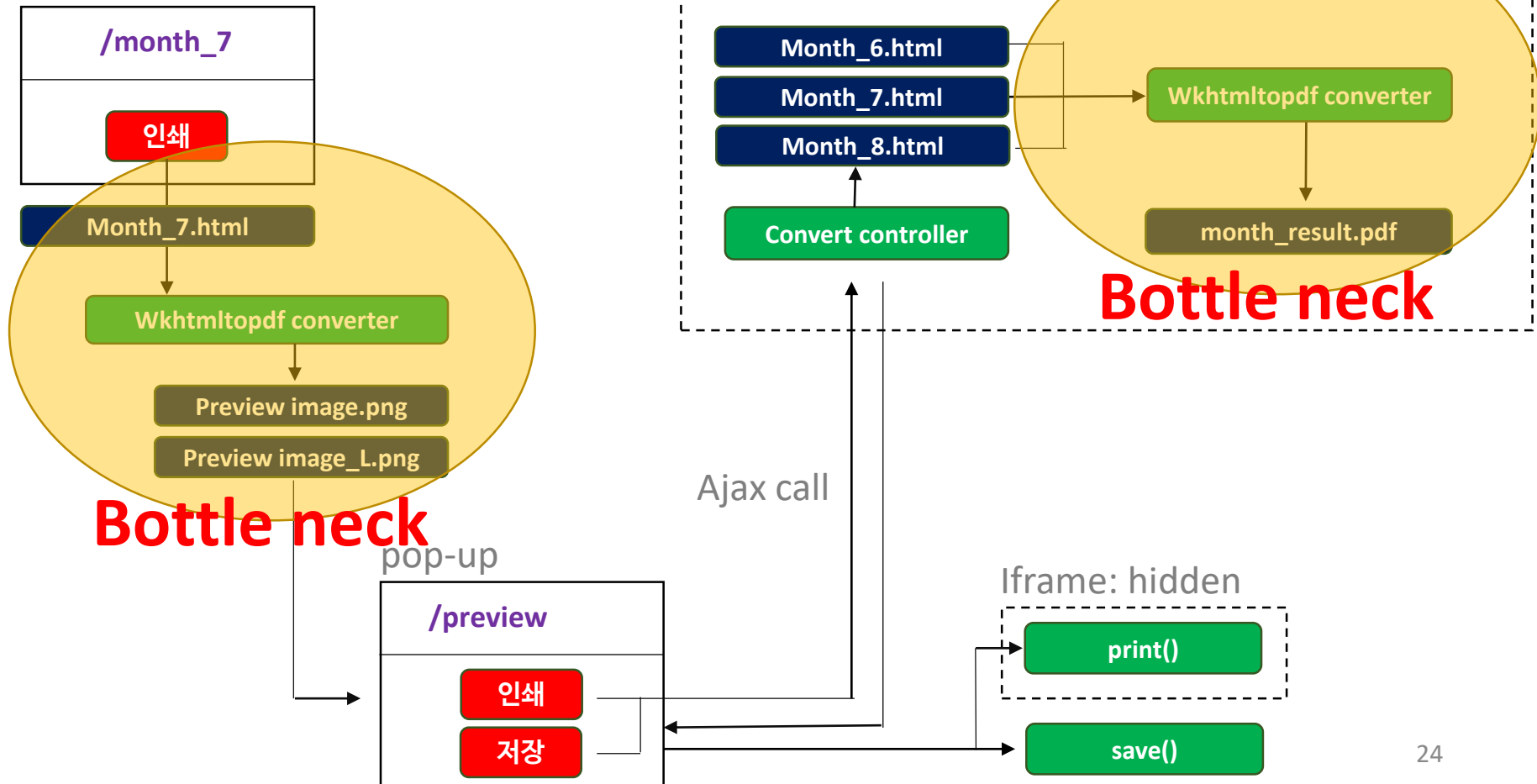
    Process wkhtml; // Create uninitialized process
    String command = null;

    String extendedUrl = "wkhtmltopdf" +
        (orientation == 1 ? " -O landscape " : " ") +
        "%s C:/Users/NAVER/Desktop/prototype/target/classes/static/tempPdf/month_result.pdf";

    command = String.format(extendedUrl, temp);

    wkhtml = Runtime.getRuntime().exec(command); // Start process
}
```

## 문제점 진단

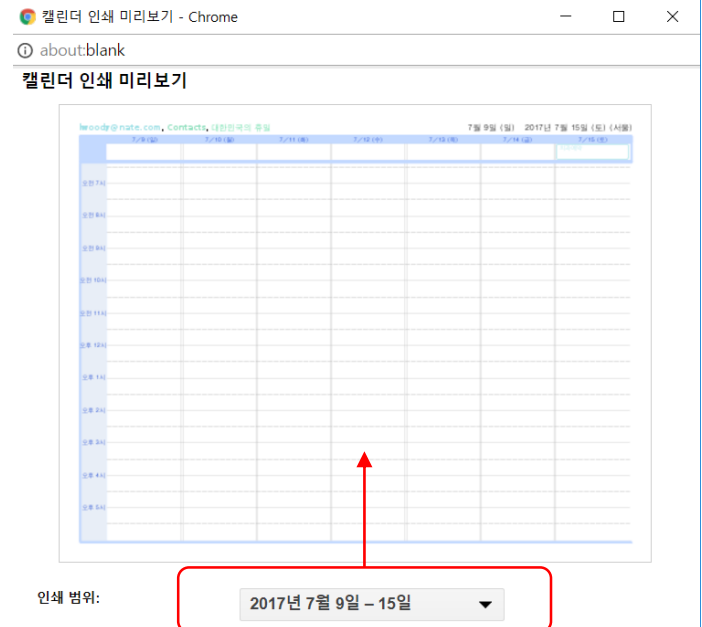
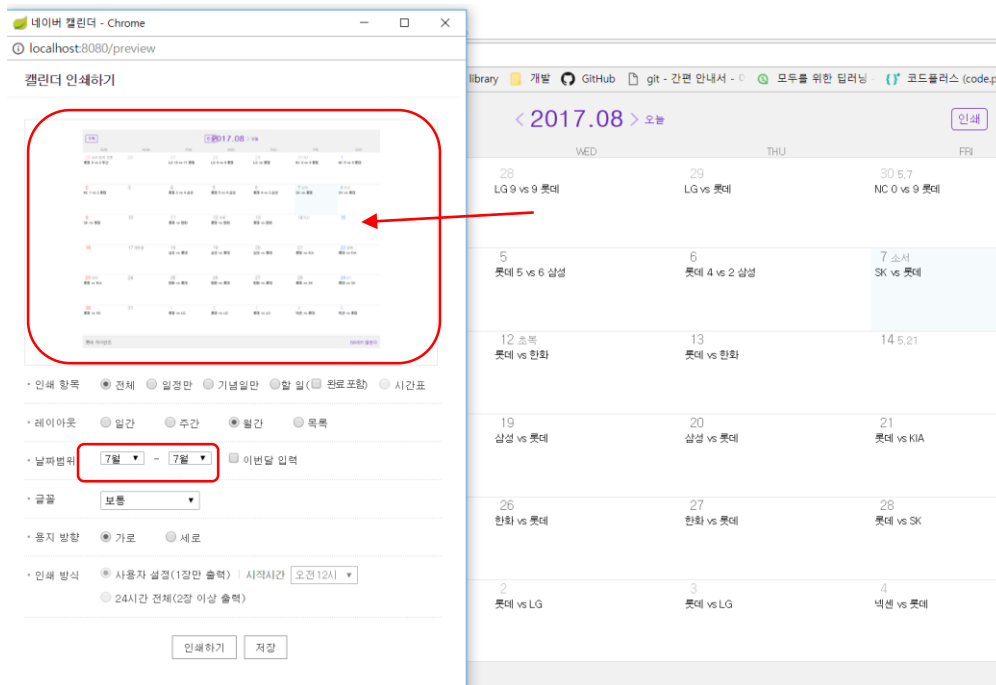




# 추후 개발 사항

## 반응형 프리뷰 이미지

- 현재 페이지의 http url을 사용하여 가로, 세로 이미지를 생성
- 프리뷰의 미리보기 이미지는 현재 페이지에 한정
- 동적으로 인쇄 범위 및 옵션에 맞는 이미지를 빠르게 보여줘야함 like 구글 캘린더



**피드백 부탁드립니다.**

**감사합니다!**