

# NGI SEARCH

## SVP64 Power ISA Vector Optimisation for Search

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Assisted by Libre-SOC

# SVP64 Power ISA Vector Optimisation for Search

- ▶ Take existing search algorithms and optimise a Vector ISA (at the hardware level) to increase energy efficiency
- ▶ Whilst normally a software developer has to make the best out of the situation of being provided with a "fait-accomplit" ISA (ARM, x86, MIPS) and attempt to optimise Search algorithms for it, we aim to turn it around: work out what features of an ISA, if added, would make the same algorithms much more power-efficient.
- ▶ RED: Hardware/ISA concepts and project management
- ▶ VectorCamp: Algorithm analysis and concepts
- ▶ VanTosh: Validation, evolution and demonstration

## Low-level Libraries: used by all software

- ▶ Regardless of the high-level algorithm portable low-level libraries are needed. JSON parsing, UTF-8, strncpy, memcpy.
- ▶ Optimising libc6 standard routines (strncpy, memcpy, isascii) would represent high value-for-money if made much more efficient
- ▶ strncpy already done under NLnet-funded Libre-SOC Grants: 11 Vector instructions, representing a huge power-saving and high bang-per-buck
- ▶ We want to see how far this technical approach can be taken.
- ▶ All source code, all instructions, all HDL, all documentation: entirely public and FOSS Licensed or to be part of OpenPOWER Foundation Standards. Full transparency!

- ▶ VectorScan is a high-performance multiple regex match library. Used in intrusion detection systems for real-time pattern search.
- ▶ A fork/replacement of HyperScan, fully compatible, VectorScan provides a level of abstraction that makes it easier to port to other architectures.
- ▶ Project goal: to port key algorithms in VectorScan to SVP64 with a view to estimated power reduction, simplicity and potential performance increases.
- ▶ Also a key additional goal is to validate SVP64 as a High-performance High-level Assembly ISA, and to see if any crucial adaptations or alterations are required.

# The end

## Thank you

### Questions?

- ▶ Discussion: <http://lists.libre-soc.org>
- ▶ Libera IRC #libre-soc
- ▶ <https://libre-soc.org/>
- ▶ <https://www.ngi.eu/ngi-projects/ngi-search/>