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**WebSphere** software

# Installation Walkthrough Jinsight for Java and WebSphere Applications on z/OS



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## Objectives

- Overview
- Jinsight for Java Installation & Verification
- WebSphere z/OS 3.5 SE Configuration
- WebSphere z/OS Version 4 Configuration
- Jinsight Screenshots



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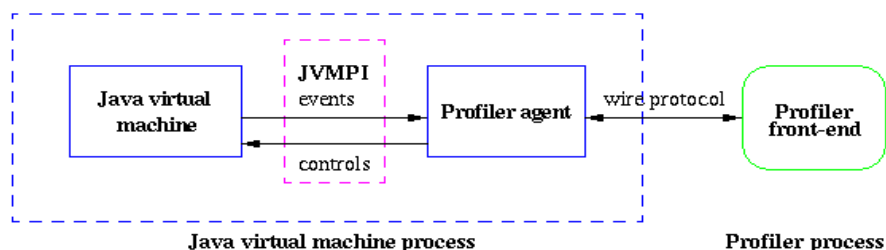
## Jinsight

- Profiler for native Java and WebSphere Programs
- Uses standard Java APIs
- Graphical TraceViewer, files have to be transferred to a Workstation
- Install & test native Java environment first, then enable WebSphere environment
- Use within a test server
- If you want to use on WAS 3.02 send me an @mail



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## Java Monitors & Profilers



- Jinsight is working well for 3.02 & 3.5, 4.0  
Some tradeoffs:
  - no JIT, big tracefiles, no realtime analysis
  - ...something is on the horizon
- Wileys Introscope is running under 3.5 & 4.0, ask for installation tips, Autoprobe is coming
- Sitraka's Jprobe is currently in beta



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## Jinsight Scorecard

profiles	Java execution
what is it	Java profiling agent, memory leak analyzer
how to use	GUI visualizer of collected trace data
it investigates...	Java performance, memory leaks, program understanding
installation	fairly easy, documented in detail
obtain from, price	IBM alphaWorks, free
usability	presents interrelated views, fully documented
usefulness	very good



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## Jinsight base installation

- Get Jinsight code from [www.alphaworks.ibm.com](http://www.alphaworks.ibm.com)
- Get the newest SDK
  - ▶ It worked for us with "J2RE 1.3.0 IBM build hm130-20010424"
- Unzip it in an PC directory
- ftp the tar file in a HFS `jinsight2.1-os390-java2-20010619.tar`
  - ▶ `/jinsight2.1`
    - `libjinsightPA.so` Jinsight 2.1 profiling agent
    - `libjinsightPA.x` Jinsight 2.1 profiling agent
    - `jintrace.jar` Jinsight 2.1 trace control servlet, WebSphere 3.5
    - `jinsight_trace` sample shell script for tracing
    - `apiSample21.java` & .class, sample Java program to verify tracing using API
- Change directory to `./jinsight2.1/` and unpack: `tar -xf j*.tar`
- Set permissions straight
  - `chown izelotte:sys1 /web/fish/Jinsight/jinsight2.1/*`
- Set program control
  - ▶ `extattr +p /web/fish/Jinsight/jinsight2.1/libjinsightPA.so`



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## Tracing Java programs

- ▶ Jinsight\_trace is a shell script that has to be tailored
- ▶ You find it in the Jinsight installation directory in the HFS

```
▪ EDIT      jinsight_trace
▪ ***** ***** Top of Data *****
▪ 000001 #!/bin/ksh
▪ 000002 print "Making a Jinsight trace (Jinsight 2.1) of a Java program"
▪ 000003 print "using Jinsight 2.1 profiling agent with Java 1.3 ..."
▪ 000004 print "  Usage example:  jinsight_trace  apiSamp21"
▪ 000005 #
▪ 000006 print "Edit these env vars if changes are needed:"
▪ 000007 # do not set JINSIGHT_TRACE_METHODS for long programs
▪ 000008 export      JINSIGHT_HOME=/web/fish/Jinsight/jinsight2.1
▪ 000009 export      JAVA_HOME=/usr/lpp/java213/IBM/J1.3/
▪ 000010 export      CLASSPATH=.:${JINSIGHT_HOME}/jintrace.jar:${CLASSPATH}
▪ 000011 export      LIBPATH=${JINSIGHT_HOME}:${LIBPATH}
▪ 000012 export      LD_LIBRARY_PATH=${JINSIGHT_HOME}:${LD_LIBRARY_PATH}
▪ 000013 export      THREADS_TYPE=native_threads
▪ 000014 export      JAVA_IEEE754=EMULATION
▪ 000015 #
```



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## Tracing a Java Program

- Change into the jinsight directory and run sample
  - ▶ `jinsight_trace apiSample21`

```
Making a Jinsight trace (Jinsight 2.1) of a Java program
using Jinsight 2.1 profiling agent with Java 1.3 ...
  Usage example:  jinsight_trace  apiSamp21
Edit these env vars if changes are needed:
JINSIGHT_TRACE_METHODS=
Note: do not set JINSIGHT_TRACE_METHODS for long programs
JINSIGHT_HOME=/web/fish/Jinsight/jinsight2.1
JAVA_HOME=/usr/lpp/java213/IBM/J1.3/
CLASSPATH=.:/web/fish/Jinsight/jinsight2.1/jintrace.jar:
LIBPATH=/web/fish/Jinsight/jinsight2.1/lib:/usr/lib:.
LD_LIBRARY_PATH=/web/fish/Jinsight/jinsight2.1:
THREADS_TYPE=native_threads
JAVA_IEEE754=EMULATION
java version "1.3.0"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.3.0)
Classic VM (build 1.3.0, J2RE 1.3.0 IBM build hm130-20010207 (JIT disabled))
...
...
apiSample21: Making call to load library jinsightPA
             from the jinsight2.1 home directory
apiSample21: Making call to stop tracing methods.
apiSample21: return code 0 from stopTracingMethods().
apiSample21: Making call to start tracing methods.
/web/fish/Jinsight/jinsight2.1/JAVADUMP.20010706.165808.16777296.txt file being
created...
```

- ▶ ftp the now generated trace.trc binary back to the PC



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## Setting up the trace viewer

- PC: copy into the jinsight directory and edit jinsight.bat
- to reuse IBMs Java environment (comes with WAS)  
edit following

```
@echo off
echo Visualizing Jinsight 2.1 trace data ...
echo Usage example: jinsight trace.trc
rem
echo Edit these env vars if changes are needed:
set JAVA2_HOME=c:\IBMdebug
set JINSIGHT_HOME=d:\jinsight\os390\jinsight2.1
set JINSIGHT_HEAP=230M
rem
rem Env vars being used are:
echo JAVA2_HOME=%JAVA2_HOME%
echo JINSIGHT_HOME=%JINSIGHT_HOME%
echo JINSIGHT_HEAP=%JINSIGHT_HEAP%
%JAVA2_HOME%\jre\bin\java -version
%JAVA2_HOME%\jre\bin\java -Xmx%JINSIGHT_HEAP% -classpath %JINSIGHT_HOME%\jinsight.jar:.-DJINSIGHT_MAXHEAP=%JINSIGHT_HEAP% jinsight.main.Jinsight %1
```

- run jinsight.bat



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## Running the trace viewer

- The jinsight workspace should pop up
- Pull down file, and pick the tracefile you ftped open. Then push the load button
- Now pull down view/histogram/objects
- If you see:



- You can proceed...

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## Jinsight installation WAS 3.5 - (1)

- Install PTF UQ51564: introduces support for two new properties in was.conf:
  - ▶ `appserver.java.system.property`
    - Specifies additional properties that can be passed directly to the Java virtual machine when the JVM initializes. The Application Server makes no attempt to validate or interpret the properties or values. Multiple instances of the `appserver.java.system.property` can be specified in the configuration file.
  - ▶ `appserver.java.extraparm`
    - Specifies additional JVM-specific parameters that can be passed to the JVM on initialization. These parameters are not validated or interpreted by the Application Server, but are passed directly to the JVM. Note that incorrect values for this property may cause the initialization of the JVM to fail, which will cause the Application Server initialization to fail. Multiple instances of the `appserver.java.extraparm` property can be specified. Only one JVM parameter per property instance can be specified. It is recommended that this property only be used under guidance from IBM support.



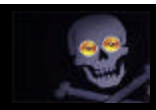
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## WAS 3.5 Configuration

- WebSphere Setup (the best, copy to xxx.xxx.notrace):
  - ▶ Edit `httpd.envvars` and add
    - `JINSIGHT_TRACEFILE_NAME=/web/fish/logs/jinsight.trc`
  - ▶ Turn JIT off in `global.properties`
    - `appserver.product.java.jvmconfig.jit=off`

**Warning !**

If you forget to turn it on again you have to attend this class a second time.



- Configure WAS to run the Jinsight profiling agent and trace control servlet:
  - ▶ Edit `was.conf` and add `jinsight home`:
    - `appserver.java.extraparm=-XrunjinsightPA`
    - `appserver.libpath=....:/web/fish/Jinsight/jinsight2.1...`
    - `appserver.classpath=....:/web/fish/Jinsight/jinsight2.1/jintrace.jar`



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## WAS 3.5 Configuration

- Installing the Jinsight control application, edit

- ▶ was.conf:

```
deployedwebapp.trace.host=default_host
deployedwebapp.trace.rooturi=/servlet/jintrace
deployedwebapp.trace.classpath=/web/fish/Jinsight/jinsigh2.1/
deployedwebapp.trace.documentroot=/web/fish/Jinsight/jinsight2.1/
webapp.trace.servlet.jintrace.code=com.ibm.jinsight.tracing.TraceControlServlet
webapp.trace.servlet.jintrace.servletmapping=/
```

- Now restart the webserver, the log should show

*Jinsight2.1 beta4*

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...

- You can now use the Jinsight control application to control its tracing parameters (methods, garbage collection, quit...)

- ▶ <http://9.12.2.23:9876/trace/jintrace?command=>



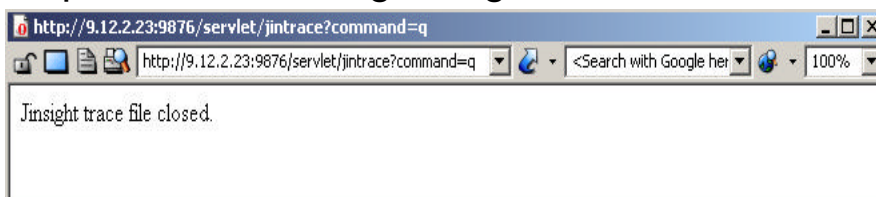
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## WAS 3.5 Configuration

- To control jinsight using the GUI you have to load (locally) jintrace.htm into your browser



- Put in hostname:port and you can start / stop / control tracing using a browser



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## WAS 3.5 Configuration

- Now everything is in place to generate an trace for your application developer
  - ▶ Stop the server
  - ▶ Delete the trace file (defined in httpd.envvars)
  - ▶ Start the server
  - ▶ Activate jinsight using the GUI
  - ▶ Run the application
  - ▶ Deactivate jinsight using the GUI
  - ▶ Stop the server, redo configuration, start server
  - ▶ Ftp jinsight.trc to your PC
  - ▶ Check the trace file
  - ▶ If its ok, give it to your application programmer
  - ▶ This one will need a very strong machine to interpret the data...



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## Setting up Jinsight for WAS 4.01

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## Jinsight on WebSphere Version 4

Basics steps:

Update J2EE Server environment variables

Modify the HTML control form with relatives URLs

Create a .war file

Create a .ear file from the war file

Install the ear file into the J2EE Server



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## Configure J2EE Server

Modify/Add Environment Variables:

***LIBPATH=/usr/lpp/jinsight/jinsight2.1:...***

***JVM\_EXTRA\_OPTIONS=-XrunjinsightPA***

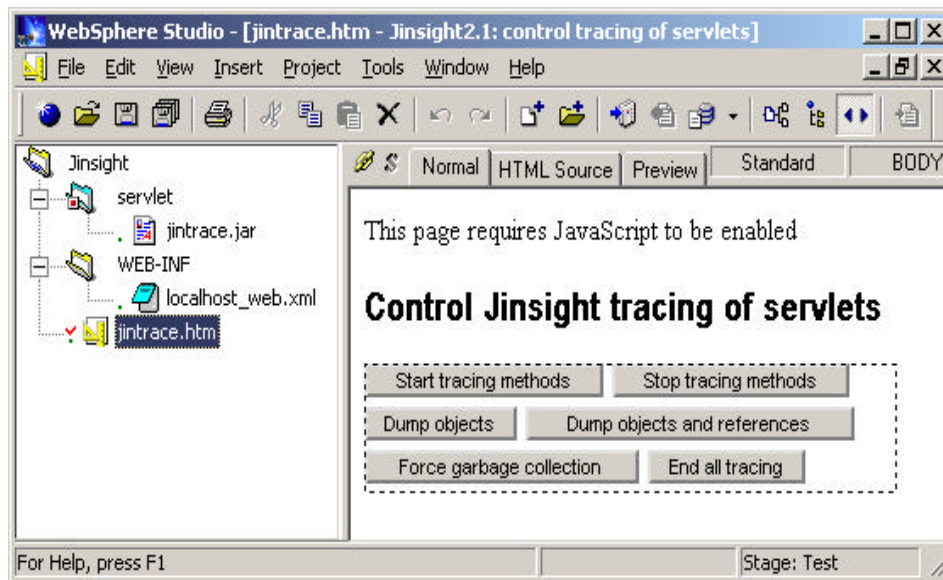
***JINSIGHT\_TRACEFILE\_NAME=/u/stfan/jinsight.trc***

***JAVA\_COMPILER=off***



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## Create a WebApp



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## Update the XML Descriptor

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE web-app (View Source for full doctype...)>
- <web-app>
  <display-name>Jinsight2.1-WebApplication</display-name>
  <welcome-file>jintrace.htm</welcome-file>
- <servlet>
  <servlet-name>jintrace</servlet-name>
  <description>THE Jinsight servlet</description>
  <servlet-
    class>com.ibm.jinsight.tracing.TraceControlServlet</servlet-class>
  </servlet>
- <servlet-mapping>
  <servlet-name>jintrace</servlet-name>
  <url-pattern>/jintrace</url-pattern>
  </servlet-mapping>
</web-app>
```



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run

Now run the application, get the tracefile, check it with the trace viewer. If you can read (not understand) it send it to your application programmer. Its a text file



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## Appendix: Jinsight ScreenShots

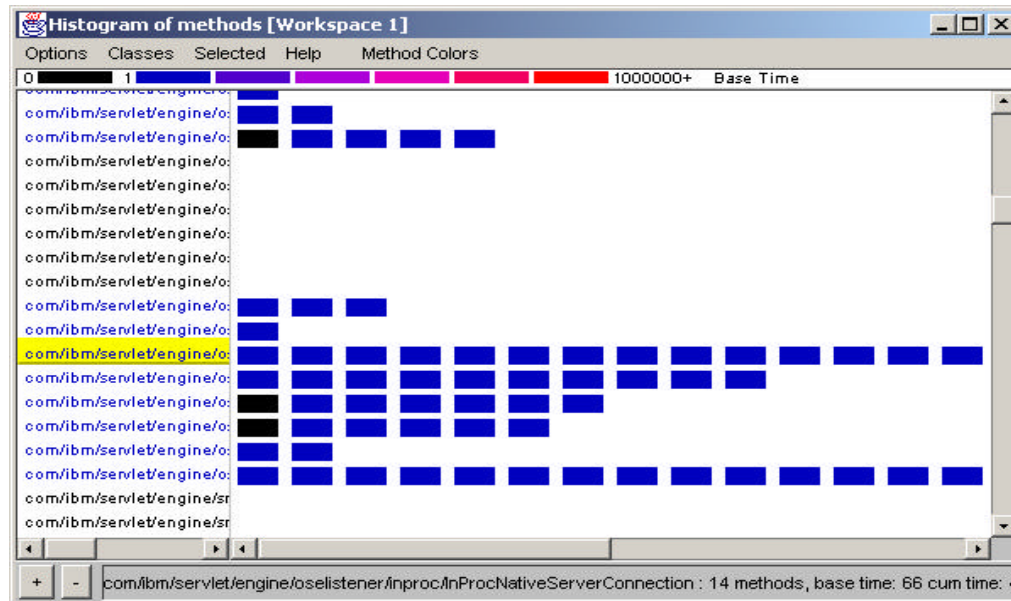
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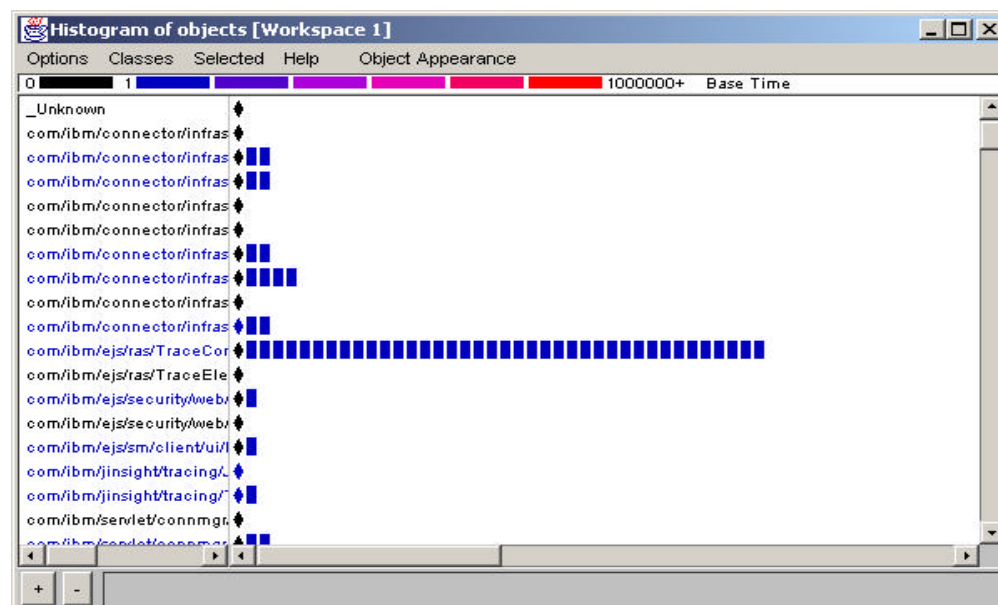


## Jinsight Methods



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## Jinsight Objects



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# Jinsight Execution flow

