

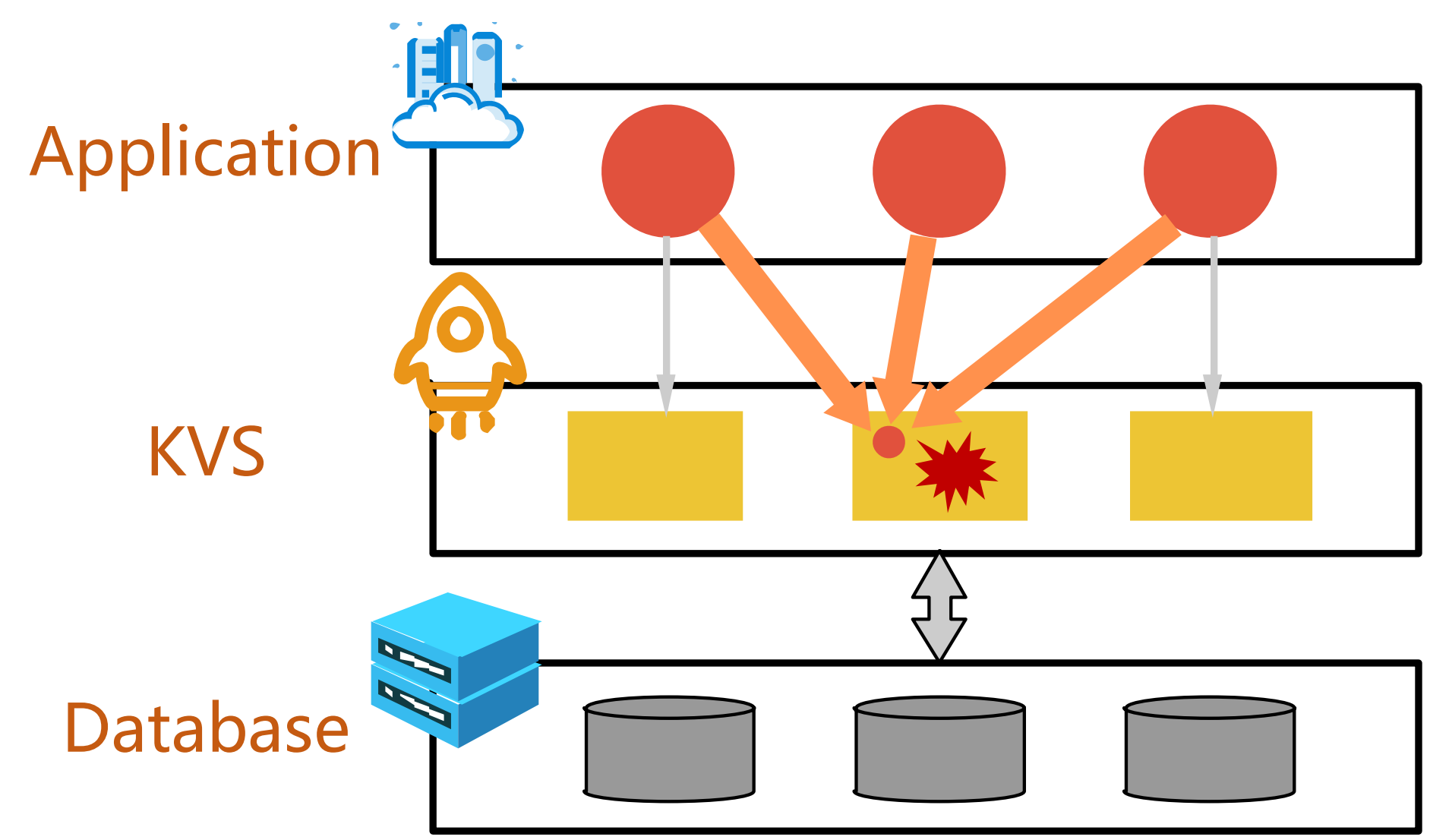
HotRing: A Hotspot-Aware In-Memory Key-Value Store

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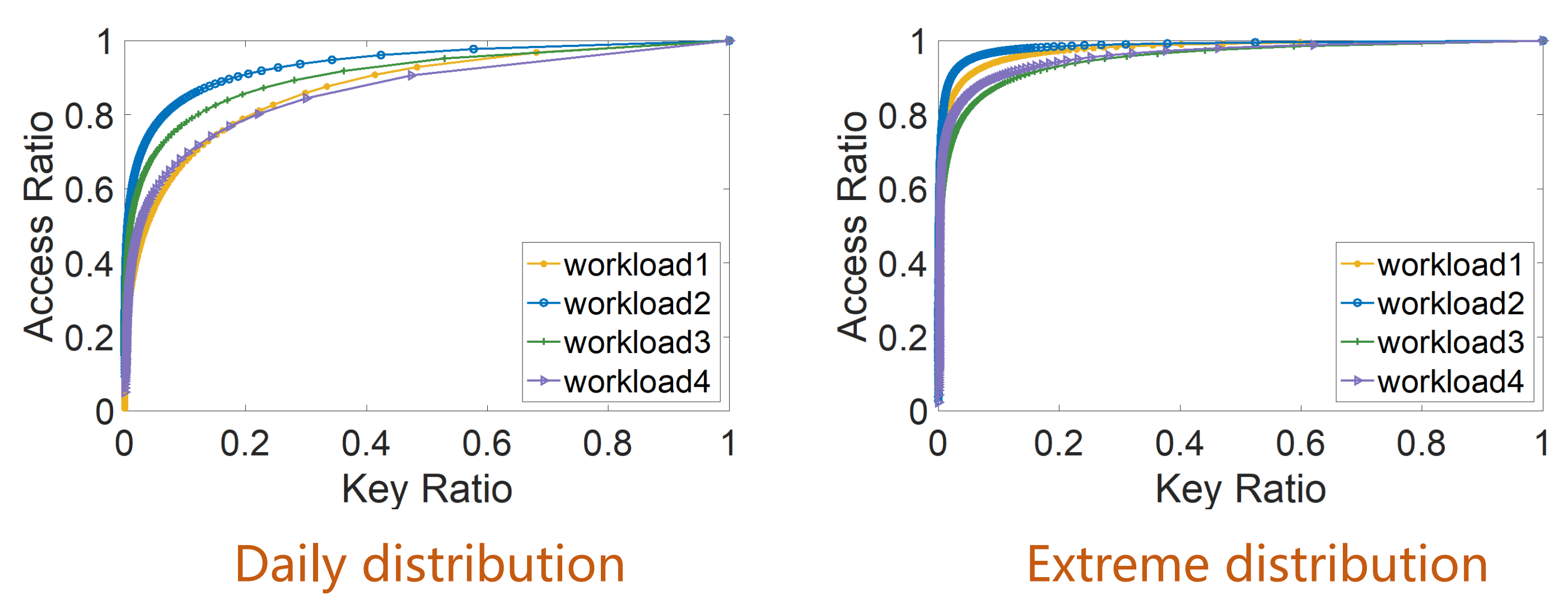
1. Hotspot issue

- A small portion of items that are frequently accessed



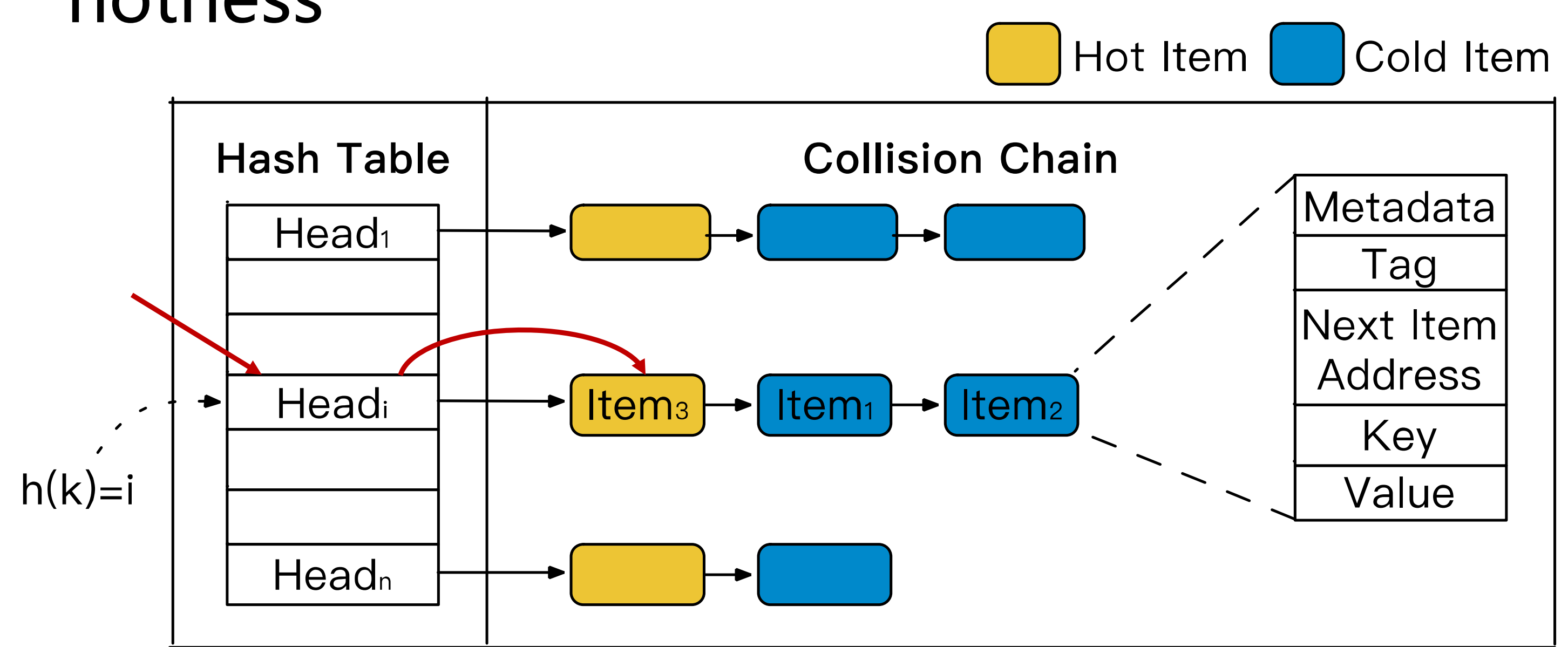
2. Workloads analysis

- Daily: 1% data holds 50% accesses
- Extreme: 1% data holds 90% accesses



3. Ideal & Challenge

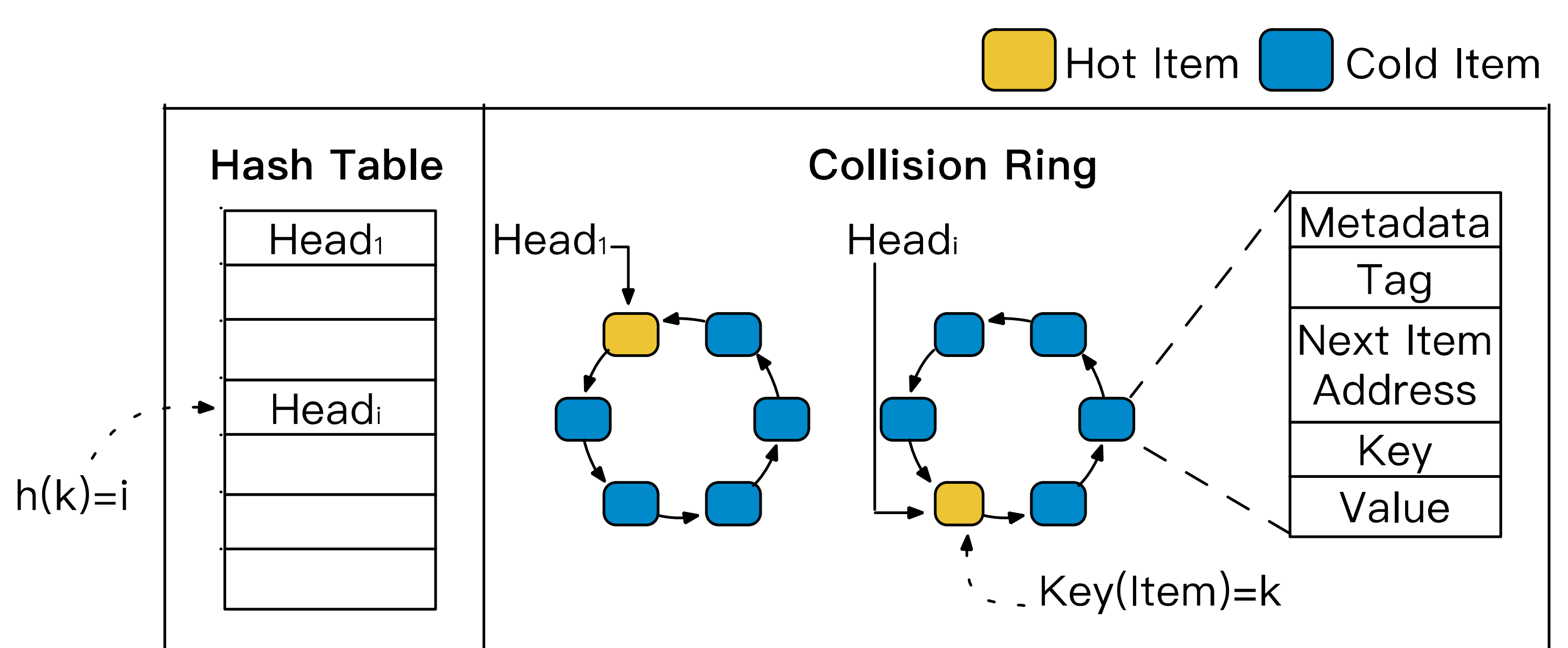
- Memory accesses required to retrieve an item should be (negatively) correlated to this hotness



- Ensuring dynamic hotspot shift and lock-free access is a challenge

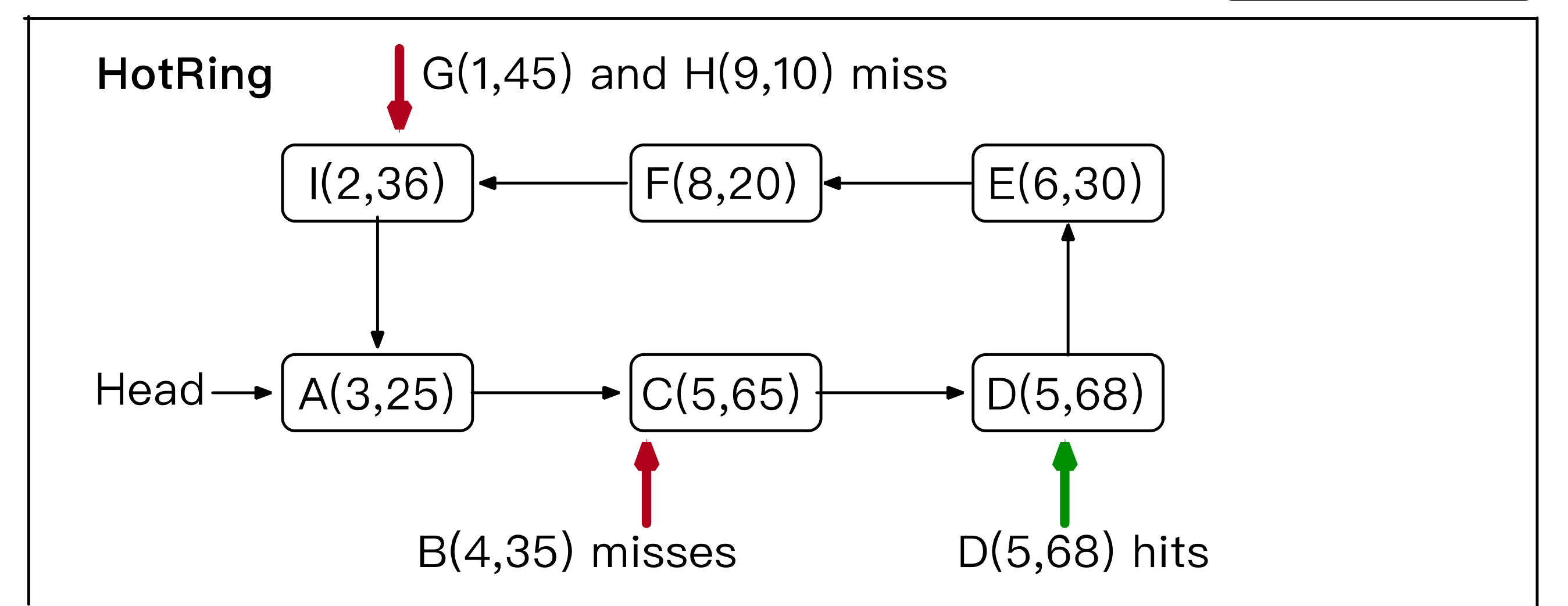
4. HotRing: Ring-based hash index

- The head pointer can point to any items dynamically



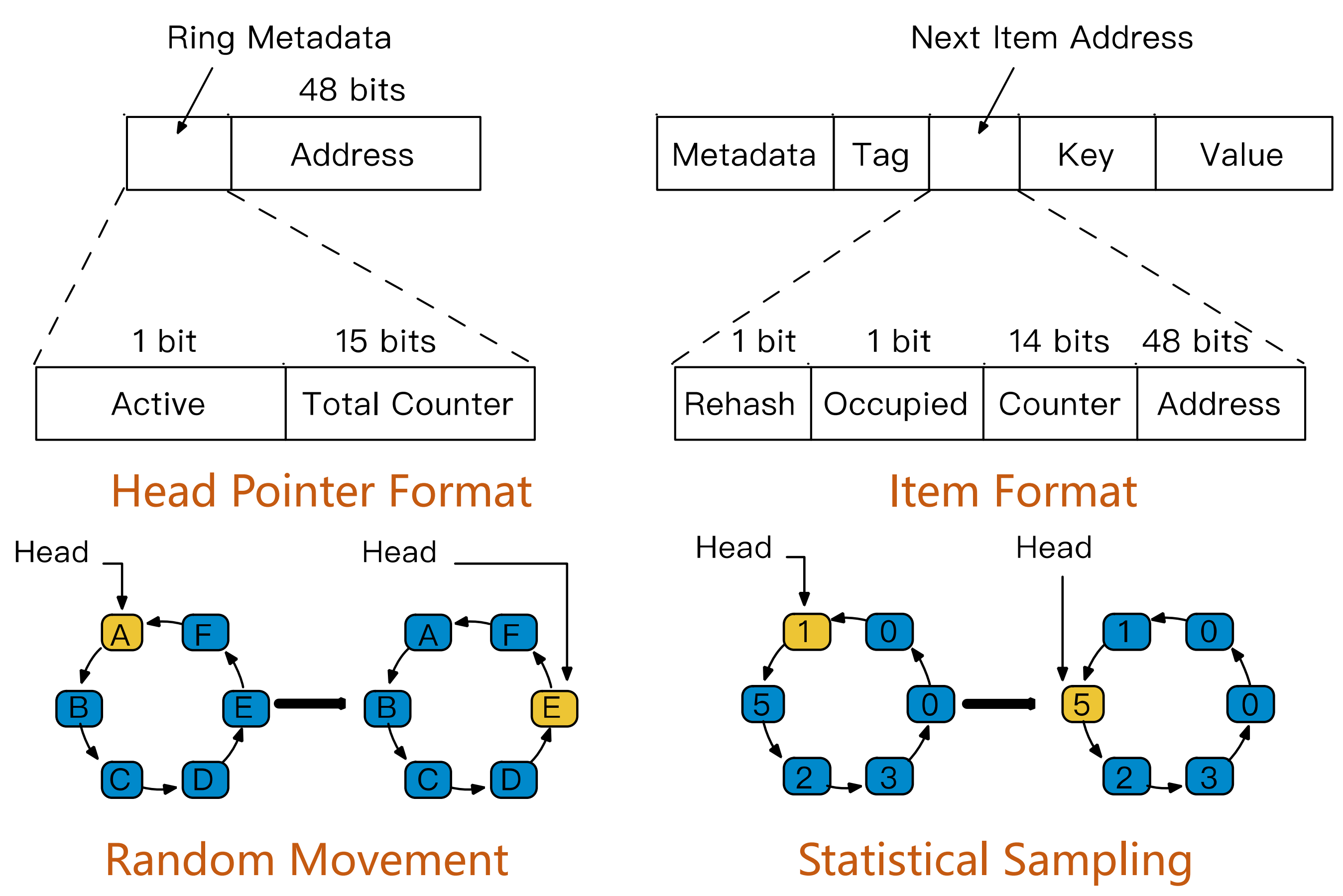
5. Design & Evaluation

- #1: Ordered-ring structure

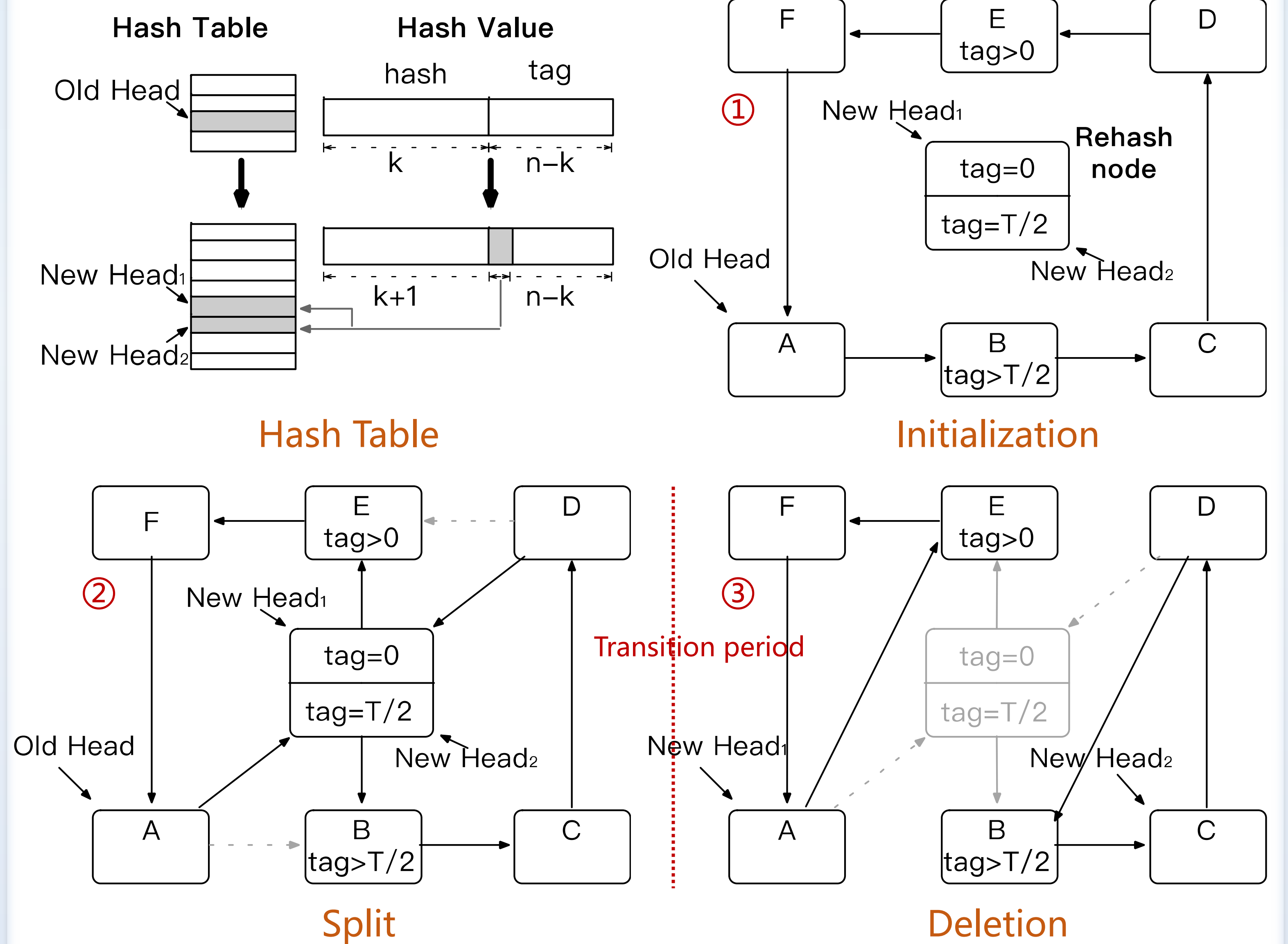


- Safe termination of lookup processes

- #2: Identify hotspots and adjust head pointer



- #3: Lock-free rehash



- #YCSB benchmarks

Key size	Value size	Zipfian θ	key-bucket ratio	# of thread
8 bytes	8 bytes	1.22	8	64

