FISE2 - INFO2- HPP
2019-2020

Introduction to SIMD – MMX/SSE/AVX

Guillaume MULLER

Why having HPP lectures in FISE2?
Why HPP ?

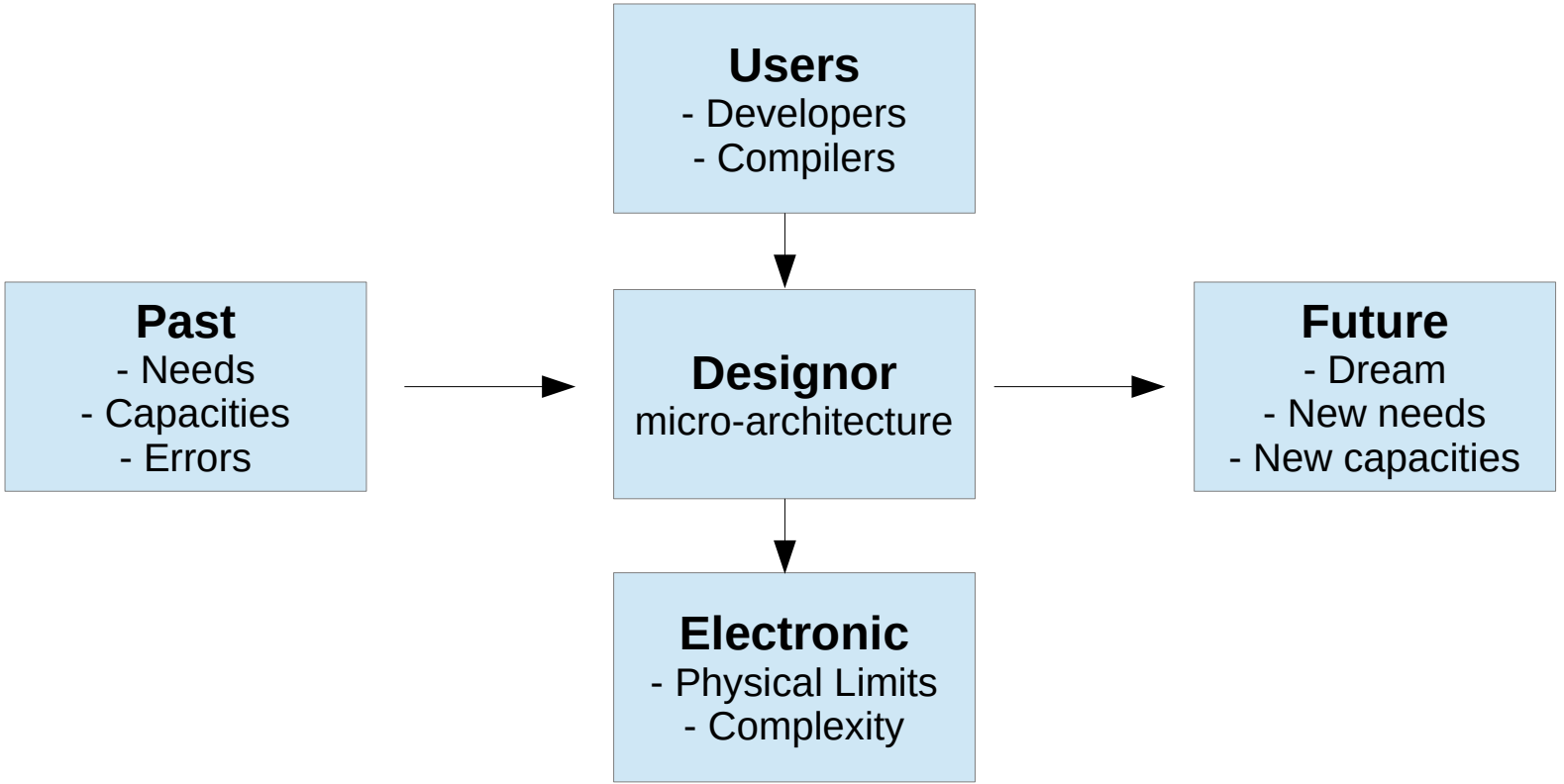
- Classical approach to HPP = distribute on cluster
  - What if the initial code is inefficient?
  - ⇒ optimize locally first!
- Current machines already are massively parallel
- A large part of optimizations can not be vreated automatically
  - ⇒ impossible to rely on tools written by others
  - ⇒ as (future) engineers in CS: mandatory knowledge

Why SIMD/MMX/SSE/AVX?

- Task Parallelism
  - Execute coarse-grained pieces of code on ≠ pieces of hardware
  - Multi-cores, hyper/multi-threading…

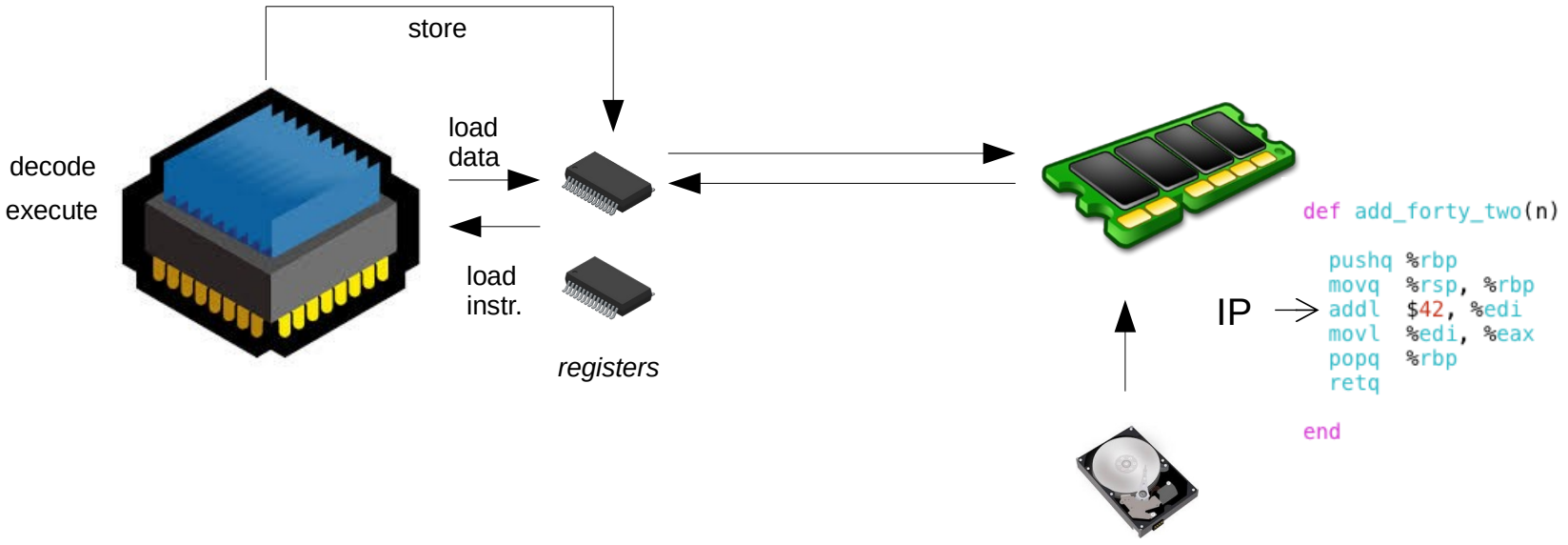
- **Instruction/Data Parallelism**
  - Tiny pieces of code/data simultaneously on = hardware

"**ça dépend**, ça dépasse"?



- *Who has already used/programmed a processor ≠ Intel?*

“Rappels”



- IP/JMP
- LD/ST
- ADD/SUB/MULT/DIV/...

```
Instruction Cycle:
- Fetch
- Decode
- Execute
```