Hands-On-Labs for the WebSphere Mainframe Administrator and System Programmer: OOM Diagnosis

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Lots-O-Labs: OOM Diagnosis

- OutOfMemory Errors
  - Default data collected:
    - Javacore: a dump of the Java Virtual Machine (JVM)
    - Snap.trc: a dump of the JVM raw internal trace data
    - Heapdump (.phd by default) : a dump of the java heap contents
- Snap.trc formatting
  - java com.ibm.jvm.format.TraceFormat <Snap.trc file>
  - Output is written to files named Snap.....trc.**fmt**
- HeapDump Analysis
  - Many tools exist for analysing heapdump contents
    - See IBM's ISA (IBM Support Assistant) for options

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- Other Important data to capture for OutOfMemory Errors
  - Garbage Collection Tracing
    - Enabled via **-verbose:gc**
    - Trace is documented in the zOS Java Diagnostic Guides
    - Tooling is available for gc trace analysis
  - Transaction Dumps (TDUMPs)
    - Similar to a console dump of the address space
    - Tdump creation for OOMs can be triggered via:

      -Xdump:system:events=systhrow,
              filter=java/lang/OutOfMemoryError

OOM Diagnosis Lab Exercises

Sample 1 - 'Simple' OutOfMemory Error

Review data collected

javacore - open the file with Notepad or WordPad

Snap.trc (formatted into .fmt files) use Notepad or WordPad

verbosegc - file may also be browsed , but let's use PMAT

heapdump (.phd by default)

all files for this Lab begin with 'Simple'

Sample 2 – 'Start' an OutOfMemory of a different flavor

Let's find some differences by reviewing the javacore, formatted Snap trace, verbosegc

all files for this Lab begin with 'Start'

OOM Diagnosis Resources

PMAT source (standalone copy)
www.alphaworks.ibm.com/tech/pmat
   Check out the other tooling resources on this page, too!

IBM Support Assistant
www-01.ibm.com/software/support/isa/

z/OS Java resources
www-03.ibm.com/systems/z/os/zos/tools/java/

z/OS Java Diagnostics Guides
www.ibm.com/developerworks/java/jdk/diagnosis60.html