

SpinalHDL, VexRiscv, SaxonSoc

Whoami

- Charles Papon
- Hardware/Software background
- Main dev behind
 - SpinalHDL, VexRiscv, SaxonSoc

FPGA to deploy hardware

- Pro
 - Affordability (dev kit ~30\$-200\$, low initial cost)
 - Iterate in a few minutes
- Their limitations :
 - Large volume => high cost
 - Speed
 - Design size
 - Only digital
 - ...

SpinalHDL

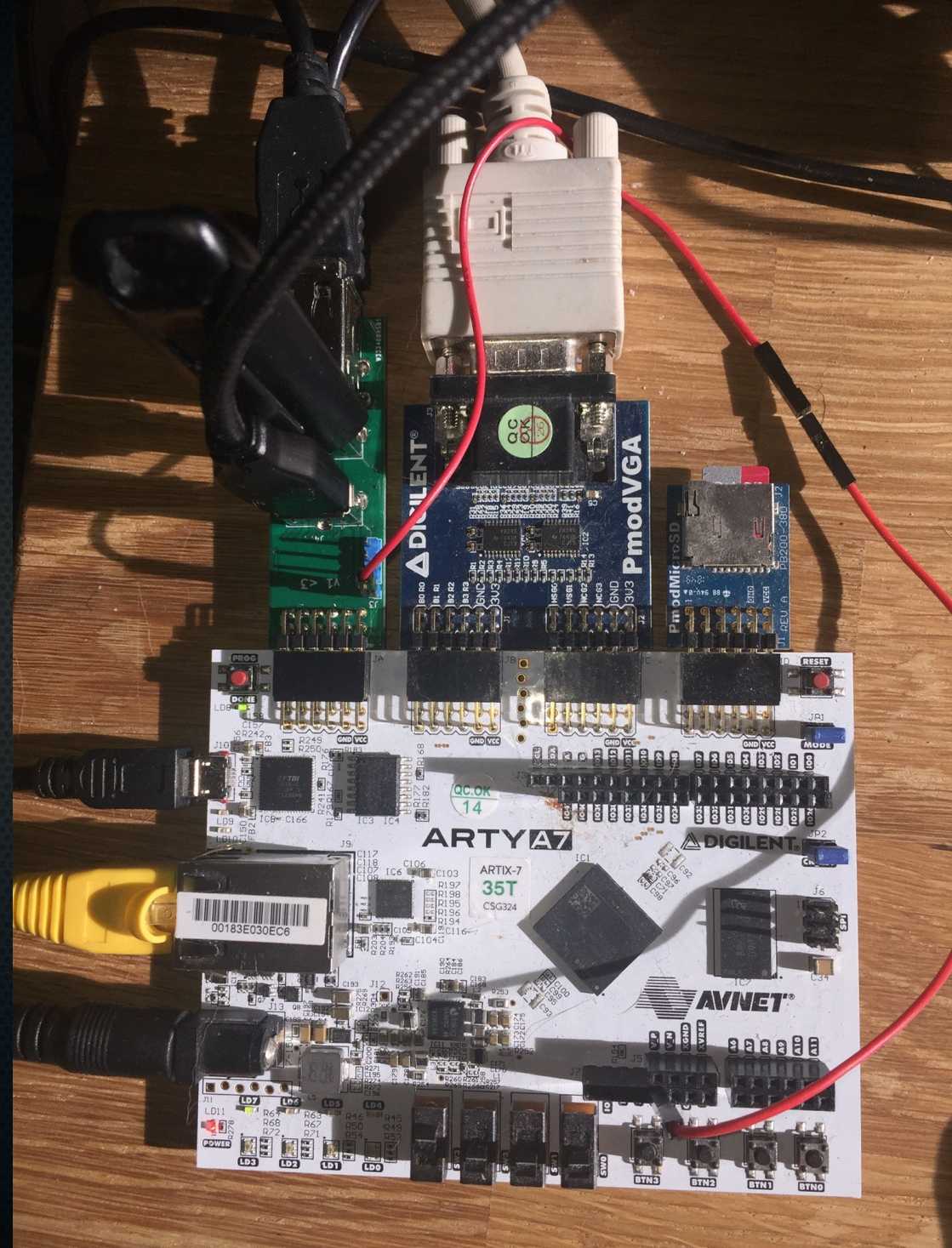
- HDL => Hardware description language
- A „modern“ alternative to VHDL/Verilog/SystemVerilog
- Technically it is a Scala iDSL
- Also implement some modules
 - DDR3 controller
 - Ethernet controller
 - USB host controller (NLnet funded)
 - ...
- <https://github.com/SpinalHDL/SpinalHDL>

VexRiscv

- CPU targeted for FPGA deployment
 - RISC-V 32 bits
 - Multi core
 - Memory coherency
 - Can run upstream linux
 - 64 bits FPU, AES (NLnet funded)
- Allow peoples to extends it
- Avoid FPGA vendor's IP creep
- <https://github.com/SpinalHDL/VexRiscv>

SaxonSoc

- Framework to compose SoC
- For instance on ArtyA7 35T
 - 2 VexRiscv ~100 Mhz
 - Shared FPU
 - DDR3 , Sdcard
 - Ethernet, USB host,
 - Video/Audio output
- <https://github.com/SpinalHDL/SaxonSoc/tree/dev-0.3/bsp/digilent/ArtyA7SmpLinux>



- Linux
- Buildroot
- x11
- mpg123
- Dillo
- USB boot
- ...

The image is a collage of various Linux desktop window screenshots:

- Dillo Browser:** Shows the URL `https://en.wikipedia.org/wiki/Portal:Science`. The page content includes a photo of a black currawong and the text: "The **black currawong** (*Strepera fuliginosa*), also known locally as the **black** is a large passerine bird".
- xclock:** A simple analog clock window.
- xterm (top right):** Displays system statistics:

1	[Progress Bar]	185.3%	Tasks: 25, 3 thr: 2 running
2	[Progress Bar]	77.2%	Load average: 2.31 2.51 2.25
Mem	[Progress Bar]	41.7M/230M	Uptime: 00:29:28
Sup	[Progress Bar]	OK/OK	

 Below this is a process list table:

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
532	root	20	0	3840	2568	2284	R	53.5	1.1	0:14.79	mpg123 -a plughw:
122	root	20	0	27704	13804	5004	R	39.5	5.9	9:03.91	/usr/bin/Xorg :0:
143	root	20	0	59792	19528	15432	R	23.2	8.3	3:07.88	pcmanfm
535	root	20	0	1916	240	204	R	21.6	0.1	0:00.57	sl
183	root	20	0	7280	4872	4192	S	21.1	2.1	3:47.10	xterm
144	root	20	0	3044	2020	1824	R	13.5	0.9	3:18.70	htop
536	root	20	0	3060	528	472	S	9.2	0.2	0:00.17	xwd -root -out sc
537	root	20	0	59792	19528	15432	S	2.2	8.3	0:00.04	pcmanfm
177	root	20	0	7460	4876	4184	S	1.6	2.1	0:16.27	xclock -update 1
- root File Manager:** Shows the root directory with a tree view on the left and a file view on the right. The tree view includes `etc`, `lib`, `lib32`, `locale`, `lost+found`, `man`, and `media`. The file view shows `background.-jpg`, `fly.jpg`, `i.mp3`, and `screenshot.x-wd`.
- xterm (bottom left):** Displays a diagram of a digital signal waveform with various labels and timing markers.
- mpg123:** A terminal window showing the output of the `mpg123` command:


```
High Performance MPEG 1.0/2.0/2.5 Audio Pla
version 1.25.13; written and copyri
free software (LGPL) without any wa

Terminal control enabled, press 'h' for

Playing MPEG stream 1 of 1: i.mp3 ...

MPEG 1.0 L III cbr320 44100 j-s

Title:  Low Tide
Comment:
Year:  2006
```
- feh:** A window displaying a photograph of a butterfly on a flower.