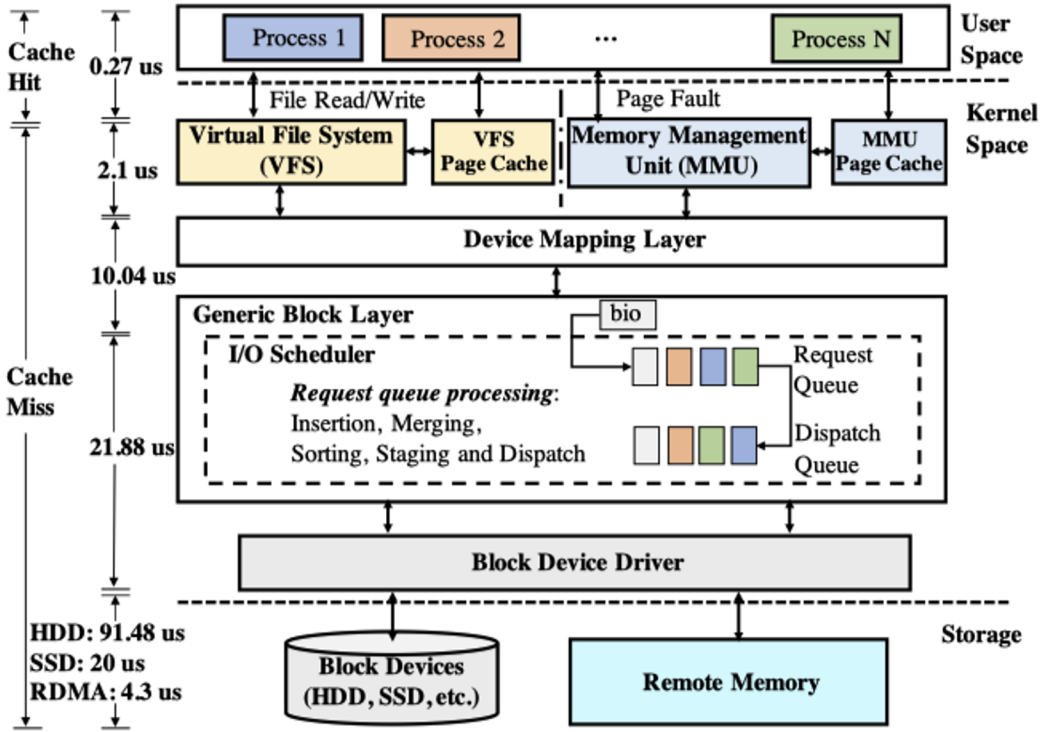
# Effectively Prefetching Remote Memory with Leap

# Latency (HDD vs RDMA)

- Ideally
  - RDMA 4.3us
  - HDD 91.48us
- real implement
  - RDMA 38.3us
  - HDD 125.5us



# Leap patched Linux kernel

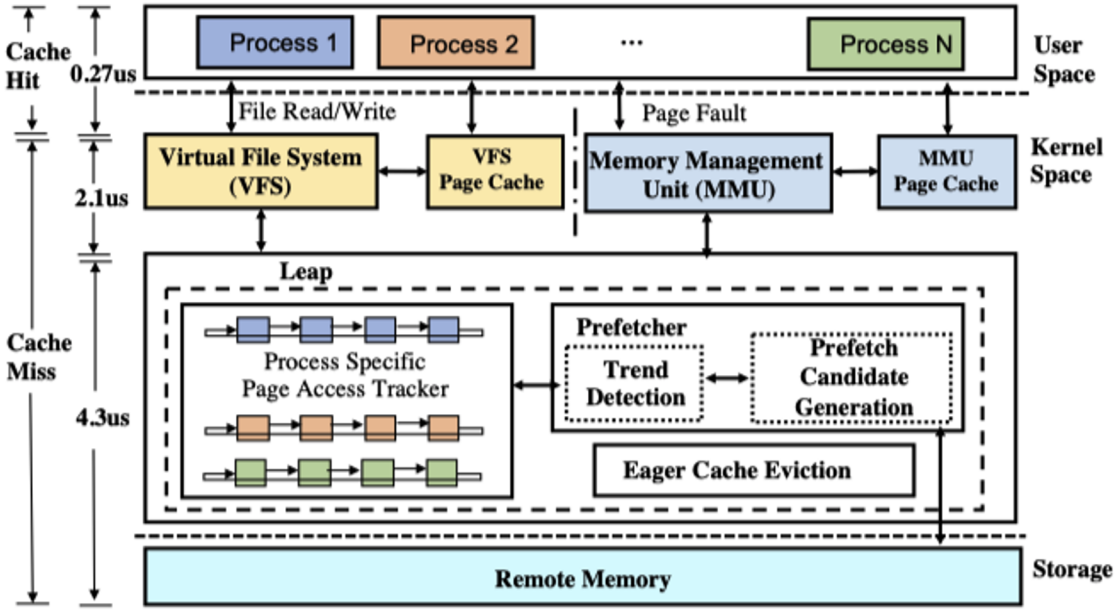
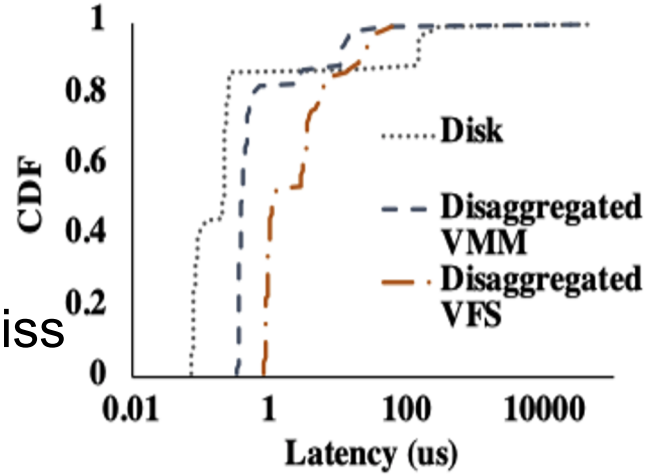


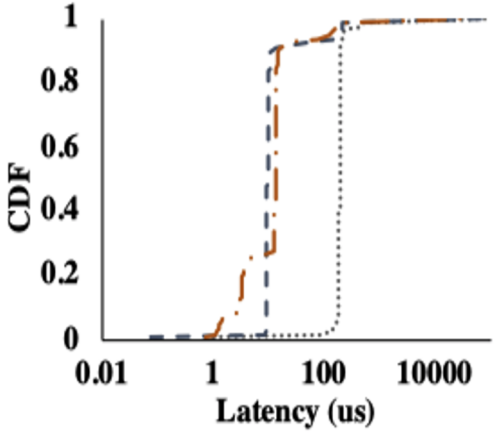

**Figure 6:** Leap has a faster data path for a cache miss.

# Access Pattern matter

- Sequential access
  - 80% cache hit
- Stride-10
  - almost 100% cache miss




(a) Sequential




(b) Stride-10

# Reason that RDMA perform not good enough

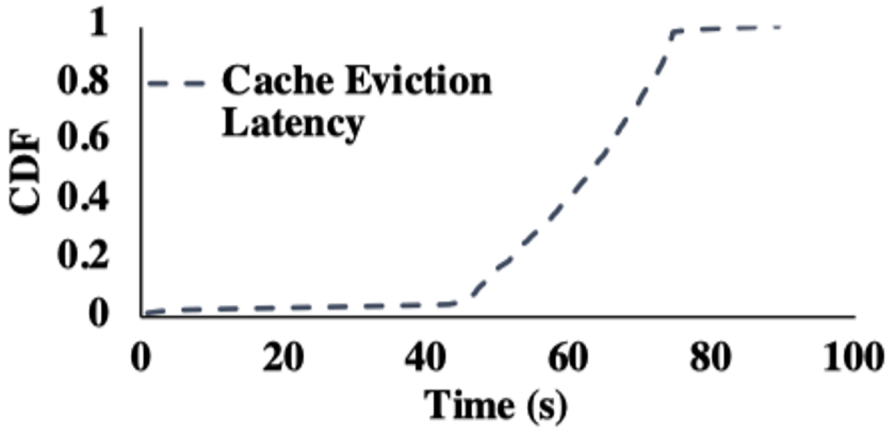
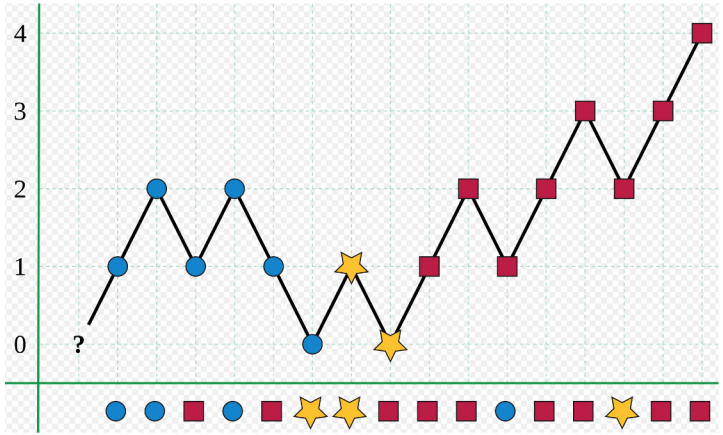
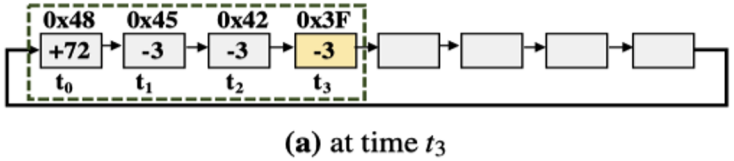



**Figure 4:** Due to Linux's lazy cache eviction policy, page caches waste the cache area for significant amount of time.

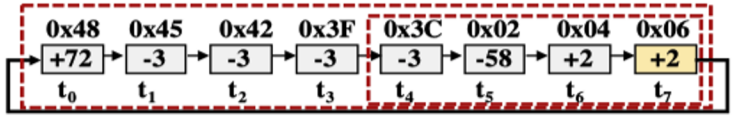
# Majority Trend-Based Prefetching

Boyer-Moore majority vote algorithm

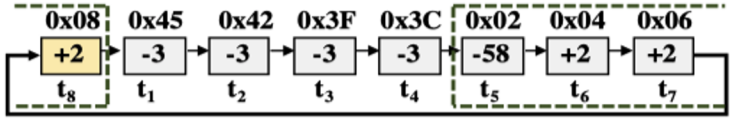


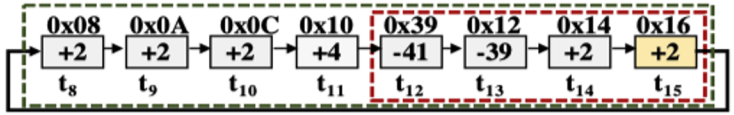

**(a)** at time $t_3$




**(b)** at time $t_7$




**(c)** at time $t_8$




**(d)** at time $t_{15}$