加加内存管理与实践

胡峰 @云下山巅 产品创新 - 通讯交互平台部 2014-03-10 Thread 线程

Method Area 方法区

Thread 隔离

Class Info 类信息

Thread 共享

Runtime Constant Pool

运行时常量池

Heap 堆 Eden S0 S1 Old/Tenured VM Stack 虚拟机栈

Stack Frame 栈帧

局部变量表

操作数栈

动态链接

方法返回地址

Native Method Stack 本地方法栈

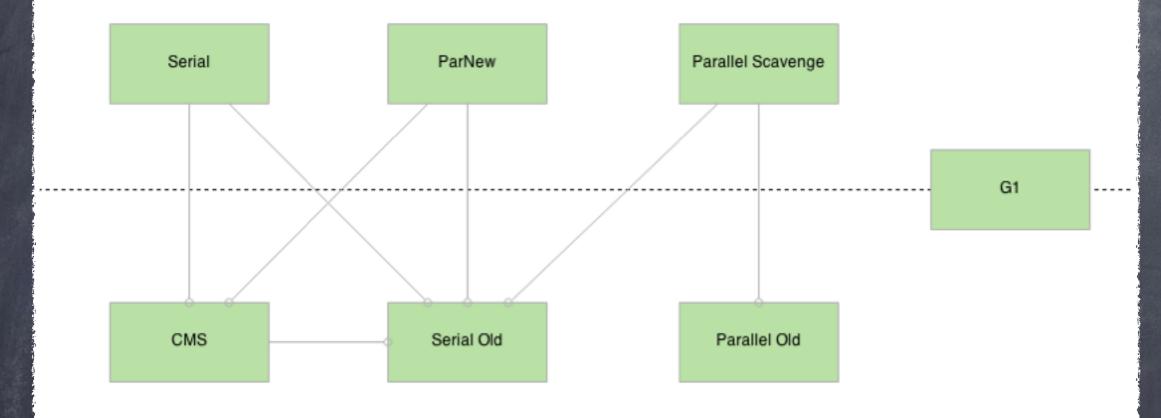
Program Counter Register 程序计数器

内存区域

内存分配

- 栈上分配
- 堆上分配
 - Eden 优先分配
 - Old/Tenured 区大对象分配
 - 对象按年龄晋升





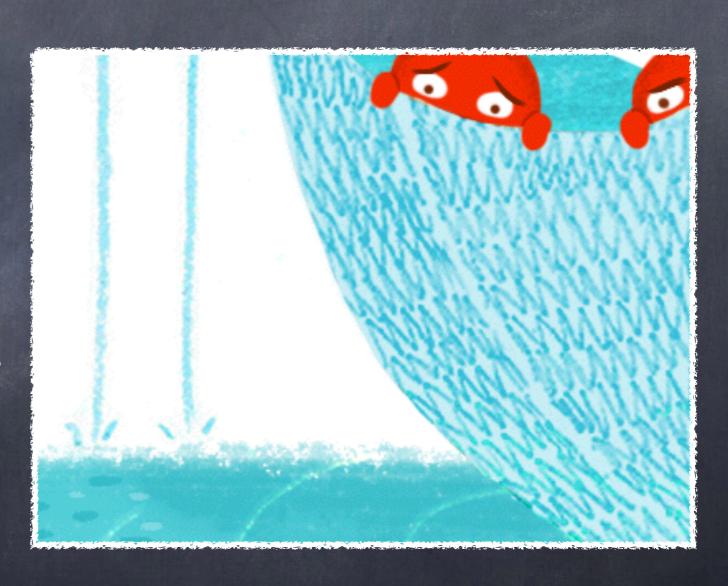
Tenured / Old Generation

内存回收 CC



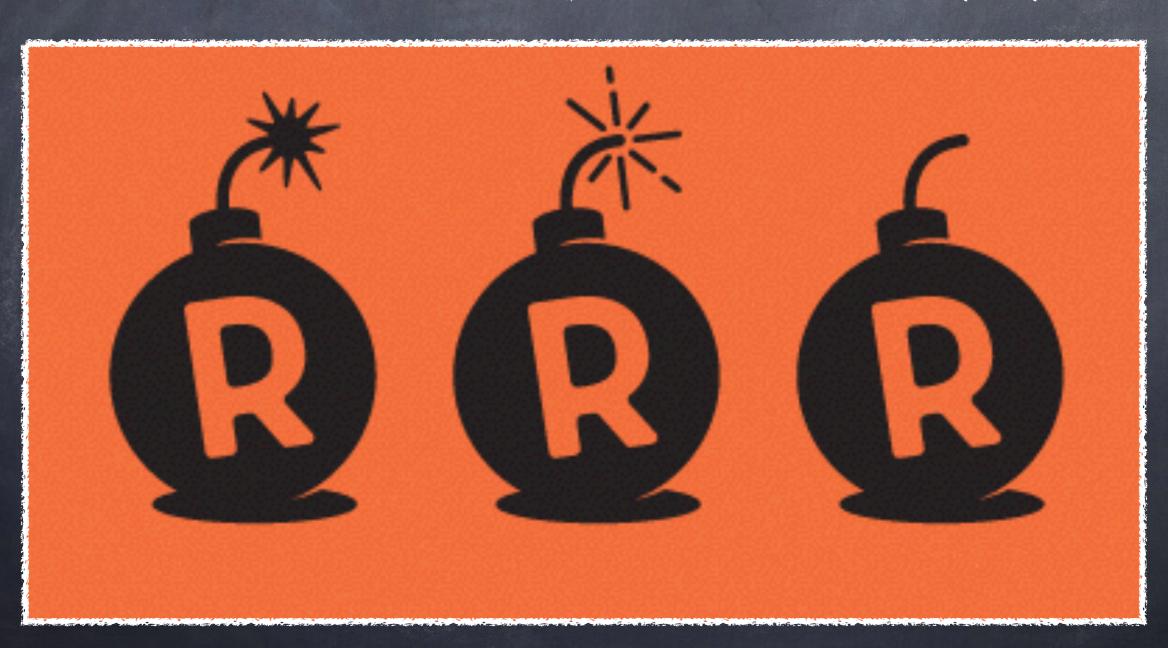
内存溢出

- o memory leak
- o memory overflow



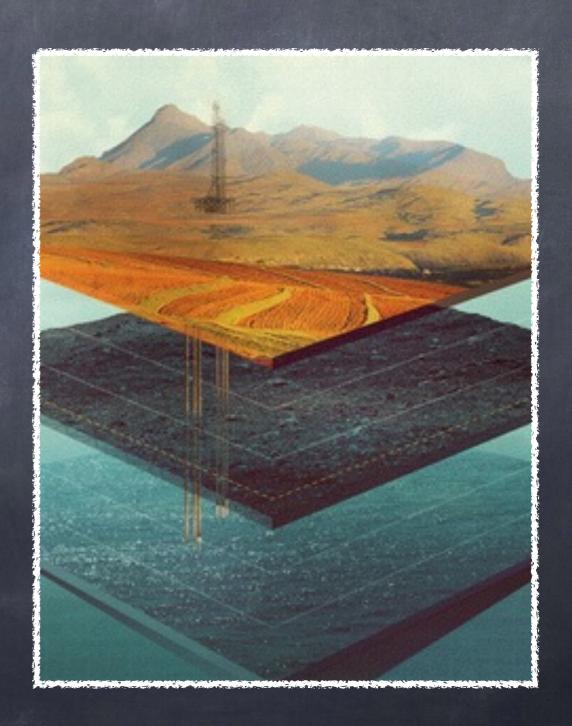
堆溢出

java.lang.OutOfMemoryError: Java heap space



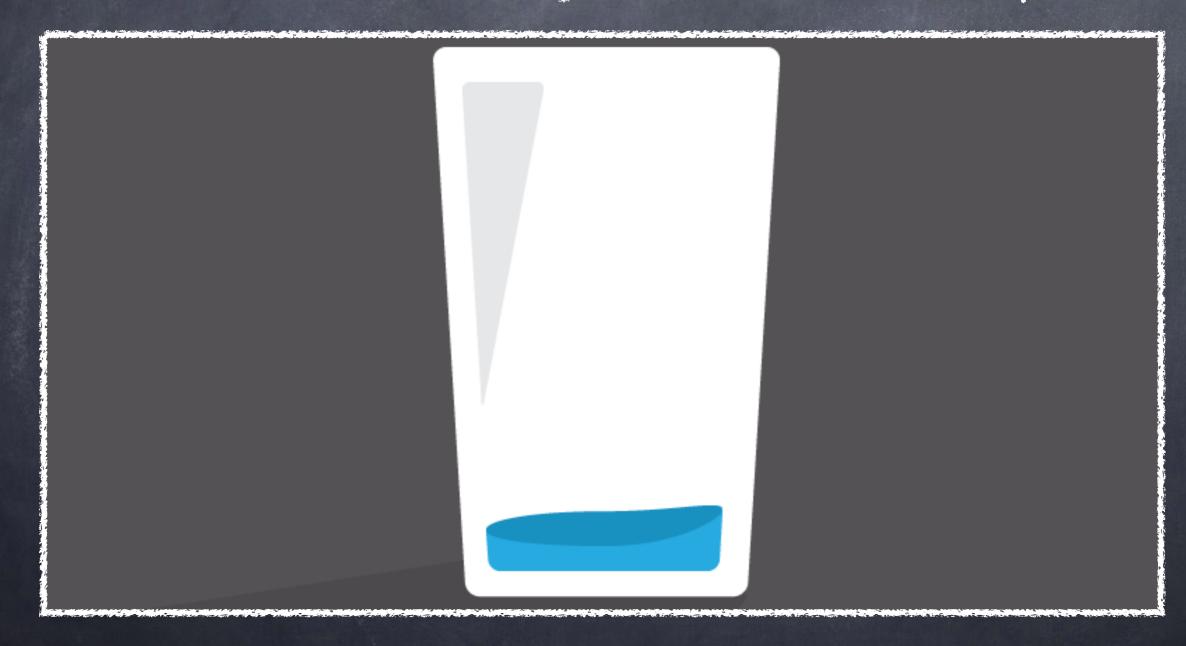
栈溢出

- ø java.lang.StackOverf LowError
- o java.lang.OutOfMem oryError: unable to create new native thread



方法区溢出

java.lang.OutOfMemoryError: PermGen space



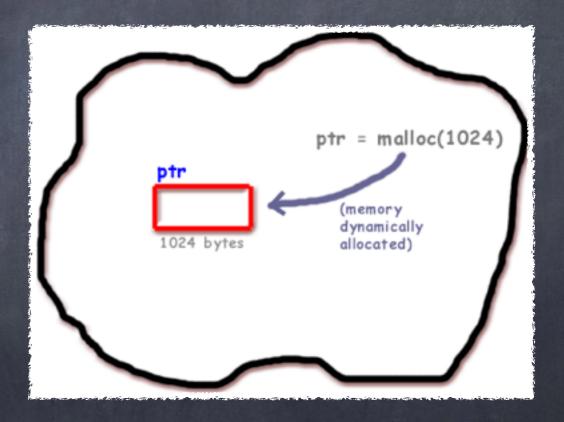
时间溢出

- oryError: GC overhead limit exceeded - JDK1.6
- more than 98% time spent on gc and less than 2% heap recycle



05 内存溢出

- o java.lang.OutOfMem oryError: requested {} bytes for {} Out of swap space?
- o OS refuse JVM's request to allocate more memory



少地址空间溢出

- ø java.lang.OutOfMemoryError:Map failed
- o cat /proc/sys/vm/max_map_count

内存工具

ø jstat

o jstat -gcutil pid

o jmap

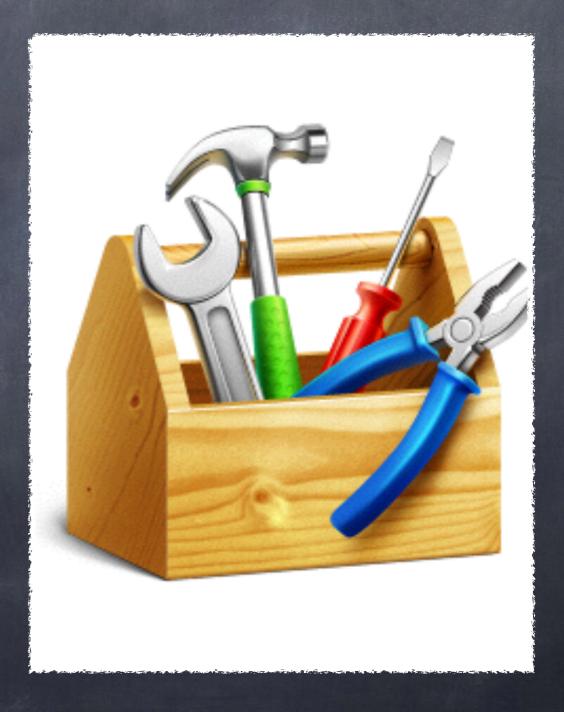
jmap -F -dump:format=b,file=java.dump pid

ø jhat

jhat -J-mx8192m -p 7000 java.dump

ø jstack

o jstack-F pid



Heap Histogram

All Classes (excluding platform)

Class	Instance Count	Total Size
class IB	107823	1933000662
class IC	171552	15375596
class fLjava.util.HashMapSEntry;	33032	7326280
class (Liava lang Object;	27477	5005088
class org. Boss netty channel DefaultChannelFuture	85166	3917636
class lava lang String	186211	3724220
Sass java stil HashMapSEntry	103567	2899876
class org. Joss notty channel DownstreamMessageEvent	83401	2668832
lass invalang reflect Method	17964	2317356
lass org. boss netty util internal LinkedTransferQueue5Node	85266	2131650
lass IL java.util.concurrent.ConcurrentHashMap\$HashEntry;	49832	2069760
Sans II	11980	2024328
lass org. boss noty buffer BigEndianHeapChannelBuffer	83359	2000616
lass java stil concurrent ConcurrentHashMap5HashEntry	64147	1796116
lass java lang Class	11305	1627920
lass lava util concurrent ConcurrentHashMap\$Segment	49844	1595008
lass java util concurrent locks RecentrantLock\$Nonfair\$ync	52276	1463728
lass java util LinkodHashMapSEntry	31652	1392688
lass Feotheris	16373	1282552
lass java stil HashMap	20313	975024
lass com id chat domain walter PopWalterGroup	39185	910110
lass org. boss notty buffer TruncatedChannelBuffer	31955	894740
The state of the s		distant.

```
cdyjy-hufeng-m:tmp mindwinds jmap -F -dump:format=b,file=java.dump 1098
Attaching to process ID 1098, please wait...
Debugger attached successfully.
Server compiler detected.
JVM version is 20.65-b04-462
Dumping heap to java.dump ...
Warning: skipping invalid TLAB for thread t@-1
Finding object size using Printezis bits and skipping over...
dean dumn file created
```

```
coyjy-nufeng-m:tmp minowinds jnat -J-mx4096m -p 7000 chat-core.dump
Reading from chat-core.dump...
Jump file created Fri Feb 21 11:58:45 CST 2014
Snapshot read, resolving...
Resolving 1881828 objects...
WARNING: Failed to resolve object id 0x7f794ec50 for field first (signature L)
WARNING: Failed to resolve object id 0x7f79735f0 for field unfinalized (signature L)
WARNING: Failed to resolve object id 0x7f79ef930 for field pending (signature L)
WARNING: Failed to resolve object id 0x7f789b228 for field head (signature L)
*ARNING: Failed to resolve object id 0x7f79eb388 for field _next (signature L)
WARNING: Failed to resolve object id 0x7f7992fb0 for field value (signature L)
WARNING: Failed to resolve object id 0x7f77b4ad8 for field value (signature L)
MARNING: Failed to resolve object id 0x7f7748f88 for field value (signature L)
ARNING: Failed to resolve object id 0x7f78eac78 for field head (signature L)
ARNING: Failed to resolve object id 0x7f790d790 for field value (signature L)
ARNING: Failed to resolve object id 0x7f789ffd8 for field head (signature L)
ARNING: Failed to resolve object id 0x7f79307c8 for field value (signature L)
hasing references, expect 376 dots.....
liminating duplicate references.....
inanshot resolved.
Started HTTP server on port 7000
```

Server is ready.

"stay hungry stay foolish."

-Steve Jobs