I'm building an automated reporting system which generates PDF reports. My approach is to use R Markdown to write the report and render to PDF using the excellent `{pagedown}` package.

Ultimately the system needs to be packaged in Docker and deployed in the cloud.


## Setup

To illustrate what I'm doing, we'll use a simple dummy document, `test.Rmd`.

```
---
title: "Test Document"
output: html_document
---

This is a test document.
```

To convert this into PDF run:

```
pagedown::chrome_print("test.Rmd")
```

I got this all running in my local environment quite easily. However, I ran into a snag when trying to package the code with Docker.

## The Chrome Problem

I created a `Dockerfile` based on `rocker/r-ver`, adding Chrome and `{pagedown}`, then copying across `test.Rmd`.

```
FROM rocker/r-ver:4.1.0

RUN apt-get update -qq && \
    apt-get install -y -qq --no-install-recommends \
        libz-dev \
        libpoppler-cpp-dev \
        pandoc \
        curl

RUN curl -L http://bit.ly/google-chrome-stable -o chrome.deb && \
    apt-get -y install ./chrome.deb && \
```

```
    rm chrome.deb

RUN install2.r --error --deps TRUE pagedown

COPY test.Rmd .
```

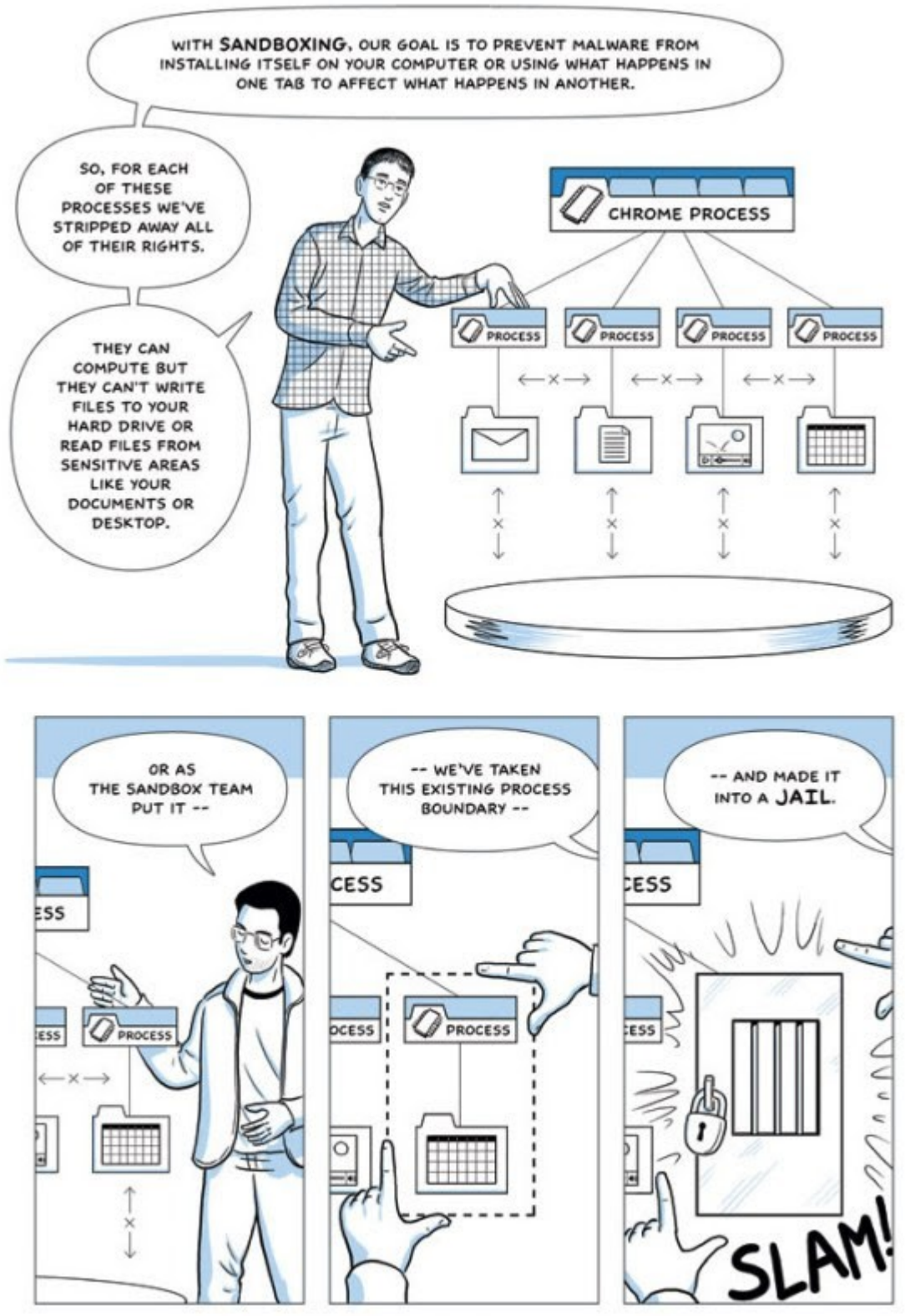
Running `pagedown::chrome_print()` from a container produces an error.

```
Error in is_remote_protocol_ok(debug_port, verbose = verbose) :
  Cannot find headless Chrome after 20 attempts
```

Bummer!

What's going on here? Chrome is clearly installed, so why is R failing to find it? Well, I think what's happening is R is actually *finding* Chrome it but it's failing to *run* it.

And the problem appears to relate to Chrome's sandbox. This is a safety feature built into Chrome. However, in this instance we need to circumvent it to get things working.




Cartoon from the Google Chrome Comic.

## Print to PDF using Docker

The `{pagedown} documentation` suggests two approaches to solving the problem.

### Use `--no-sandbox` Argument

One solution is to send `--no-sandbox` to Chrome via the `extra_args` argument.

```
pagedown::chrome_print("test.Rmd", extra_args = c("--no-sandbox"))
```

This is perfectly reasonable. And it works! So, from a pragmatic perspective, it's perfect.

However, I'm going to be making a bunch of calls to `pagedown::chrome_print()` and, in the interests of simplicity, I'd prefer not to have to provide the extra argument every time.

### Specify Security Options

An alternative is to use `docker run` with `--security-opt` to specify some custom security options. Again, this works, but it's just added complexity! Also, I prefer a solution that's actually baked into the Docker image.

## A Chrome Solution

### A Chrome Shim

I created a BASH script shim, `google-chrome`, with the following contents:

```
#!/bin/bash

/usr/bin/google-chrome --no-sandbox $*
```

It basically executes Chrome, passing along all command line arguments plus `--no-sandbox`.

I made the script executable.

```
chmod u+x google-chrome
```

### An Environment File

I also added the root folder, `/`, to the `PATH` environment variable in a file called `Renviron`.

```
PATH="/:${PATH}"
```

### Tweaking the Dockerfile

The `Dockerfile` requires two small tweaks:

- copy the `google-chrome` script across to `/usr/local/bin/`; and
- copy `Renviron` as `.Renviron`.

The revised `Dockerfile` looks like this:

```
FROM rocker/r-ver:4.1.0

RUN apt-get update -qq && \
    apt-get install -y -qq --no-install-recommends \
        libz-dev \
        libpoppler-cpp-dev \
        pandoc \
        curl
```

```
RUN curl -L http://bit.ly/google-chrome-stable -o chrome.deb && \
    apt-get -y install ./chrome.deb && \
    rm chrome.deb

RUN install2.r --error --deps TRUE pagedown

COPY test.Rmd .

COPY Renviron /.Renviron
COPY google-chrome /usr/local/bin/
```

The actual Chrome executable is located at `/usr/bin/google-chrome`. But `/usr/local/bin/` comes before `/usr/bin/` in `PATH`, so when R looks for Chrome it finds the shim script first. This in turn adds in the `--no-sandbox` argument and my PDFs are then happily built by `pagedown::chrome_print()`.

## A Chromium Solution

How about using Chromium instead of Chrome? We need to make some changes to the `Dockerfile` to get Chromium installed.

```
FROM rocker/r-ver:4.1.0

# Install Chromium with apt not snap!
COPY bionic-updates.list /etc/apt/sources.list.d/
COPY chromium-deb-bionic-updates /etc/apt/preferences.d/

RUN apt-get update -qq && \
    apt-get install -y -qq --no-install-recommends \
        libz-dev \
        libpoppler-cpp-dev \
        pandoc \
        chromium-browser

RUN install2.r --error --deps TRUE pagedown

COPY test.Rmd .

COPY Renviron /.Renviron
COPY chromium-browser /usr/local/bin/
```

Adding in a shim script which supplies the `--no-sandbox` option to Chromium and we're sorted! 🚀

Admittedly this is a relatively deep rabbit hole for such a simple (and probably inconsequential) issue. But it was fun and instructive.