

Serviceability in HotSpot

The best tool is your own tool

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Troubleshooting

Bugs

Performance

Memory

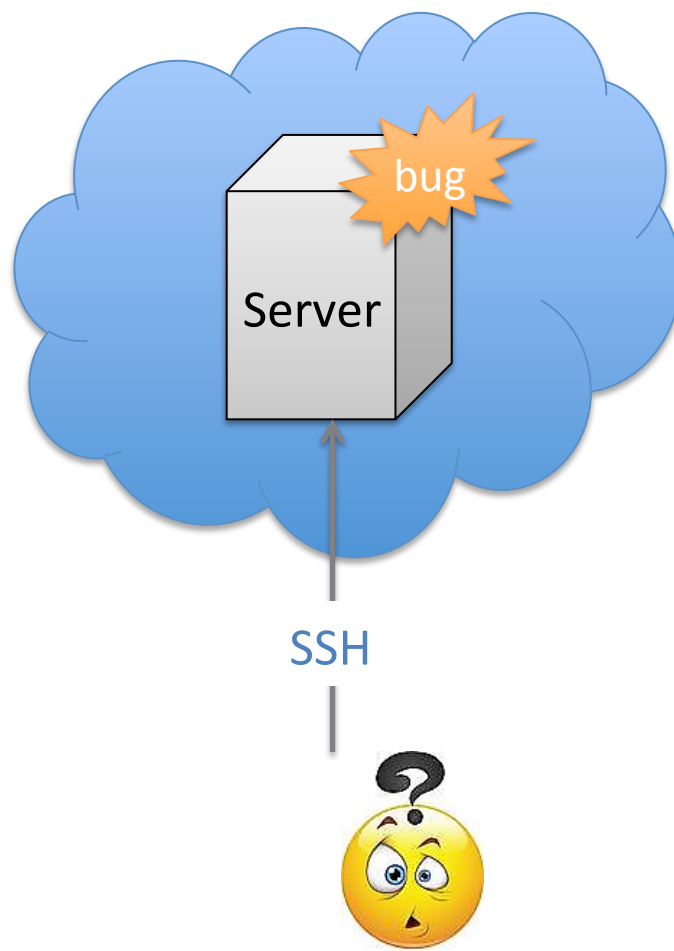
JVM crash

Debugger

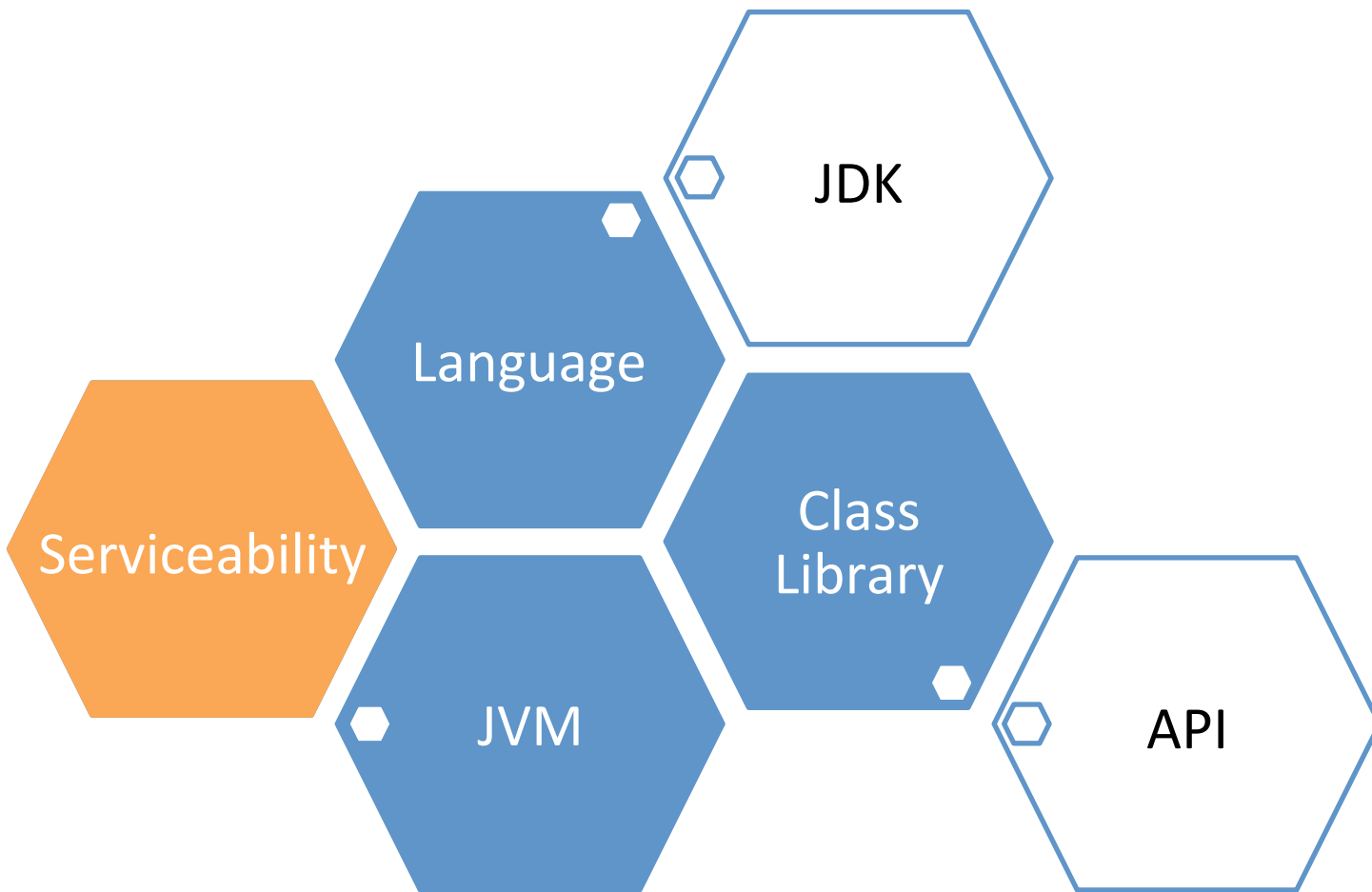
Profiler

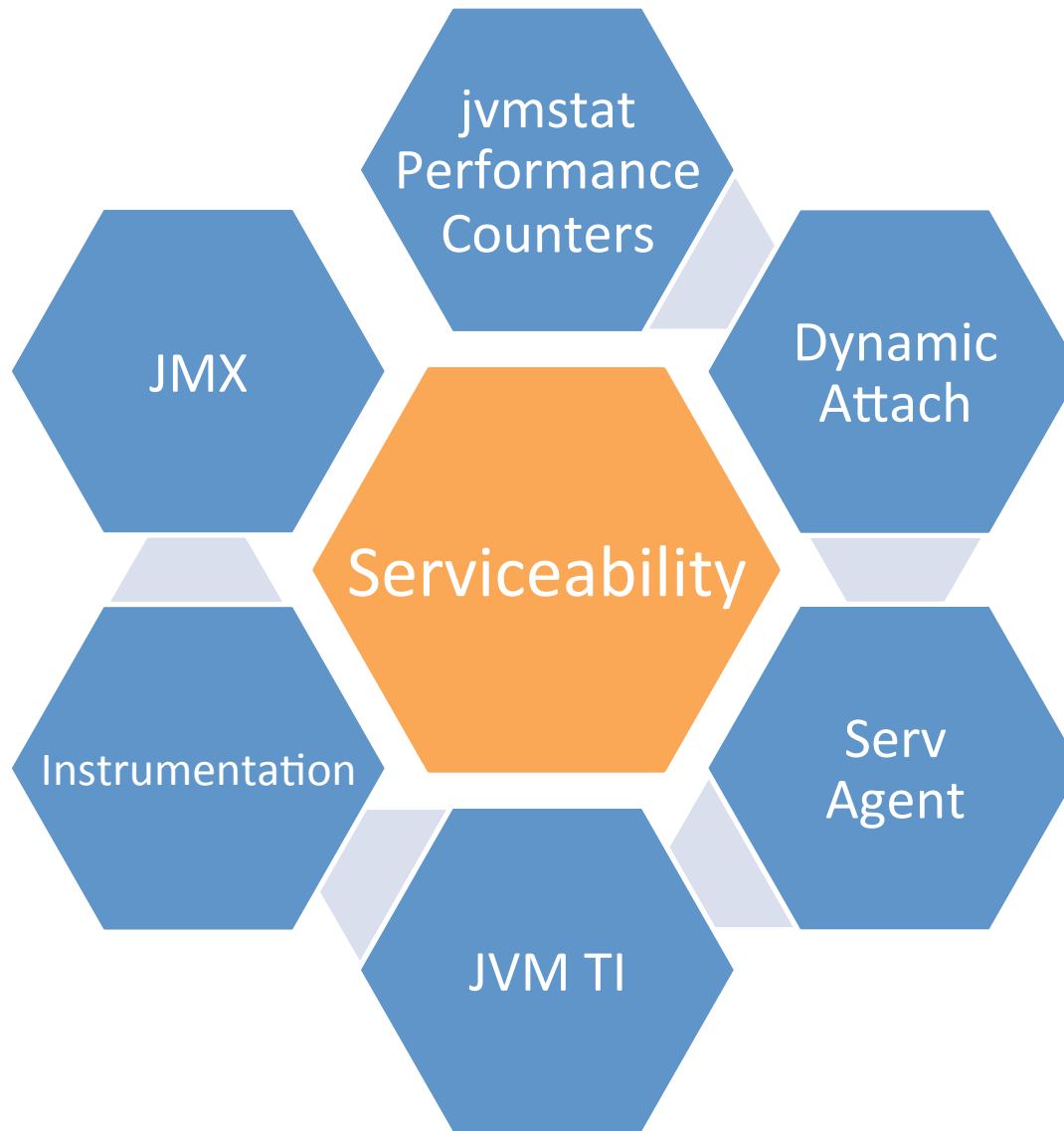
Memory
analyzer

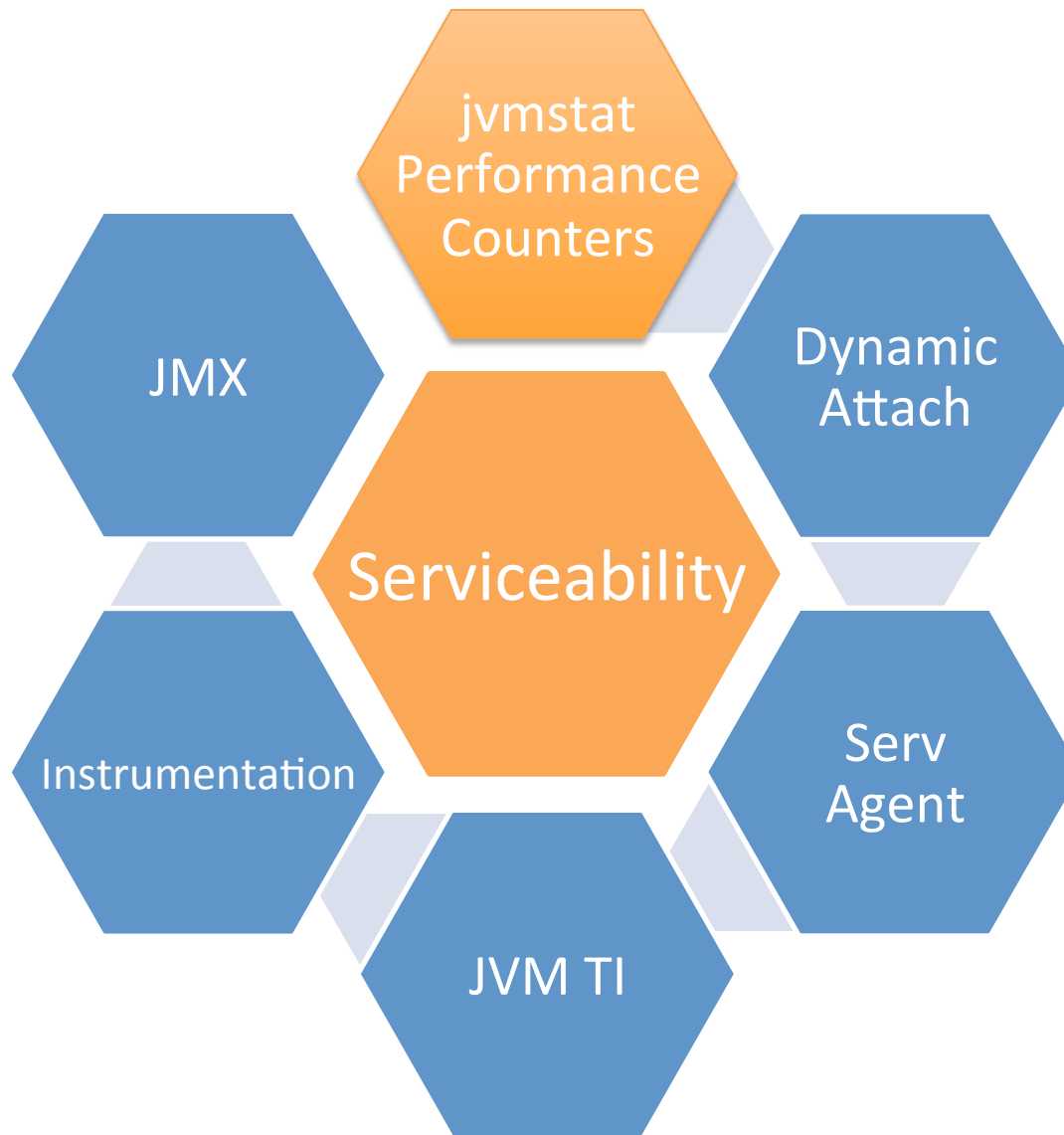
hs_err.log



Java Platform

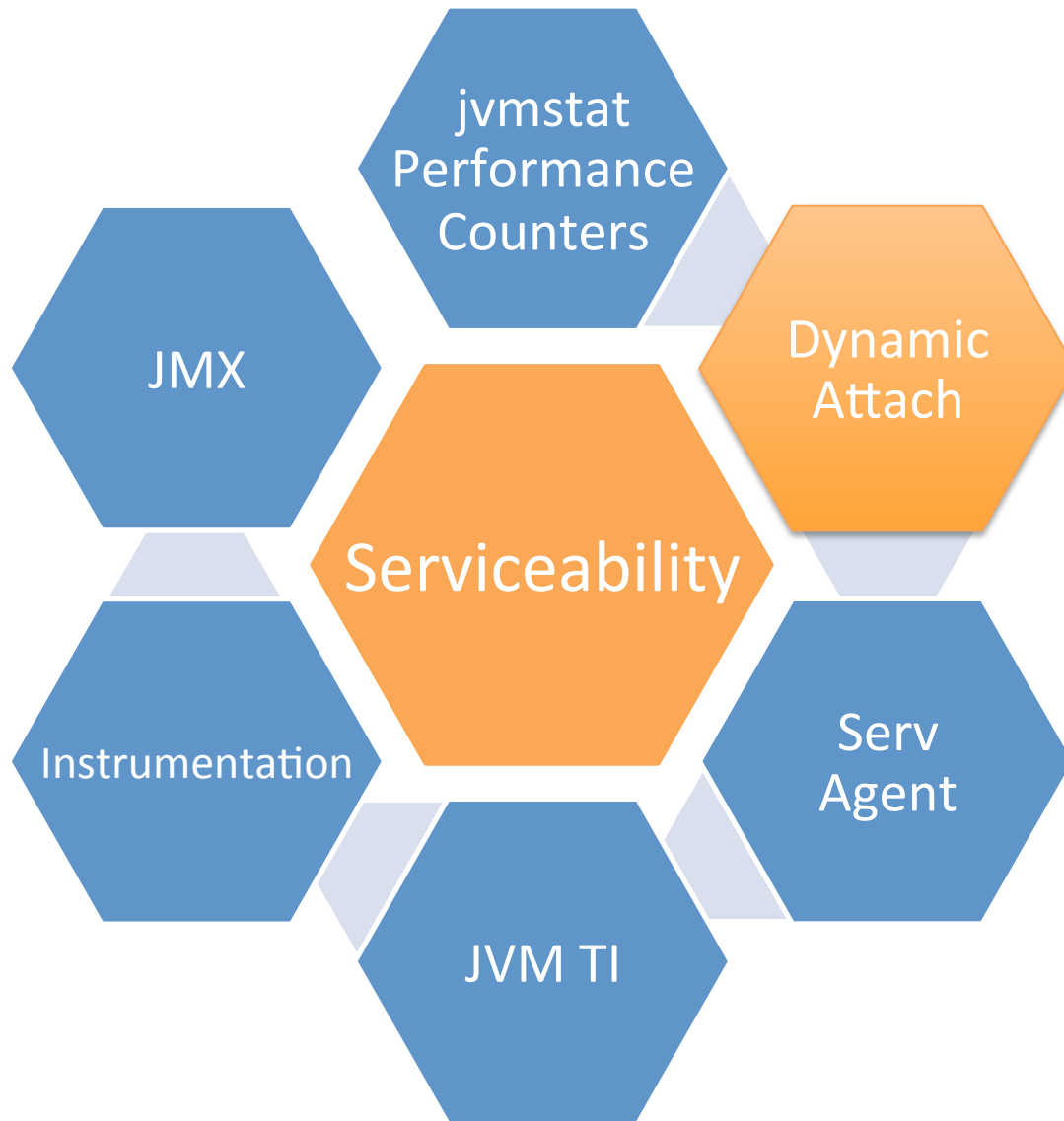






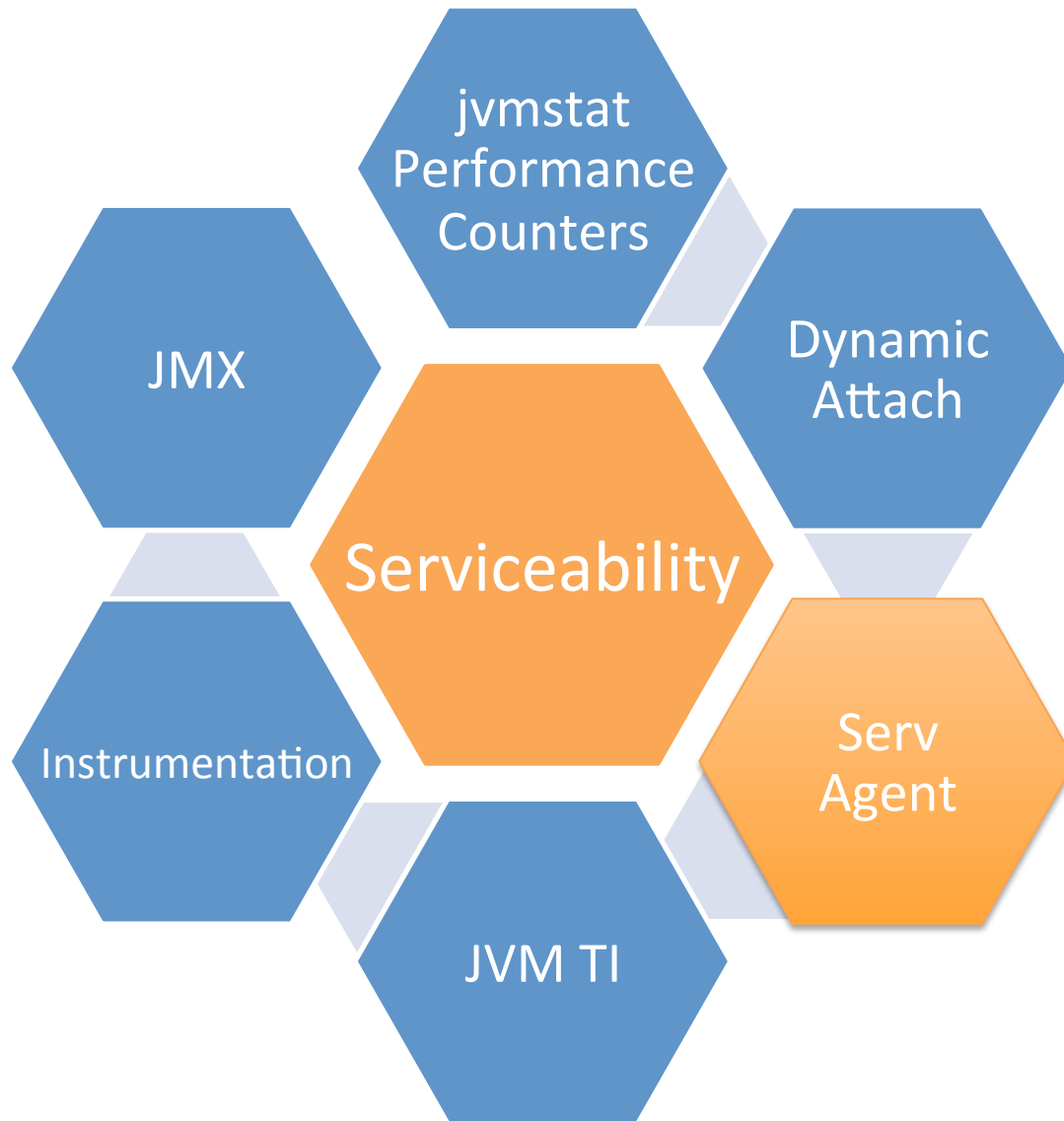
Performance Counters

- /tmp/hsperfdata_user
 - pid1
 - pid2
- Backed by mmap'ed file
- jstatd
- -XX:-UsePerfData



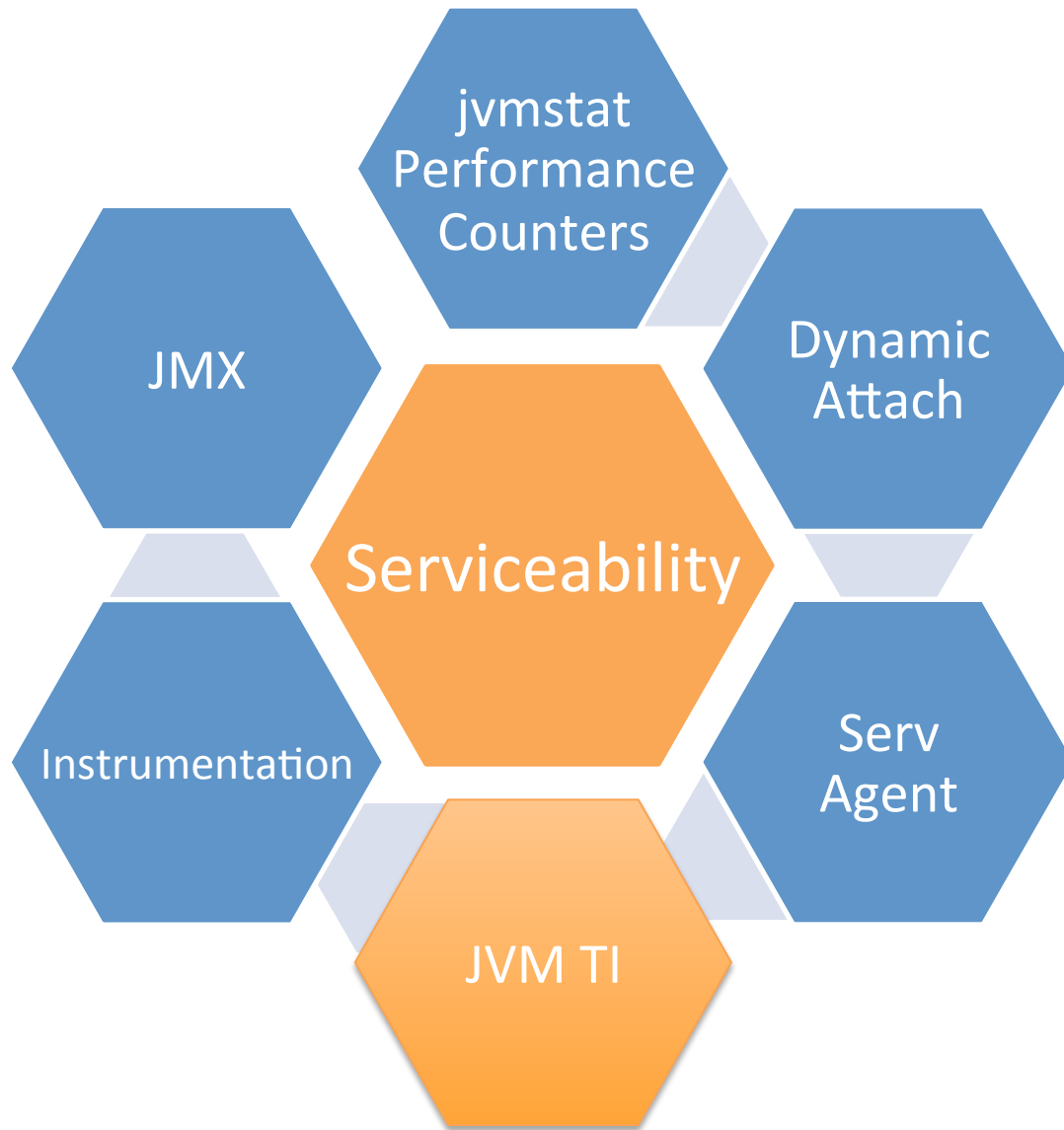
Dynamic Attach

- Commands
 - Dump threads, dump heap
 - Invoke GC
 - Manage VM flags
 - Load agent
- UNIX socket or named pipe
- `-XX:+DisableAttachMechanism`



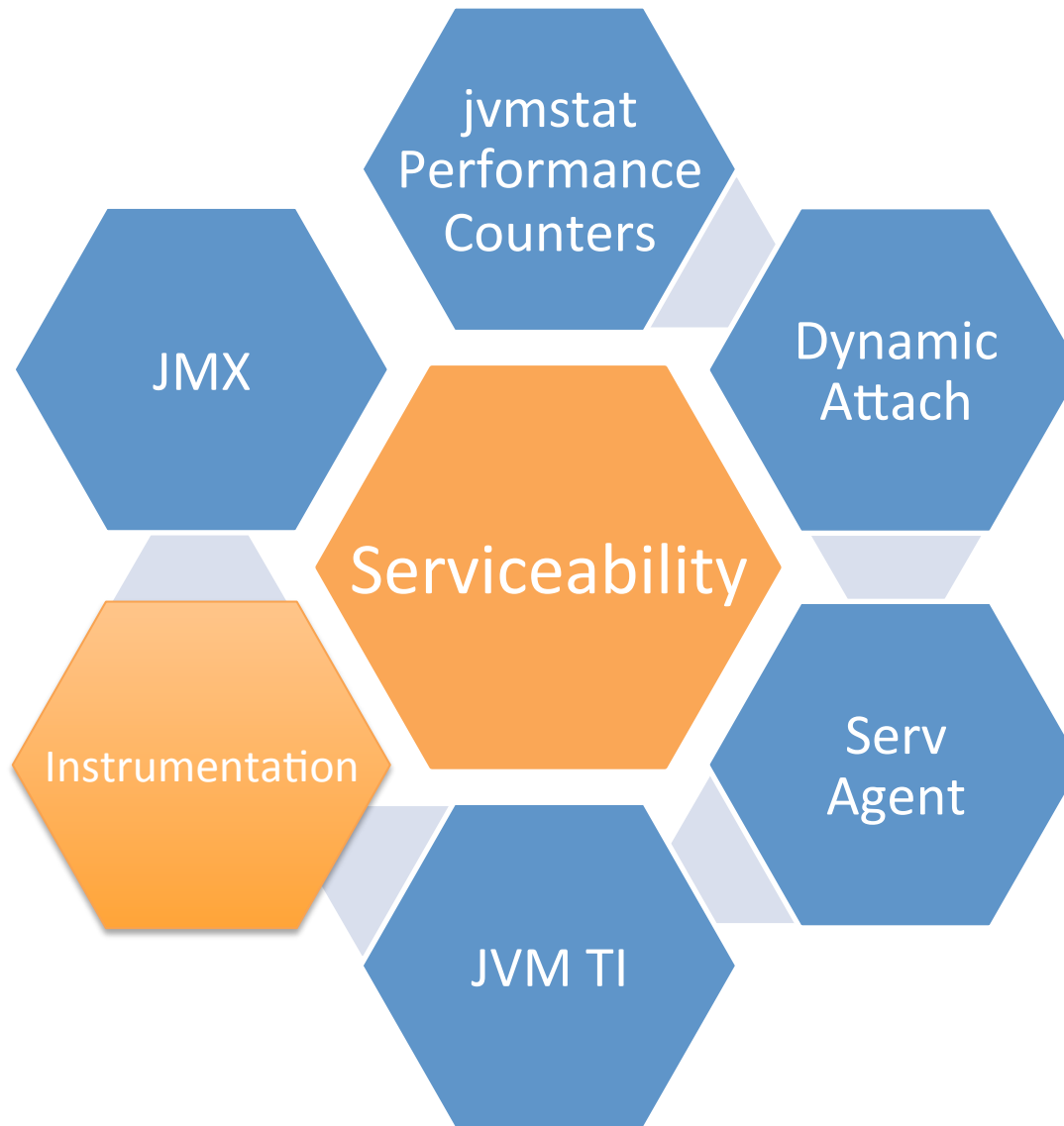
Serviceability Agent

- Internal VM structures → Java API
- ptrace or WinDbg + sa-jdi.jar
- No cooperation from target JVM
- jsadebugd



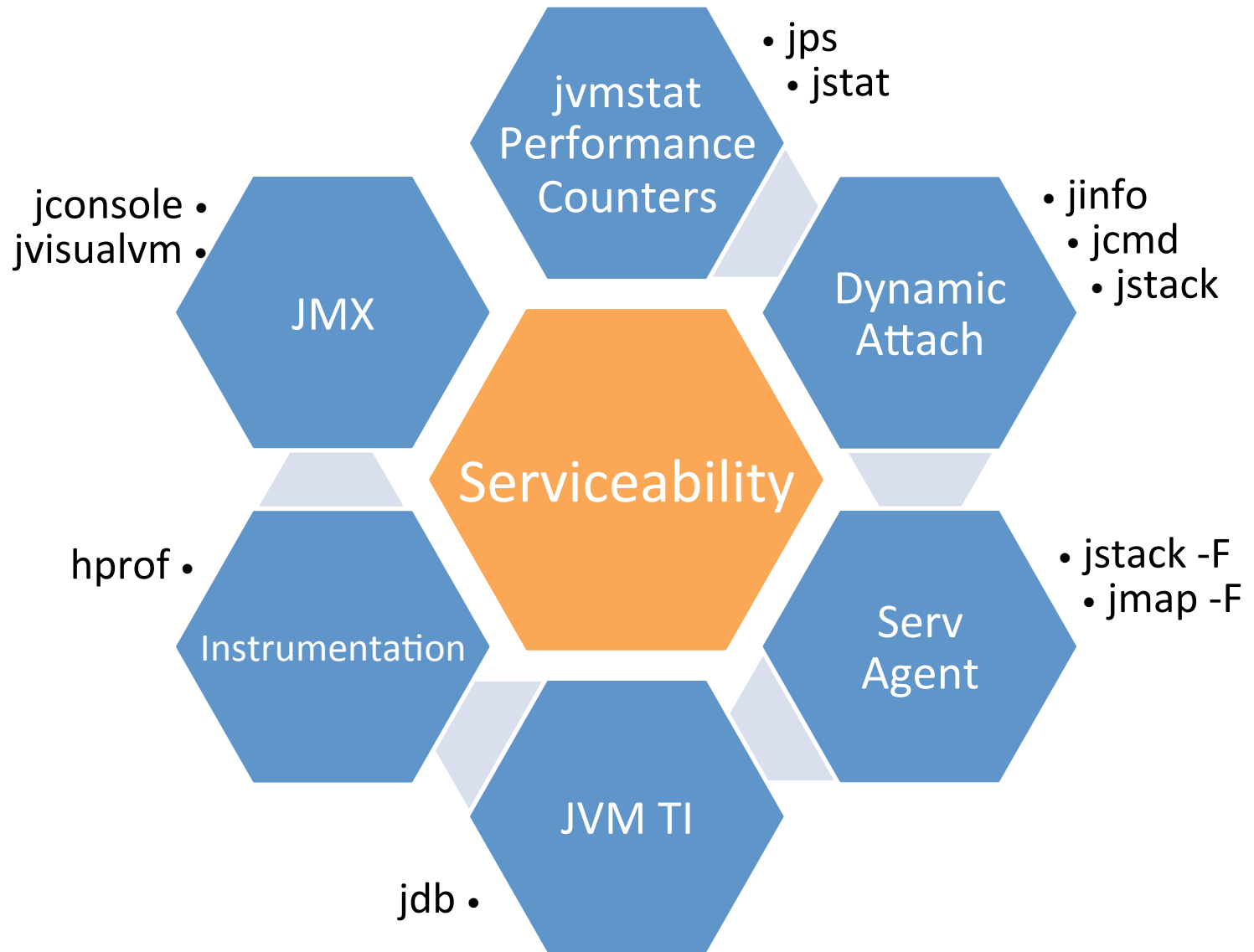
JVM Tool Interface

- Standard native API for debuggers
 - Threads and stacks
 - Local variables
 - Breakpoints, watchpoints
 - Event callbacks
- `jvmtiCapabilities`
- `-agentpath` or `dynamic attach`



Instrumentation

- `java.lang.instrument.Instrumentation`
 - `redefineClasses`
- Patch bytecode
 - Profiling, benchmarking, interception...
 - Javassist
- `-javaagent` or `dynamic attach`



Documentation

- <http://openjdk.java.net/groups/serviceability/>
- <http://openjdk.java.net/groups/hotspot/docs/Serviceability.html>
- <http://docs.oracle.com/javase/7/docs/jdk/api/attach/spec/>
- <http://docs.oracle.com/javase/7/docs/platform/jvmti/jvmti.html>
- Examples:
 `$JDK_HOME/demo/jvmti`

Thank You

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- Open source @ OK
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