Building Your Memory Analysis Toolkit

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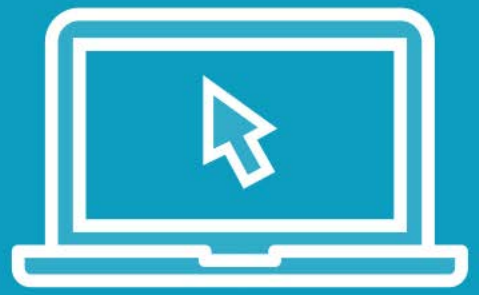
Inspecting the VM

Heap Dumps

Memory Profiling

How to Inspect the JVM

Demo



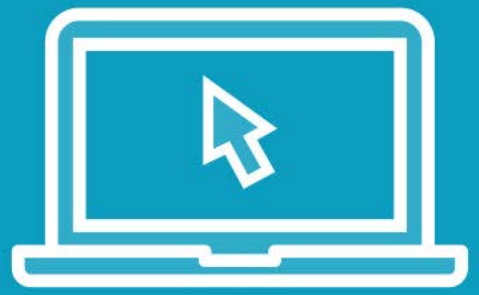
jps

Ships with the JVM

Can list running JVMs

Commandline Tool

Demo



JvisualVM

Ships with the JVM

Very versatile tool

GUI

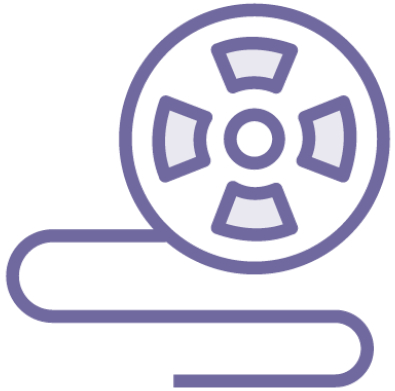
Object Histogram

A listing of how much memory is used by different types of objects

Object Histograms

Snapshot
What is in the heap currently

Quick
Very fast to collect



Low Detail
Doesn't list cause or objectrelationships

```
jmap -histo:[live,] <pid>
```

Seeing an Object Histogram

Heap Dumps

Heap Dump

A copy of all live objects in the application's heap

What is a Heap Dump?

Snapshot
What is in the heap currently

Slow &Large
Requiresspaceto store and time to take thedump

HighDetail
Object relationships andperobject memory

```
jmap -dump:[live,] file=/path/to/dump <pid>
```

Recording a Heap Dump

Also possible using JVisualVM

```
-XX:+HeapDumpOnOutOfMemoryError

-XX:HeapDumpPath=/path/to/dump
```

Heap Dump on Out of Memory

Performs a heap dump when you run out of memory (or spends too long performing GC)

Can be useful, but care is needed

Eclipse Mat

Free Heap Dump Analyzer

http://eclipse.org/mat

Other Tools Usable

JVisualVM, jhat

Memory Profiling

Memory Profiling

Event Driven

See patterns of activity

Records memory allocations and related information

Memory Profilers

JVisualVM

Free, Open Source Tool

Ships with JDK

Includes a Memory Profiler

Can disable escape analysis

Java Mission Control

Free for use in Development

Ships with Java 8+

Includes a Memory Profiler

More accurate

Summary

Learned about memory tooling

- Memory Profiling with JVisual VM and Mission Control
- Heap Dumps with MAT
- jmap
- jps

Time to solve some problems!