ETH zürich ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

CachePool: Many-core cluster of customizable, lightweight scalar-vector PEs for irregular L2 data-plane workloads

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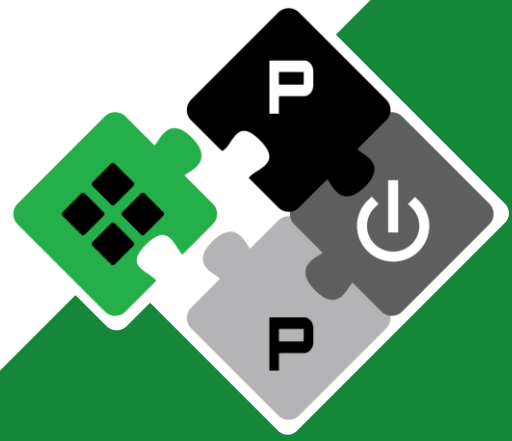

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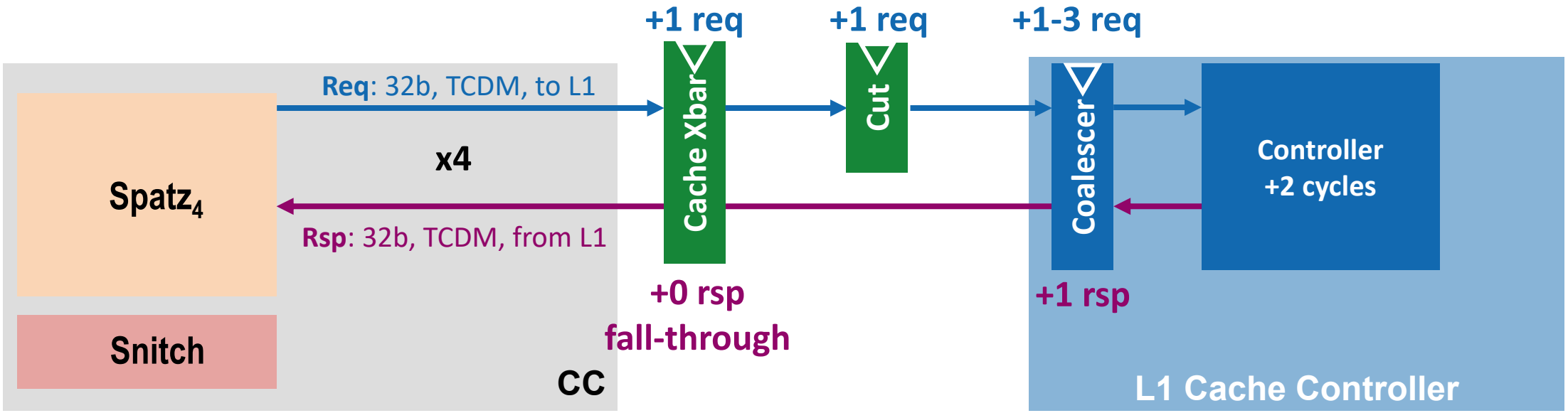
PULP Platform
Open Source Hardware, the way it should be!

Hit Load-to-Use Latency in CachePool -- Spatz



In total: 1 + 1 + (1~3) + 2 + 1 = 6~9 Cycles

- **Interconnection adds 2 cycles on req: 1 for xbar critical path cut, 1 for atomic units**
- **Coalescer adds 1~3 cycles on request, 1 cycle on response**
  => Depends on cacheline width, needs optimization
- **Controller hit takes 2 cycles**

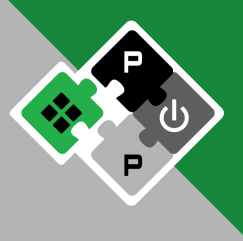
Hit Load-to-Use Latency in CachePool -- Spatz

In total: 1 + 1 + (1~3) + 2 + 1 = 6~9 Cycles

- **Timing Report after CTS:**
  WNS = -0.034ns @ 1GHz, slow-slow corner in 12nm technology node
  => Can be considered as timing closed

```
****** Setup timing categories ******
category                                                  Count      Worst      Total   Percentage
----------------                                         -------    -------    -------    -----
* category  S1: Large clock skew(LCS)                         0
* category  S2: Large external input delay(LID)               0
* category  S3: Large driver adjustment(LDA)                  0
* category  S4: Large clock uncertainty(LCU)                  0
* category  S5: Large setup time of end point(LLS)            0
* category  S6: Large external output delay(LOD)              0
* category  S7: Delay setting is illegal(ID)                  0
* category  S8: Path ends up at scan in pin(SIP)              0
* category  S9: Path with high density(HD)                    0
* category  S10: POCV related violation path(POCV)            0
* category  S11: Small violations(SM)                      5195     -0.005     -8.772   52.59%
* category  S12: Remaining violating paths(OT)              938     -0.034     -7.908   47.41%

****** Remaining violations distributed by slack ******
-0.100 >= slack > -~                                         0      0.000      0.000   -0.00%
-0.050 >= slack > -0.100                                     0      0.000      0.000   -0.00%
-0.020 >= slack > -0.050                                     6     -0.034     -0.160    0.96%
-0.010 >= slack > -0.020                                   228     -0.020     -2.886   17.30%
-0.005 >= slack > -0.010                                   704     -0.010     -4.861   29.15%
```



Thank you!