cms gc

可以看到cms在新生代使用的是ParNew收集器,而在老年代使用并发清理收集器(cms)

```
java -XX:+PrintGCDetails -XX:+PrintGCDateStamps -Xmx512m -Xms512m  -XX:+UseConcMarkSweepGC week_01_j
正在执行...
2021-03-25T16:10:19.727-0800: [GC (Allocation Failure) 2021-03-25T16:10:19.727-0800: [ParNew: 139626
2021-03-25T16:10:19.800-0800: [GC (Allocation Failure) 2021-03-25T16:10:19.800-0800: [ParNew: 157246
2021-03-25T16:10:19.967-0800: [GC (Allocation Failure) 2021-03-25T16:10:19.967-0800: [ParNew: 157247
2021-03-25T16:10:20.024-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.024-0800: [ParNew: 157245
2021-03-25T16:10:20.088-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.088-0800: [ParNew: 157248
2021-03-25T16:10:20.134-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 189624K(349568K)] 209908K(
2021-03-25T16:10:20.134-0800: [CMS-concurrent-mark-start]
2021-03-25T16:10:20.146-0800: [CMS-concurrent-mark: 0.012/0.012 secs] [Times: user=0.02 sys=0.00, re
2021-03-25T16:10:20.147-0800: [CMS-concurrent-preclean-start]
2021-03-25T16:10:20.148-0800: [CMS-concurrent-preclean: 0.001/0.001 secs] [Times: user=0.00 sys=0.00
2021-03-25T16:10:20.148-0800: [CMS-concurrent-abortable-preclean-start]
2021-03-25T16:10:20.158-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.158-0800: [ParNew: 156730
2021-03-25T16:10:20.235-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.235-0800: [ParNew: 157248
2021-03-25T16:10:20.318-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.318-0800: [ParNew: 157244
2021-03-25T16:10:20.362-0800: [CMS-concurrent-abortable-preclean: 0.007/0.214 secs] [Times: user=0.3
2021-03-25T16:10:20.362-0800: [GC (CMS Final Remark) [YG occupancy: 32199 K (157248 K)]2021-03-25T16
2021-03-25T16:10:20.364-0800: [CMS-concurrent-sweep-start]
2021-03-25T16:10:20.365-0800: [CMS-concurrent-sweep: 0.001/0.001 secs] [Times: user=0.01 sys=0.00, r
2021-03-25T16:10:20.365-0800: [CMS-concurrent-reset-start]
2021-03-25T16:10:20.365-0800: [CMS-concurrent-reset: 0.000/0.000 secs] [Times: user=0.00 sys=0.00, r
2021-03-25T16:10:20.386-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.386-0800: [ParNew: 157148
2021-03-25T16:10:20.455-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 331471K(349568K)] 349203K(
2021-03-25T16:10:20.455-0800: [CMS-concurrent-mark-start]
2021-03-25T16:10:20.468-0800: [CMS-concurrent-mark: 0.013/0.013 secs] [Times: user=0.01 sys=0.00, re
2021-03-25T16:10:20.468-0800: [CMS-concurrent-preclean-start]
2021-03-25T16:10:20.469-0800: [CMS-concurrent-preclean: 0.001/0.001 secs] [Times: user=0.00 sys=0.00
2021-03-25T16:10:20.469-0800: [CMS-concurrent-abortable-preclean-start]
2021-03-25T16:10:20.469-0800: [CMS-concurrent-abortable-preclean: 0.000/0.000 secs] [Times: user=0.0
2021-03-25T16:10:20.469-0800: [GC (CMS Final Remark) [YG occupancy: 24257 K (157248 K)]2021-03-25T16
2021-03-25T16:10:20.471-0800: [CMS-concurrent-sweep-start]
2021-03-25T16:10:20.472-0800: [CMS-concurrent-sweep: 0.001/0.001 secs] [Times: user=0.00 sys=0.00, r
2021-03-25T16:10:20.472-0800: [CMS-concurrent-reset-start]
2021-03-25T16:10:20.472-0800: [CMS-concurrent-reset: 0.000/0.000 secs] [Times: user=0.00 sys=0.00, r
2021-03-25T16:10:20.494-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.494-0800: [ParNew: 157247
2021-03-25T16:10:20.510-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 281685K(349568K)] 301937K(
2021-03-25T16:10:20.510-0800: [CMS-concurrent-mark-start]
2021-03-25T16:10:20.514-0800: [CMS-concurrent-mark: 0.004/0.004 secs] [Times: user=0.01 sys=0.00, re
2021-03-25T16:10:20.514-0800: [CMS-concurrent-preclean-start]
2021-03-25T16:10:20.515-0800: [CMS-concurrent-preclean: 0.001/0.001 secs] [Times: user=0.00 sys=0.00
2021-03-25T16:10:20.515-0800: [CMS-concurrent-abortable-preclean-start]
2021-03-25T16:10:20.536-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.536-0800: [ParNew: 157246
2021-03-25T16:10:20.552-0800: [CMS-concurrent-abortable-preclean: 0.002/0.037 secs] [Times: user=0.0
2021-03-25T16:10:20.552-0800: [GC (CMS Final Remark) [YG occupancy: 28447 K (157248 K)]2021-03-25T16
2021-03-25T16:10:20.553-0800: [CMS-concurrent-sweep-start]
2021-03-25T16:10:20.554-0800: [CMS-concurrent-sweep: 0.001/0.001 secs] [Times: user=0.00 sys=0.00, r
2021-03-25T16:10:20.554-0800: [CMS-concurrent-reset-start]
2021-03-25T16:10:20.554-0800: [CMS-concurrent-reset: 0.000/0.000 secs] [Times: user=0.00 sys=0.00, r
2021-03-25T16:10:20.577-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.577-0800: [ParNew: 157245
2021-03-25T16:10:20.642-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 303975K(349568K)] 304630K(
2021-03-25T16:10:20.642-0800: [CMS-concurrent-mark-start]
执行结束!共生成对象次数:6287
```

```
Heap
 par new generation   total 157248K, used 6216K [0x00000007a0000000, 0x00000007aaaa0000, 0x00000007a
  eden space 139776K,   4% used [0x00000007a0000000, 0x00000007a0612310, 0x00000007a8880000)
  from space 17472K,    0% used [0x00000007a9990000, 0x00000007a9990000, 0x00000007aaaa0000)
  to   space 17472K,    0% used [0x00000007a8880000, 0x00000007a8880000, 0x00000007a9990000)
 concurrent mark-sweep generation total 349568K, used 303975K [0x00000007aaaa0000, 0x00000007c000000
 Metaspace       used 2572K, capacity 4486K, committed 4864K, reserved 1056768K
  class space    used 277K, capacity 386K, committed 512K, reserved 1048576K
```

```
1  2021-03-25T16:10:19.727-0800:
2  [GC (Allocation Failure) 2021-03-25T16:10:19.727-0800:
3  [ParNew: 139626K->17470K(157248K), // cms新生代使用parnew收集器,并行处理
4  0.0409333 secs]
5  139626K->38902K(506816K), 0.0410418 secs]
6  [Times: user=0.02 sys=0.01, real=0.04 secs]
```

```
1  2021-03-25T16:10:20.134-0800: [GC (CMS Initial Mark) //初始化标记 stw
2  [1 CMS-initial-mark: 189624K(349568K)] 209908K(506816K), 0.0003451 secs]
3  [Times: user=0.00 sys=0.00, real=0.00 secs]
4  2021-03-25T16:10:20.134-0800: [CMS-concurrent-mark-start] //开始并发标记
5  2021-03-25T16:10:20.146-0800: [CMS-concurrent-mark: 0.012/0.012 secs] [Times: user=0.02 sys=0.00, re
6  2021-03-25T16:10:20.147-0800: [CMS-concurrent-preclean-start] // 开始并发预清理
7  2021-03-25T16:10:20.148-0800: [CMS-concurrent-preclean: 0.001/0.001 secs] [Times: user=0.00 sys=0.00
8  2021-03-25T16:10:20.148-0800: [CMS-concurrent-abortable-preclean-start]//开始可中断的并发预清理
9  2021-03-25T16:10:20.158-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.158-0800: [ParNew: 156730
10 2021-03-25T16:10:20.235-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.235-0800: [ParNew: 15724
11 2021-03-25T16:10:20.318-0800: [GC (Allocation Failure) 2021-03-25T16:10:20.318-0800: [ParNew: 15724
12
13 // 可中断并发预清理结束,中间产生了多次ParNew GC.就是在并发清理过程中,
14 // 用户线程继续执行产生的对象在新生代放不下了.中断并发预清理.先进行新生代的gc,
15 // 腾出空间让用户线程执行
16
17 2021-03-25T16:10:20.362-0800: [CMS-concurrent-abortable-preclean: 0.007/0.214 secs] [Times: user=0.
18 2021-03-25T16:10:20.362-0800: [GC (CMS Final Remark) // 最终标记
19 [YG occupancy: 32199 K (157248 K)]2021-03-25T16:10:20.362-0800: [Rescan (parallel) , 0.0009799 secs
20 2021-03-25T16:10:20.364-0800: [CMS-concurrent-sweep-start]//开始清理
21 2021-03-25T16:10:20.365-0800: [CMS-concurrent-sweep: 0.001/0.001 secs] [Times: user=0.01 sys=0.00,
22 2021-03-25T16:10:20.365-0800: [CMS-concurrent-reset-start]//重置,将标志位根扫描对象的重置为非根等操作
23 2021-03-25T16:10:20.365-0800: [CMS-concurrent-reset: 0.000/0.000 secs]
24 [Times: user=0.00 sys=0.00, real=0.00 secs]
```