A Look into Zen Architecture

Laurentiu Popescu
CPTR 380
3/12/18
History

- Five basic stages
- Intel’s approach was virtual
- AMD’s approach was physical
- Bulldozer is AMD’s chance to catch up
Zen Overview

- 2 million hours
- 54% more instructions per cycle
- SenseMI Technology for better optimization
  - Pure Power, Precision Boost, Extended Frequency Range, Neural Net Prediction, and Smart Prefetch
New Instructions

- SHA1 and SHA256
  - Cryptography
- CLZERO
  - Clear cache in single line
- PTE Coalescing
  - 4K to 32K page tables
Caches

- 1 MB L3 sub-slices
- L1 L2 enhanced by 2x
- L3 enhanced by 5x
Simultaneous Multi-Threading

- Increased throughput
- TLBs very effective
- AMD is comparable to Intel
Future

- 5% - 15% increased performance
- Zen 2 in 2019 and Zen 3 in 2020
- Spectre proof by Zen 2
References

References