

main

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Code

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	.github/workflows	add github actions w...		last year	
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	tinyemu	add on screen keybo...		last year	
	web	add license and read...		last year	
	.gitignore	build the root filelist ...		last year	
	LICENSE	add license and read...		last year	
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	build.sh	allow building both 3...		last year	
	embed_files.py	implement graphical...		last year	
	file_template.js	port the emulator to ...		last year	
	gen_pdf.py	update readme and ...		last year	
	init	add more text to the...		last year	
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	requirements.txt	port the emulator to ...		last year	
	vm_32.cfg	allow building both 3...		last year	
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README

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LinuxPDF

This is Linux running inside a PDF file via a RISC-V emulator, which is based on [TinyEMU](#).

Try it here: [linux.pdf](#)

linuxpdf.mp4

0:00 / 2:13

See also: [DoomPDF](#)

Explanation

This works in a very similar way to my previous [DoomPDF](#) project.

You might expect PDF files to only be comprised of static documents, but surprisingly, the PDF file format supports Javascript with its own separate standard library. Modern browsers (Chromium, Firefox) implement this as part of their PDF engines. However, the APIs that are available in the browser are much more limited.

The full specfication for the JS in PDFs was only ever implemented by Adobe Acrobat, and it contains some ridiculous things like the ability to do [3D rendering](#), make [HTTP requests](#), and [detect every monitor connected to the user's system](#). However, on Chromium and other browsers, only a tiny subset of this API was ever implemented, due to obvious security concerns. With this, we can do whatever computation we want, just with some very limited IO.

C code can be compiled to run within a PDF using an old version of Emscripten that targets [asm.js](#) instead of WebAssembly. With this, I can compile a modified version of the TinyEMU RISC-V emulator to asm.js, which can be run within the PDF. For the input and output, I reused the same display code that I used for DoomPDF. It works by using a separate text field for each row of pixels in the screen, whose contents are set to various ASCII characters. For inputs, there is a virtual keyboard implemented with a bunch of buttons, and a text box you can type in to send keystrokes to the VM.

The largest problem here is with the emulator's performance. For example, the Linux kernel takes about 30-60 seconds to boot up within the PDF, which over 100x slower than normal. Unfortunately, there's no way to fix this, since the version of V8 that Chrome's PDF engine uses has its [JIT compiler disabled](#), destroying its performance.

For the root filesystem, there are both 64 and 32 bit versions possible. The default is a 32 bit buildroot system (which was prebuilt and taken from the original TinyEMU examples), and also a 64 bit Alpine Linux system. The 64 bit emulator is about twice as slow however, so it's normally not used.

Build Instructions

Clone this repository and run the following commands:

```
python3 -m venv .venv
source .venv/bin/activate
pip3 install -r requirements.txt
./build.sh
```

If you want to build the 64 bit rather than 32 bit version, edit `build.sh` and change the `BITS="32"` line.

The `build.sh` script will download Emscripten `1.39.20` automatically. You must be on Linux to build this.

The generated files will be in the `out/` directory. Then you can run `(cd out; python3 -m http.server)` to serve the files on a web server.

Credits

This project was made by [@ading2210](#).

The RISC-V emulator is forked from [TinyEMU](#), which was written by [Fabrice Bellard](#).

License

This repository is licensed under the GNU GPL v3.

```
ading2210/linuxpdf - Linux running inside a PDI
Copyright (C) 2025 ading2210
```

```
This program is free software: you can redistribr:
it under the terms of the GNU General Public L:
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(at your option) any later version.
```

About

Linux running inside a PDF file via a RISC-V emulator

[linux.doompdf.dev](#)

Readme

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Activity

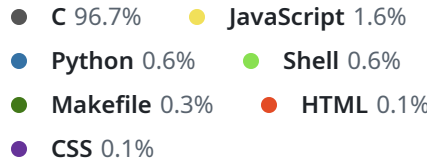
4.5k stars

29 watching

210 forks

Report repository

Languages



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