

The No Bits Left Behind Pattern

given:

- a storage hierarchy

- a query

- some data

solution:

- for all levels in the hierarchy (L1, L2, ...): try to use minimal number of bits

The No Bits Left Behind Pattern

advantages:

- no bit wasted

- no bit used for data nobody cares about

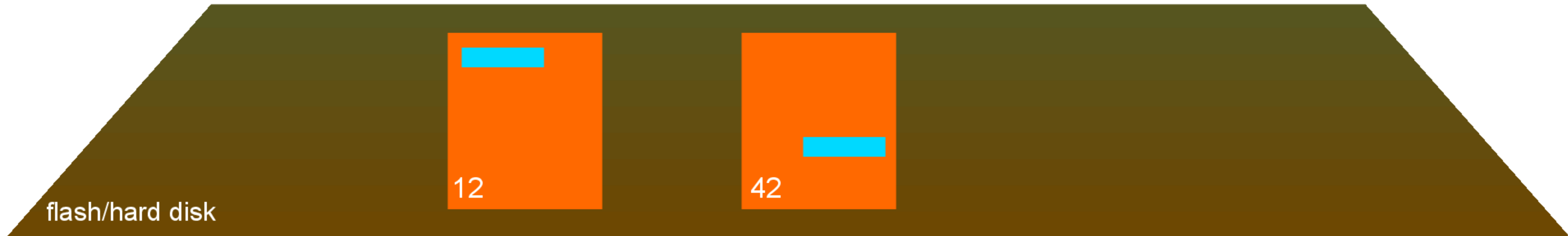
- no bandwidth wasted for moving unnecessary data

drawbacks:

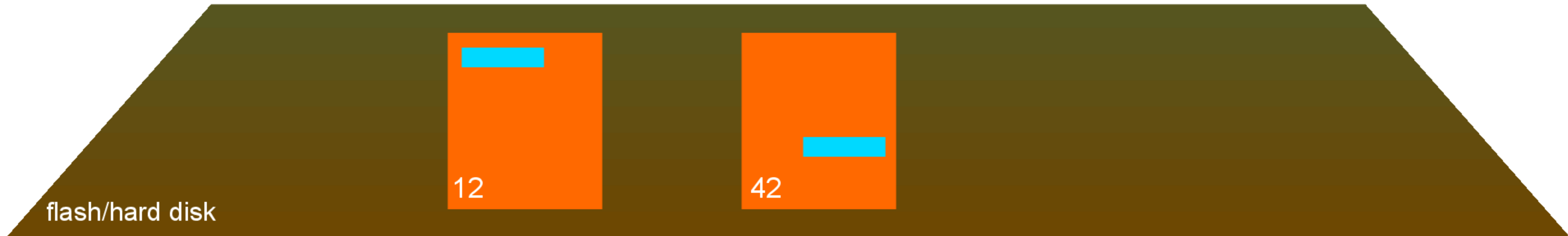
- space optimality and CPU optimality in conflict!

- thus: need to design all data layouts for the sweet spot!

Example with Wasted Bits



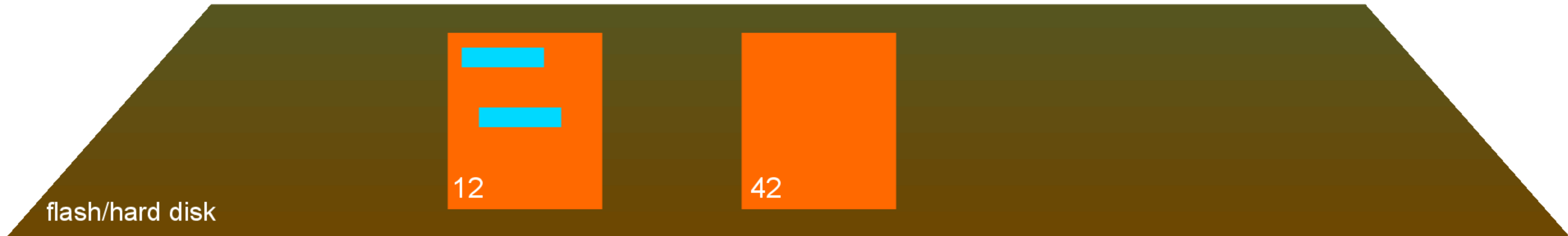
Example with Wasted Bits



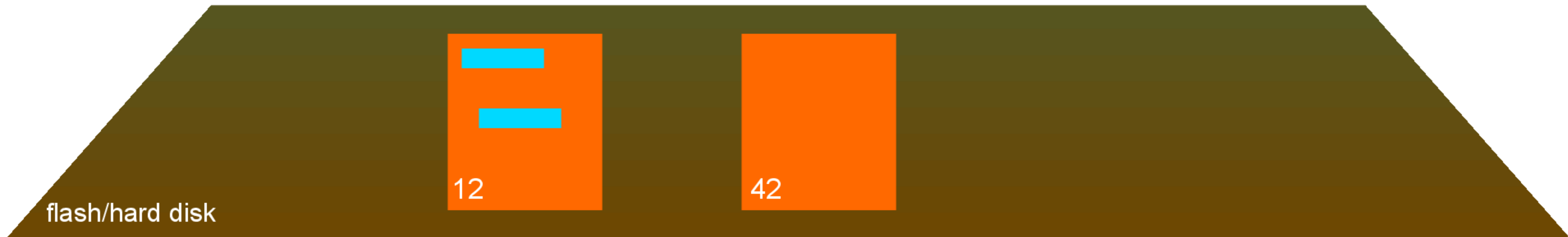
Example with Wasted Bits



Example with Better Data Layout



Example with Better Data Layout



Credits

pattern name inspired by the paper:

Eugene Wu, Carlo Curino, Samuel Madden
No Bits Left Behind.
CIDR 2011