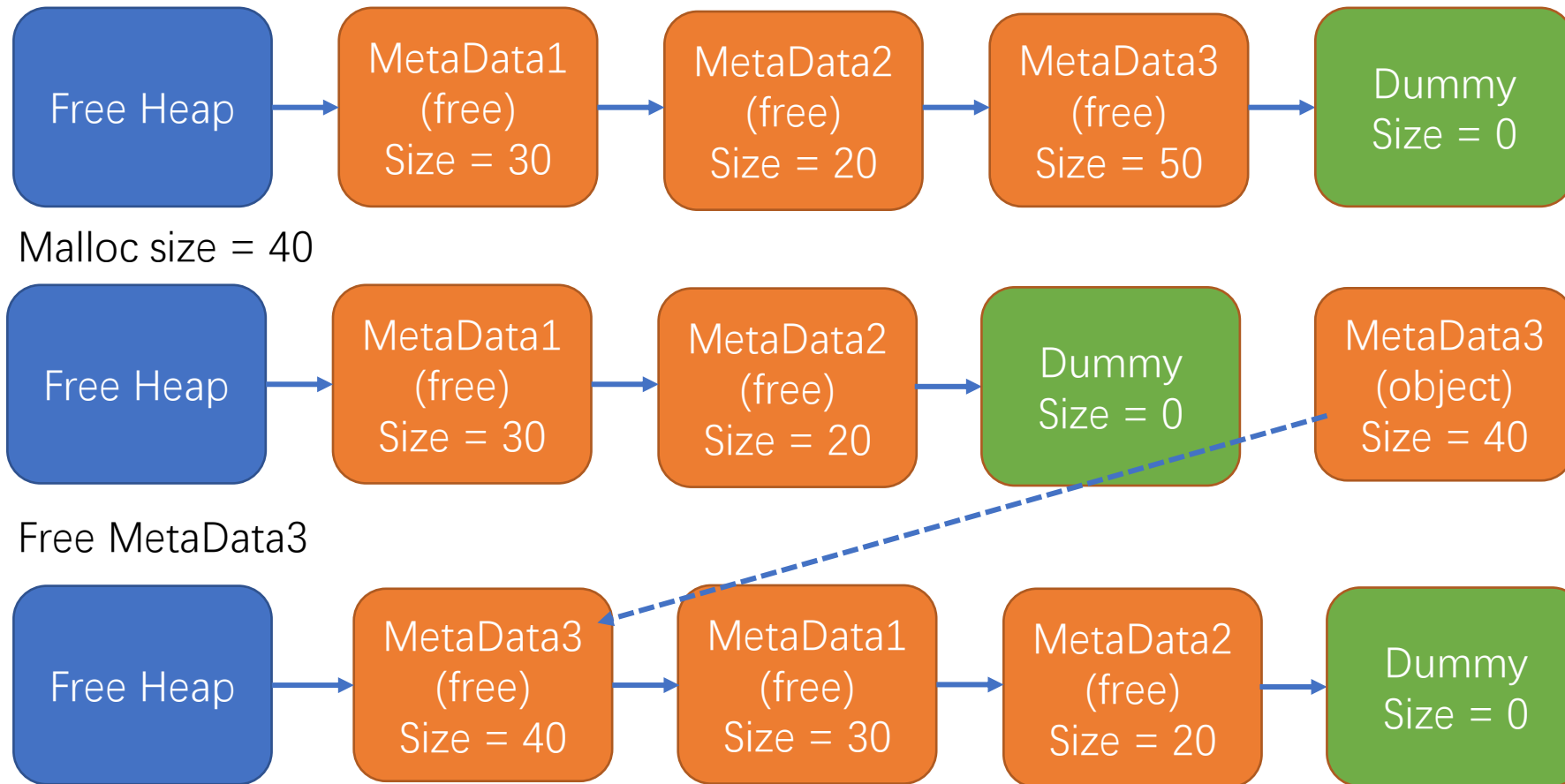


Simple Malloc



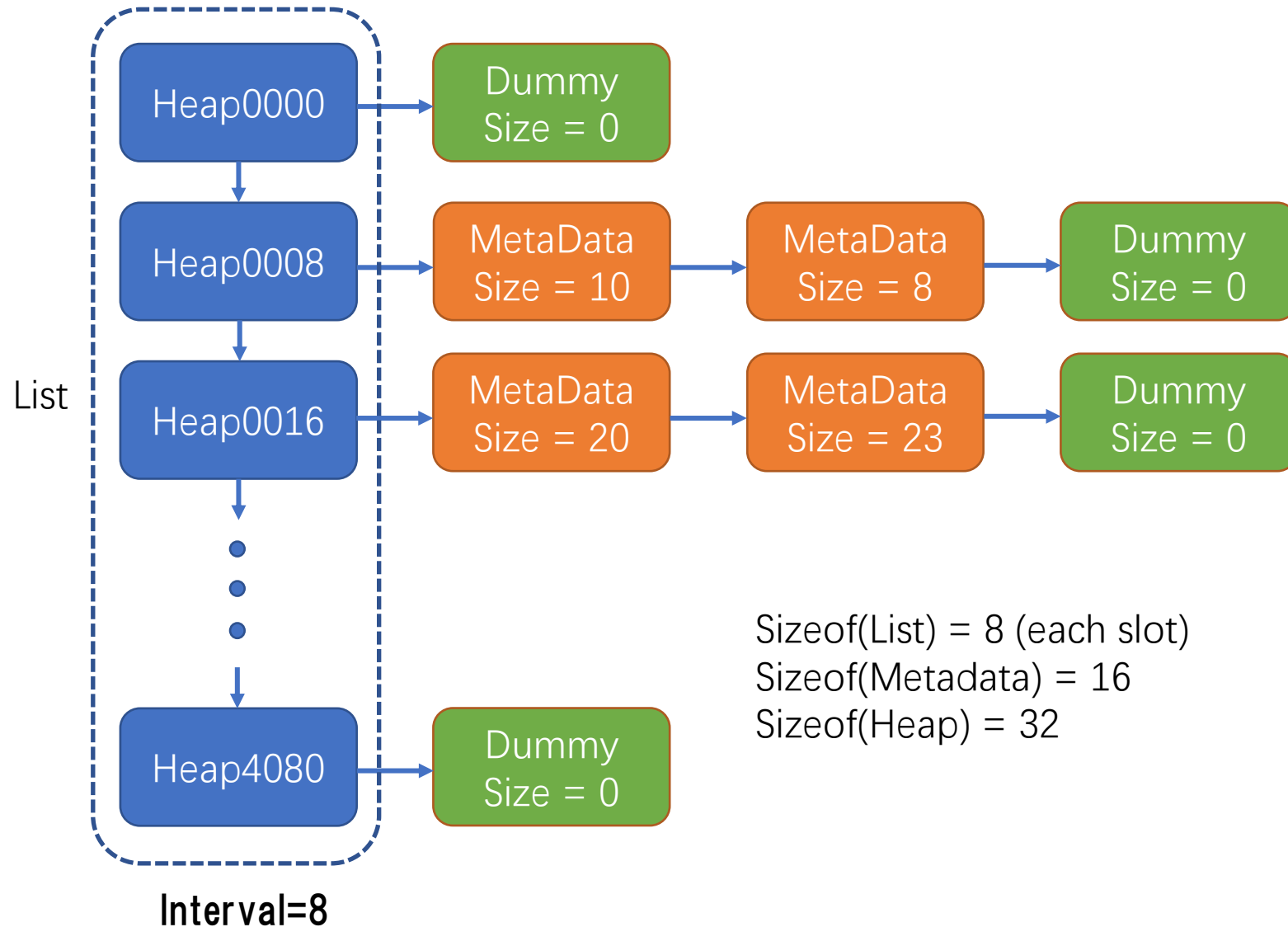
Drawback

(1) Search for a proper Metadata is slow

(2) The first available slot may not be the most proper one.

(3) When we free a data, the Metadata size will be the object size, but not the previous size.

My Malloc (Design)



In My Malloc, heaps are linked and we only put metadata into the heap that: $\text{heap size} \leq \text{size} < \text{next heap size}$.

e.x. Heap0008->Heap0016->Heap0024
Heap0008 can contain size = 8~15
Heap0016 can contain size = 16~23

**

If we allocate new memory, we put the new metadata into Heap0000

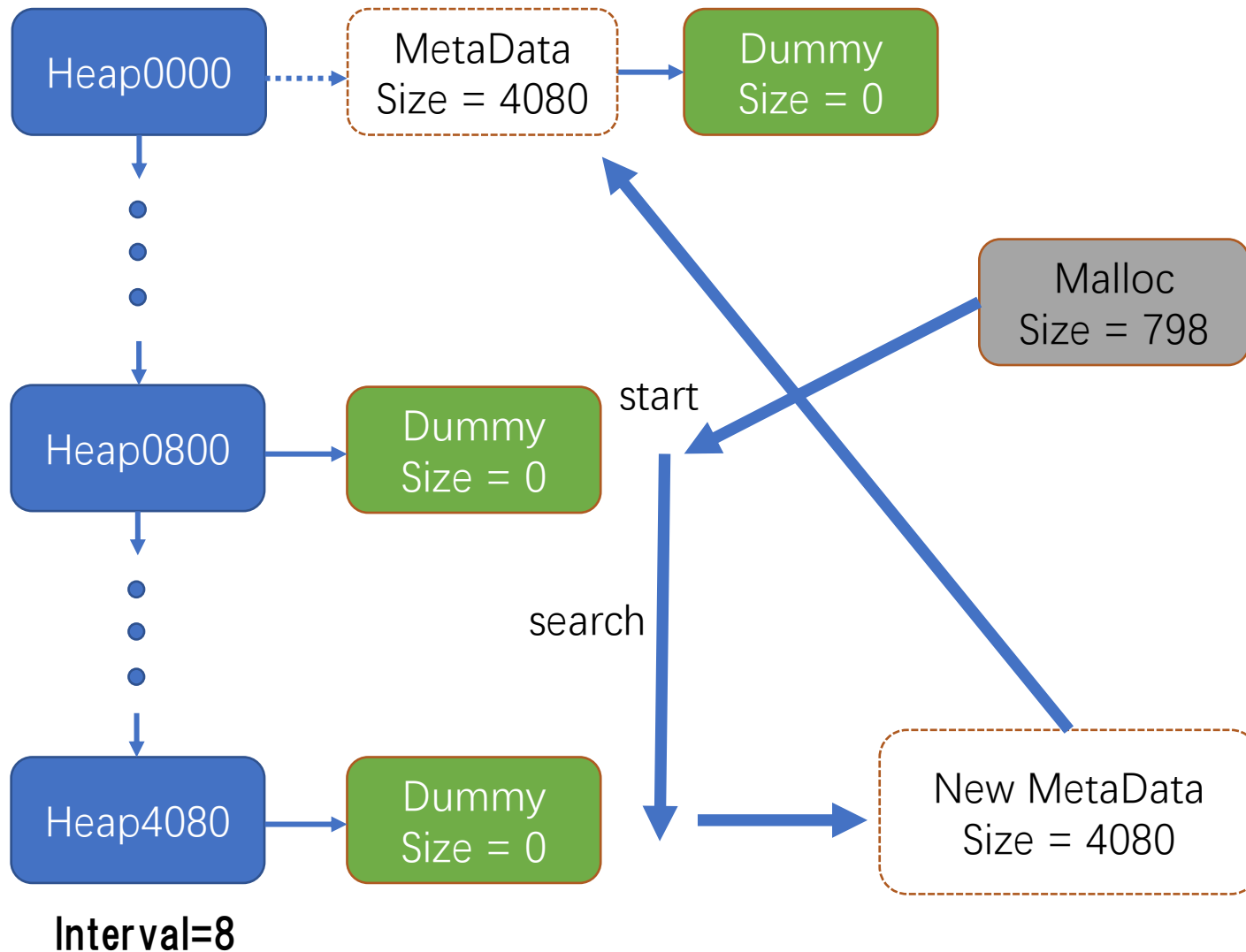
We have n additional heaps so we need first allocate new memory and use $\text{size} = 32 * n$ for heaps.

We can use list to search faster, we also need $\text{size} = 8 * n$ for the list.

$$n = 4096 / \text{interval}$$

$$\text{init_size} = 40 * n = (40 / \text{interval}) * 4096$$

My Malloc (Malloc and allocate new)



When we malloc a space, like size = 798. We first view Heap0000, if it is vacant, then start from Heap0800.

While

heap->next == Dummy (vacant)

We go to the next heap.

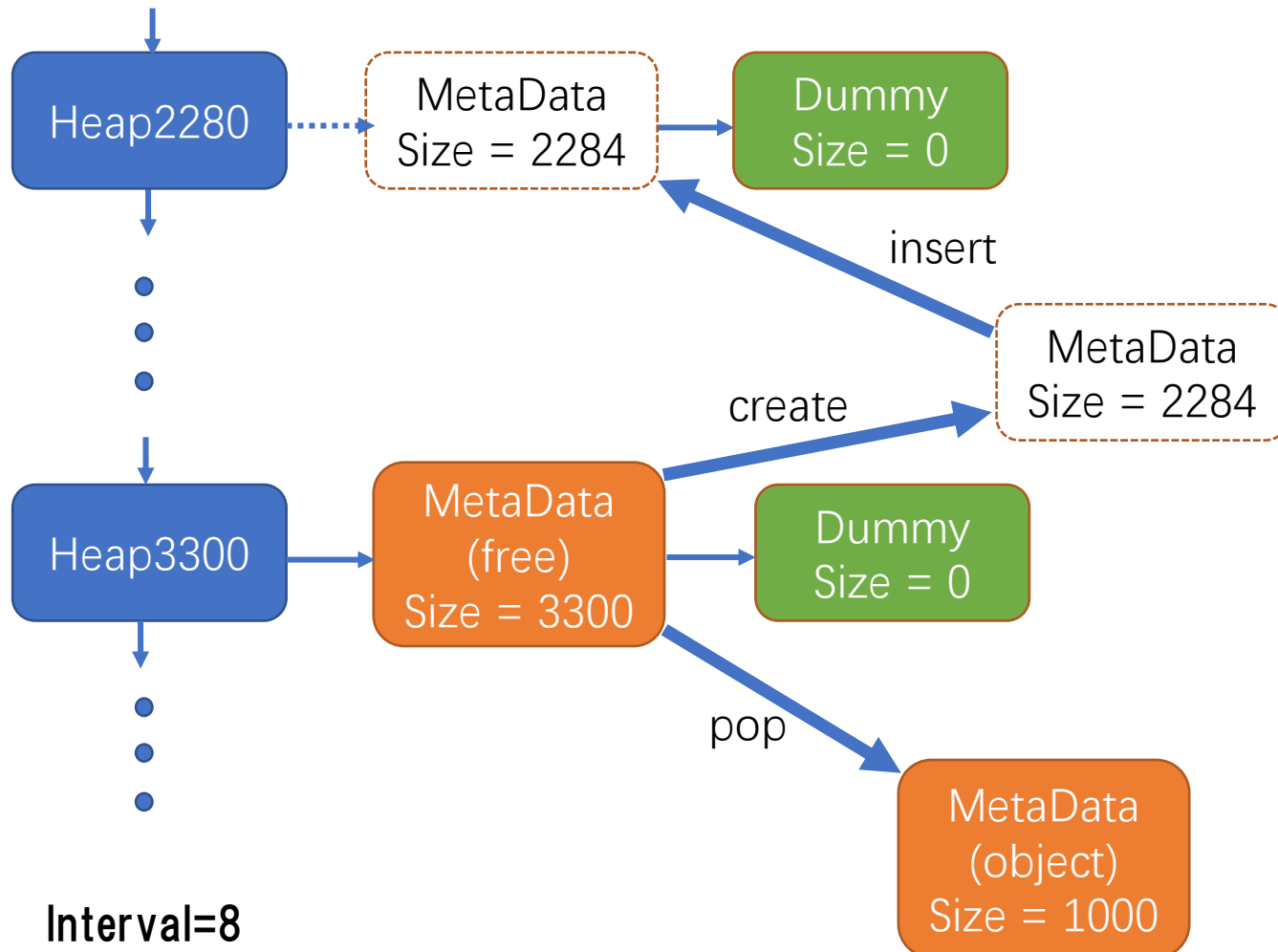
So when we stop, the current heap must have a MetaData whose size \geq object size.

If we viewed the last heap (Heap4080) but still find no proper MetaData.

We allocate for new memory (size = 4096) and create a new MetaData (size = 4080) in Heap0000.

So that when we re-run the malloc function, we can find this MetaData at the first time.

My Malloc (Arrange object)

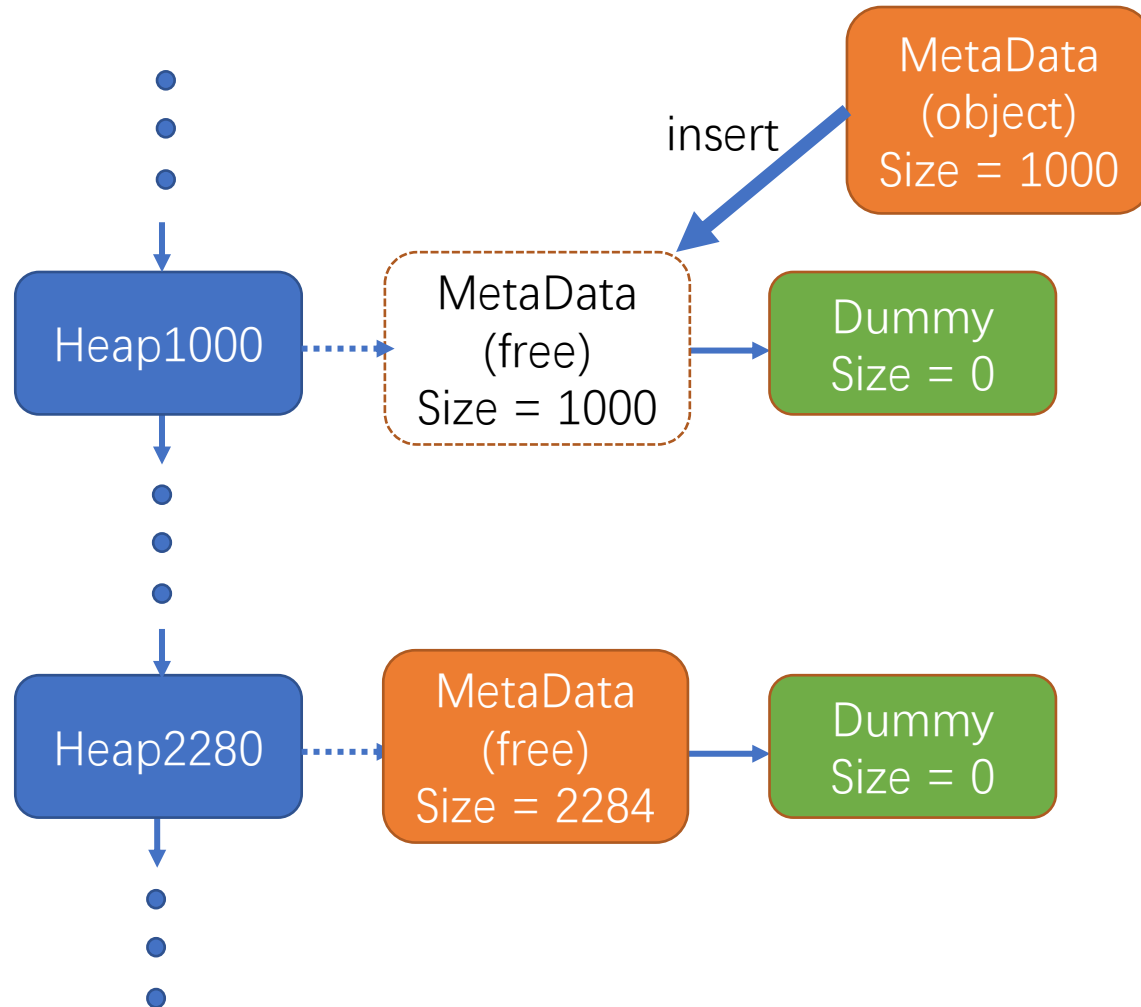


For example, when object size = 1000 and we find the proper MetaDate (size = 3300). Similar to simple malloc, we first use 1000 and the remaining size = 2300, then we use 16 for creating a new MetaData, and the rest become 2284.

Next, we will search a proper heap for 2284, that is Heap2280. So that we can insert the new MetaData.

If the remaining size < 24, which can not contain a metadata(16) + object(>=8).
We do not need to change the size,
because when we free the MetaDate, its
size would not change.

My Malloc (Free object)



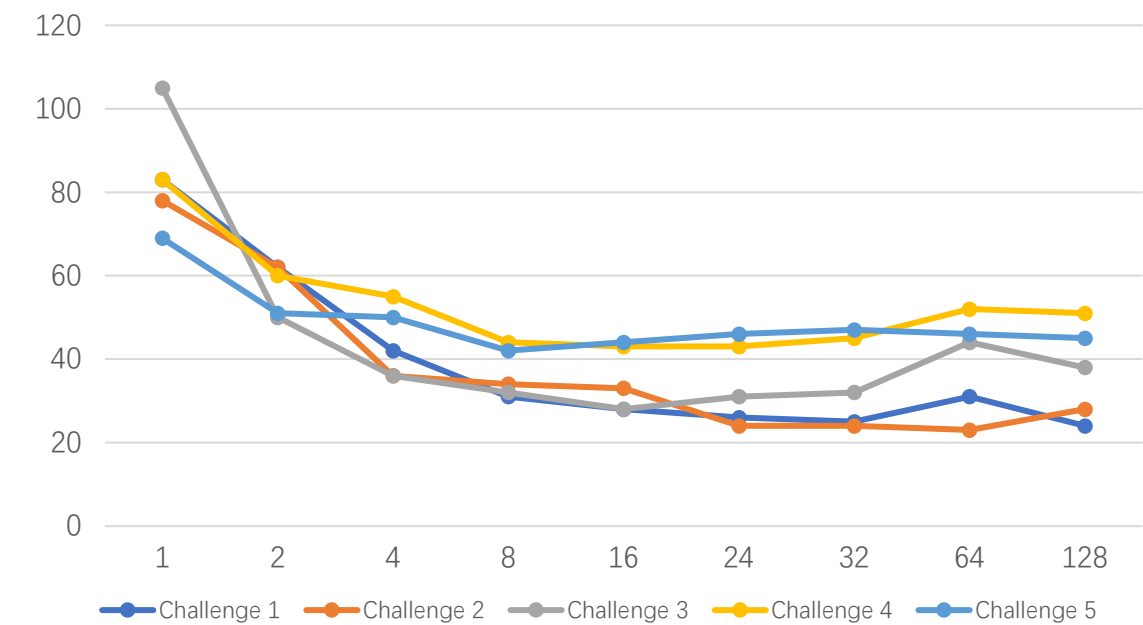
Interval=8

Similar to the last page.

Have no time to use `munmap_to_system` to release the space.

	Interval=1	Interval=2	Interval=4	Interval=8	Interval=16	Interval=24	Interval=32	Interval=64	Interval=128
C1	83ms/70%	62ms/70%	42ms/70%	31ms/70%	28ms/70%	26ms/70%	25ms/70%	31ms/70%	24ms/70%
C2	78ms/39%	62ms/39%	36ms/39%	34ms/39%	33ms/39%	24ms/39%	25ms/39%	23ms/39%	28ms/39%
C3	105ms/51%	50ms/51%	36ms/51%	32ms/51%	28ms/43%	31ms/30%	32ms/12%	44ms/4%	38ms/3%
C4	83ms/72%	60ms/72%	55ms/72%	44ms/72%	43ms/70%	43ms/67%	45ms/61%	52ms/45%	51ms/30%
C5	69ms/72%	51ms/72%	50ms/72%	42ms/72%	44ms/71%	46ms/68%	47ms/62%	46ms/46%	45ms/31%

Time-Interval



Utilization-Time

