APAC Technology
Using ConTeXt in Enterprise – Aha! & Gotcha!


APAC Technology
Sep 2021
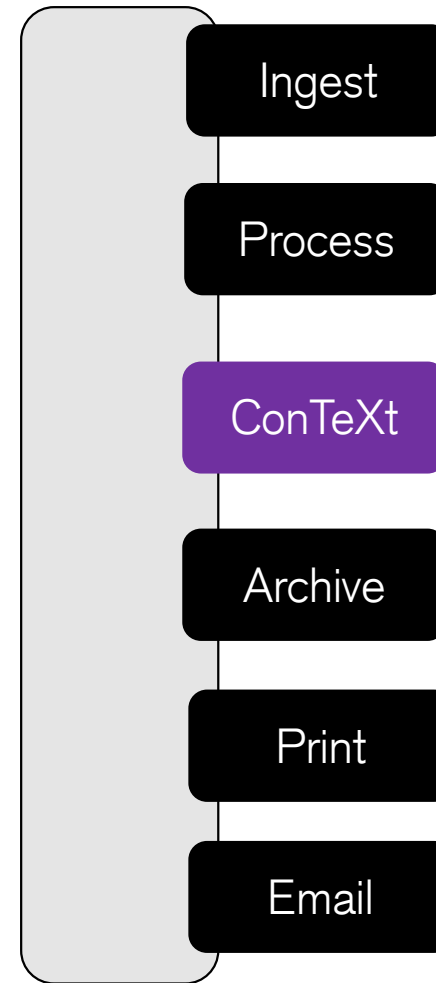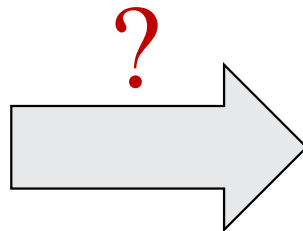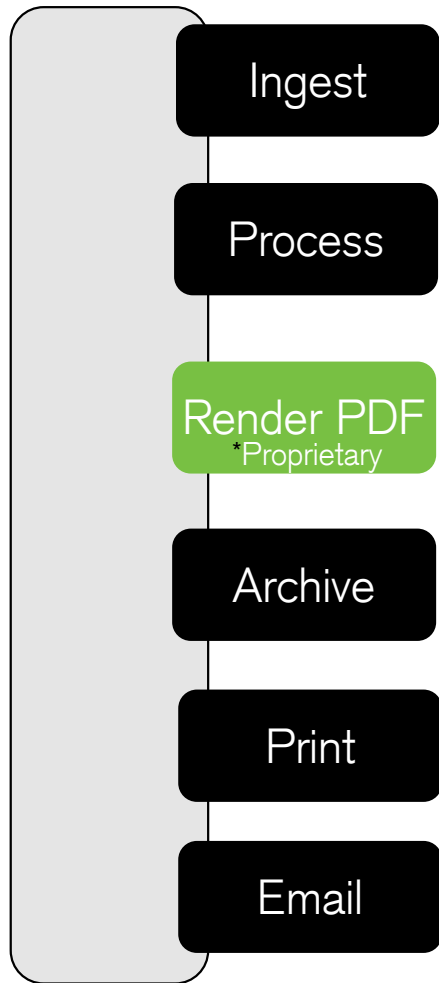V0.1

CREDIT SUISSE

Introduction

- **My name is Ramkumar**
  - Technical Lead for Client Output System, APAC Technology
  - Write code in Kotlin & Typescript (React) at work
  - These days – Lua & MetaPost also!
  - When am not doing above – learning Rust

- **Client Output System**
  - 30+ Types of PDF Statements
  - ~ 500k to 700k PDFs monthly
  - PDF Content – Tables, Charts & Line Graphs, Data Viz widgets
  - Single page statement to 300 page statement
  - Batch mode – e.g. ~ 70k PDFs in an overnight batch
  - Online mode - Request / Response (with PDF)

TXT JSON XML …

Client Output System

PDF

Archive Printer Email
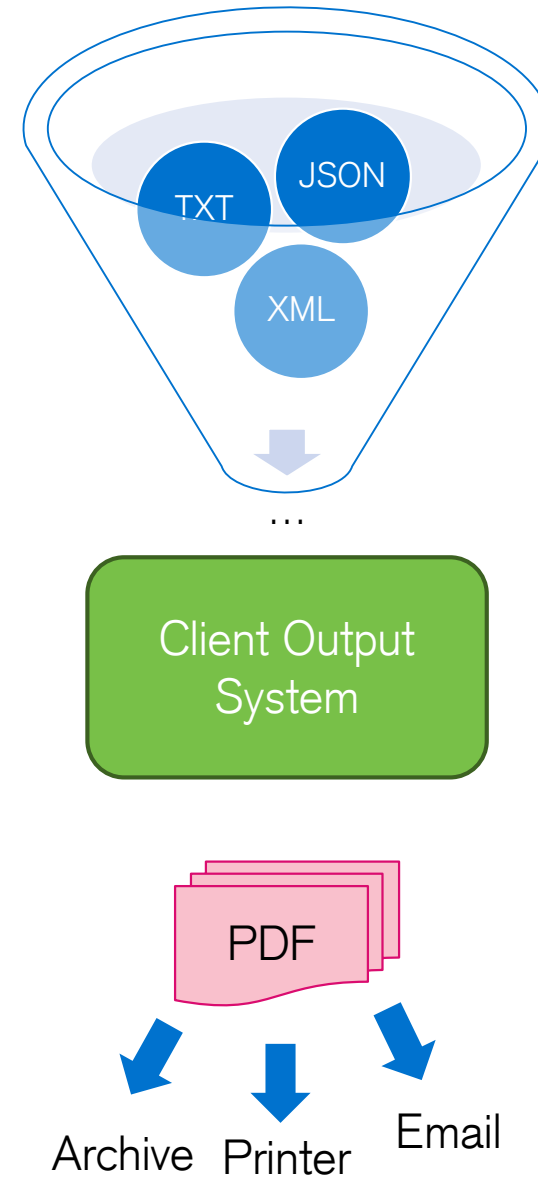
Key Question – Can we use ConTeXt for our usecase?
It has been a 8 month journey thus far…

```
┌──────────┐              ┌──────────┐
│  Ingest  │              │  Ingest  │
├──────────┤              ├──────────┤
│ Process  │     ?        │ Process  │
├──────────┤    ═══>      ├──────────┤
│Render PDF│              │ ConTeXt  │
│*Proprietary             ├──────────┤
├──────────┤              │ Archive  │
│ Archive  │              ├──────────┤
├──────────┤              │  Print   │
│  Print   │              ├──────────┤
├──────────┤              │  Email   │
│  Email   │              └──────────┘
└──────────┘
```

Elevator Pitch
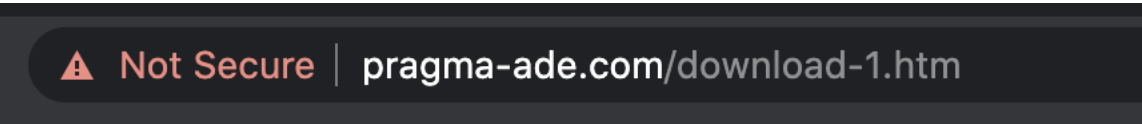
Key Benefits of ConTeXt Engine
- PDF Template as Code
- Whole Community of Users – https://tex.stackexchange.com
- Pixel perfect high quality PDF, Automated PDF Form-Filling as a service
- Simple Linux Process, can be scaled out to as many cores/servers as needed
- GNU license

Installation
Gotcha! – blocked, needed a local internal mirror

- Site was blocked internally!

⚠ Not Secure | pragma-ade.com/download-1.htm

- Solution => Internal (manual) mirror

- Sample ConTeXt installer files for Win64:
  - tex/status.tma
  - tex/texmf.tma
  - tex/texmf-context.tma
  - tex/texmf-win64.tma
  - texmf.zip
  - texmf-context.zip
  - tex/texmf-win64/bin/context.exe
  - tex/texmf-win64/bin/context.lua
  - tex/texmf-win64/bin/luametatex.exe
  - tex/texmf-win64/bin/luatex.exe
  - tex/texmf-win64/bin/mtxrun.exe
  - tex/texmf-win64/bin/mtxrun.lua

Do we have to copy all these files with every new release or just the ZIP files?

JSON .. LPEG ..♥

Gotcha! - `%` in the JSON Data

Thanks to the Lua community, there are many high quality JSON parsers using **lpeg** ♥
Templating with Lua Tables is straightforward…

```
% =============== Read JSON Data ===============
\startluacode
local json = require("luautils.json")
local file = io.open(document.arguments.file)
tab = json.parse(file:read("*all"))
file:close()
\stopluacode
```

```
\ctxlua{tex.print(math.floor(tab.sustainabilityGroups[1].weightInPortfolio))}\%
```

Gotcha! - But we have JSON data with `%` symbols (a perfectly valid JSON) –
Pre-process to escape them, so that ConTeXt engine does now throw errors -

```
"description": "3.95 \% BONDS PT BANK RAKYAT INDONESIA (PERSERO) TBK 2019-
28.03.24 REG S",
```

Tables – Natural Tables (vs XTables)

- **\framed** in ConTeXt ♥ is like `<div class="mt-3 text-lg text-gray-500">`

- Ability to style individual cells in Table turned out to be super important

- Usecases were more for Natural Tables module than xtable

Liquidity	Currencies		Min (%)	Neutral[1] (%)	Max (%)	Comments[2]
		Total	0	0	100	
		USD				
		EUR				
		SGD				
		Others				

Position		Value in CHF	Weight
🌐 **Impact investing** — Positions that explicitly promote social or environmetal goals, adhere to the IFC[2] impact principles and report on the impact achieved.		1,234	0%
📋 **Thematic** — Positions that contribute significantly to the United Nations Sustainable Development Goals (UN SDGs).		2,322	8.00%
Shs -HBC-CHF- N1 Euro Cov Bd Capitalisation		1,000	5.00%

< 1. Footnotes >
< 2. Footnotes >

Statistical Charts Module ♥ ♥ ♥
Gotcha! – Negative values are common in Finance!

- Awesome work by the authors - Supports a wide variety of charts

- But patched it to support –ve values (4th Quadrant)

- Could be expanded with new types of Charts – sparklines, linear bubble charts, …

sparklines

linear bubble charts

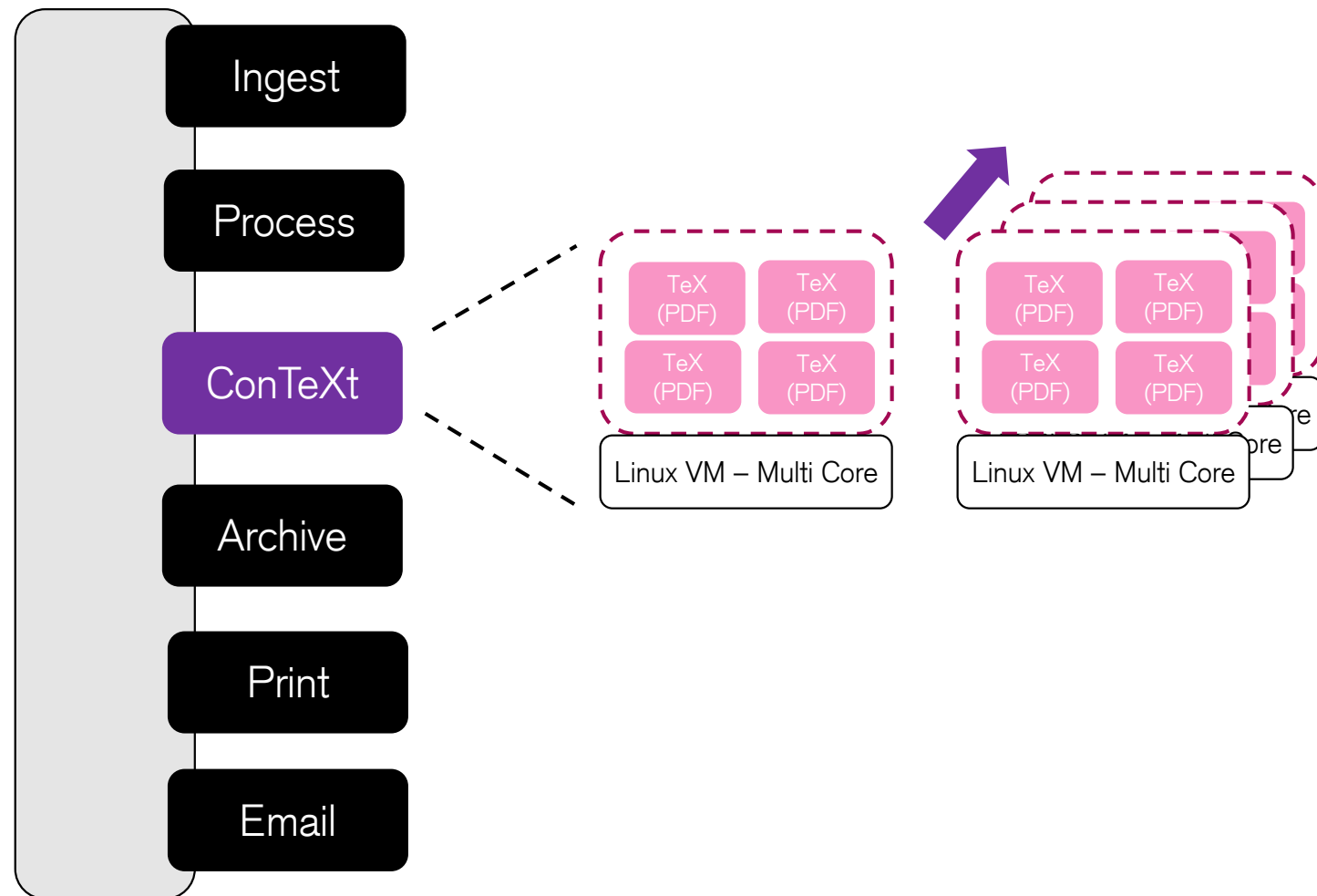

patch
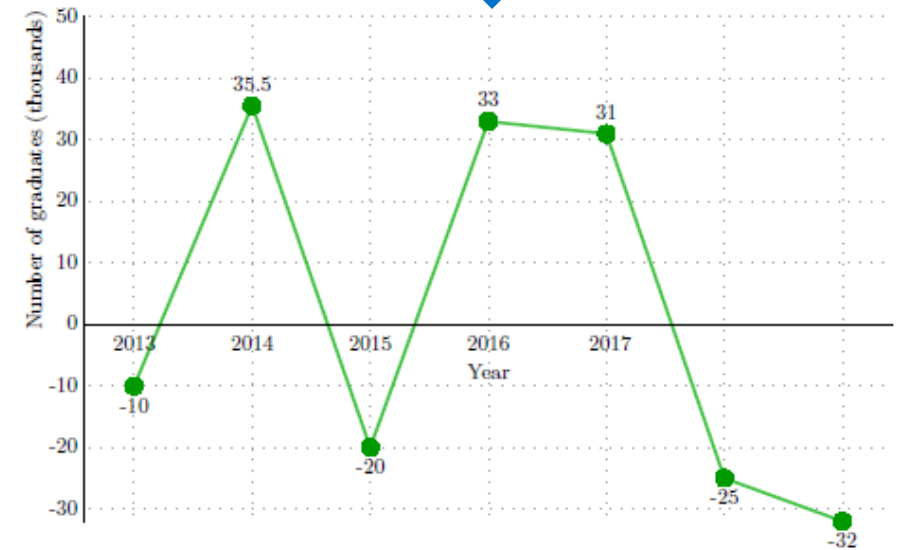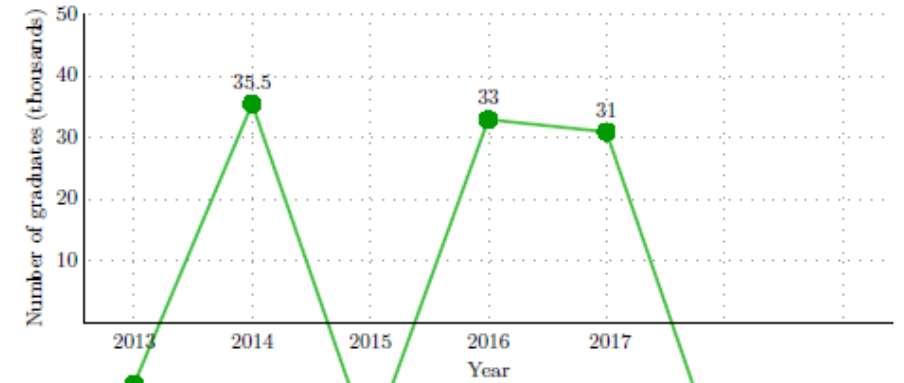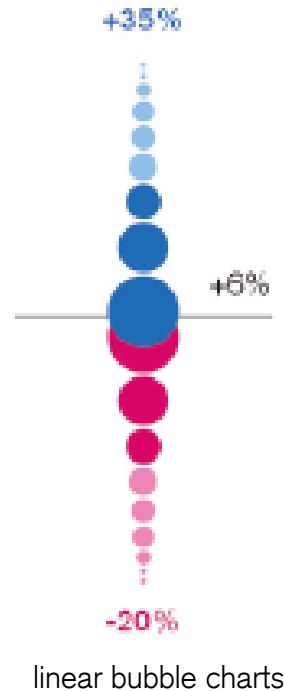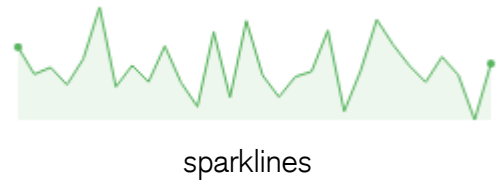
Scale-out with Apache NiFi / GNU Parallel

Scale Out for Batch mode (work in progress)

2 Options being explored -

1. GNU Parallel

2. Apache NiFi

< 1. Footnotes >
< 2. Footnotes >

# Scale-out with Apache NiFi / GNU Parallel
Work-in-progress

GNU Parallel – Create copies of the TeX file, run them in Parallel and clean up afterwards.

- Error Handling – Should we do inside ConTeXt (e.g. call a Service) or do it outside? How does Parallel report individual file errors?

```
find demo -name \*.json | parallel cp esg-one-pager-
clean.tex {/.}.tex
find demo -name \*.json | parallel context --file={} --
result={/.}.pdf --runs=2 --noconsole --batchmode {/.}.tex
find demo -name \*.json | parallel mv {/.}.pdf output
find demo -name \*.json | parallel rm {/.}.log {/.}.tuc
{/.}.tex
```
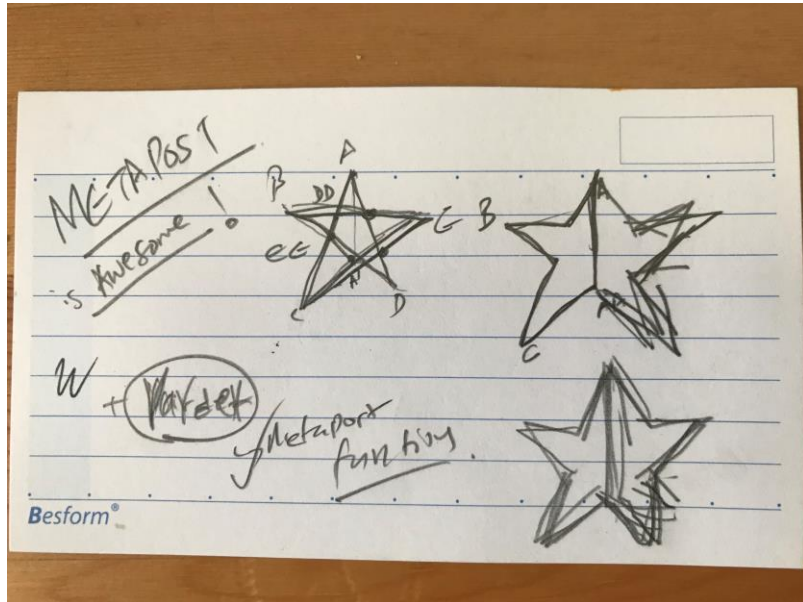
Running a Batch using **Apache NiFi** Flow files -
- Error Handling – NiFi handles concurrency and reports on any single failure
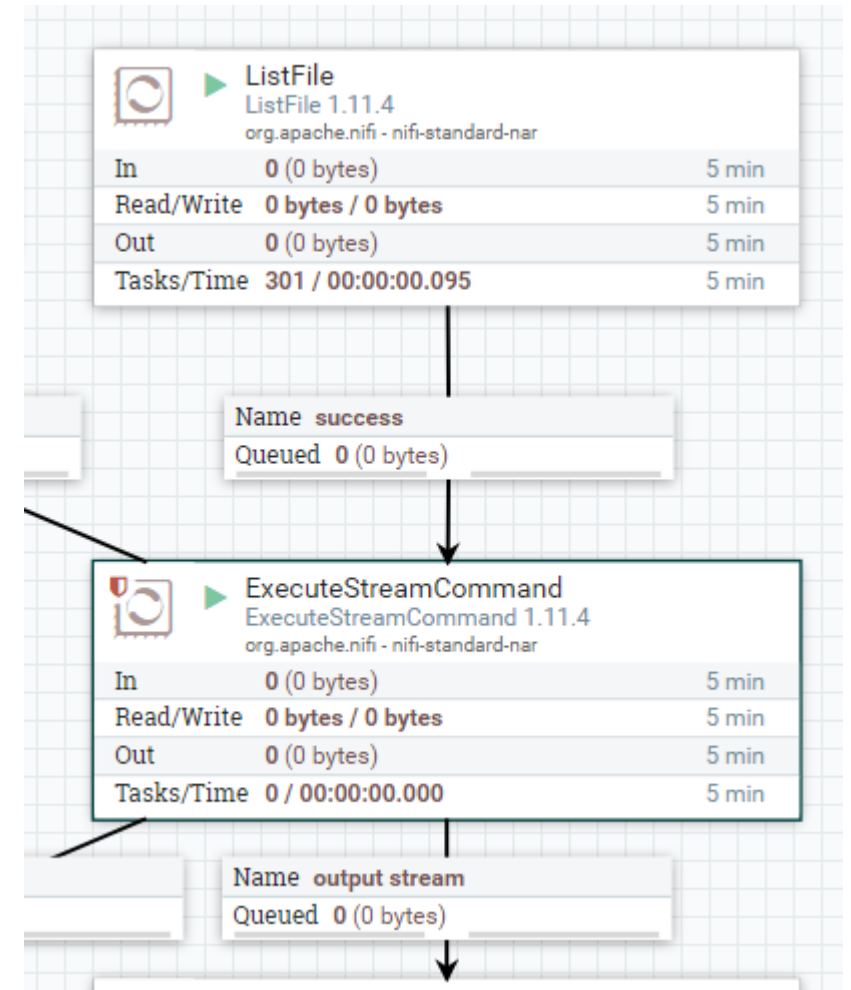
MetaPost / MetaFun ♥ ♥ ♥ ♥ ♥

Turns PDF into a creative canvas !

Thank you Hans / Taco - `withpattern` in metafun is pretty cool!

Vitalstatistix allocation by sustainability classifications

- 4% Impact Investing
- 13% Thematic
- 5% ESG aware
- 20% Avoid harm
- 8% Traditional
- 34% Not sustainable
- 7% Not classified
- 6% Liquidity

Miscellaneous ♥

- Unicode support - CJK !

- Test files.zip – Very useful to create training materials

- Add custom PDF Properties

- QRCode library – `qrencode.lua`

- … a whole lot of stuff that we have not explored

- VSCode as IDE – The extension not fully ConTeXt aware but works

  - This could be a good grad school project to have a ConTeXt aware intellisense for VSCode

Creating an (internal) Training Module

- Installation

- Basics

  - Fonts

  - Layouts

- Basic Lua for Templating with JSON Data

- Natural Tables & XTables

- MetaPost / MetaFun – creating custom data viz

- Charts & Graphs

- Debugging

  - `Underfull \hbox (badness 10000) in paragraph`

  - `Understanding the ConTeXt logs`

< 1. Footnotes >
< 2. Footnotes >

Some parting thoughts…

- Section in the ConTeXt wiki on "Security" –
  - What is PDF Security all about?
  - How to check the "health of a PDF" – e.g. no unwanted embedded fonts inside

- What does ConTeXt community think about Tectonic?
  - https://tectonic-typesetting.github.io/en-US/index.html
  - Similar to ConTeXt but with Rust
  - New kid on the block?