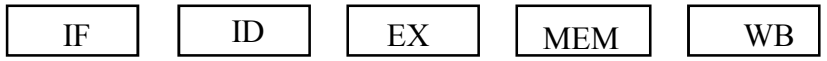
When a field is mature? - SIMD

- Mid-90': first SIMD extensions (VIS-MMX)
- Mid-years 2000: was SIMD mature? Yes and No
  - SIMD extensions have been continuously developed
  - Compiler developments were needed
  - We published several papers on SIMD FP16 (half) extensions (2005-2006)
    - "half" precision is sufficient for many graphic and media applications
    - Increased computation speed and reduced memory footprint…
    - **Too early**
- New applications: deep learning…
  - Reduced precision is OK
  - FP16 SIMD is implemented in Nidia GPU and some ARM CPUs

Revisiting “very mature” fields



Pipeline of Scalar CPUs

- New applications: IoT, wearable devices, etc.
- CPU – BA-20 (IP Cast)

  - “Re-invent the basic architecture: what about those “non-pipelined” CPUs architectures?”

Features	BA20	BA21	BA22 (CE/AP)	BA25
NB stages	1	2	5	7/12
CoreMarks/MHz	3,41	2,77	2,93	2,51
FMAX @TMSC65LP	75 MHz	150 MHz	400 MHz	800 MHz
CoreMarks	256	415	1175	2000
Nb gates	> 10 K	> 10 K	>25 K	> 150 K
Caches	-	-	L0 /L0	L0 et L1
MMU	-	-	-/L0	L0 et L1