

Records and Text Blocks: But What Else Is Interesting In OpenJDK 17?



JDK 17



Rudy De Busscher

- **Payara**

- Product Manager
- Developer Advocate

- **Involved in**

- Committer of MicroProfile
- Committer in Eclipse EE4J groups
- Java EE Security API Expert group member



@rdebusscher



<https://blog.payara.fish/>
<https://www.atbash.be>

Agenda

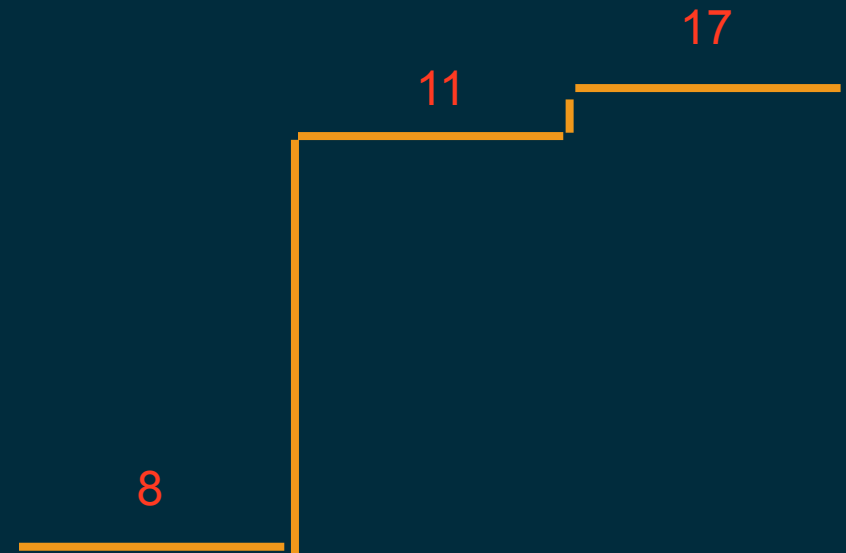
- JDK 11 to JDK 17 changes
- Class Data Sharing
 - Easier usage
- Garbage Collection
 - New collectors
 - Performance improvements
- Flight Recorder for Monitoring
- Context-Specific Deserialization Filters

JDK 17

- Latest LTS (Long Term Supported)
 - Not replaced in 6 months
- Previous LTS - JDK 11
- Many changes on different levels
 - Java Language
 - JVM changes
 - 'Operational' aspects

From JDK 11 to JDK 17

- Language Features
 - Records
- JVM changes
 - Garbage Collectors
- Tools
 - Class Data Sharing
 - JFR Event Streaming



JDK 11 -> JDK 17 (1)

- Language features
 - Switch expressions
 - Streams
 - Text blocks
 - Records
 - Pattern matching
 - Sealed Classes
 - Strongly Encapsulate JDK Internals by Default
 - Unix domain channel sockets

JDK 11 -> JDK 17 (2)

- Operations oriented
 - Garbage collection (Z garbage collector, Shenandoah)
 - Dynamic CDS archive
 - Flight Recorder for Monitoring
 - Support for AArch64
 - Package tool

Class Data Sharing

- Faster startup by preparing class information.

11

- *java -XX:DumpLoadedClassList=classes.lst -jar micro-root/launch-micro.jar --warmup --deploymentDir deployment*
- *java -Xshare:dump -XX:SharedClassListFile=classes.lst -XX:SharedArchiveFile=payara.jsa -jar micro-root/launch-micro.jar*

Class Data Sharing

- Dynamic Archive

17

- *java -XX:ArchiveClassesAtExit=payara.jsa -jar micro-root/launch-micro.jar --warmup --deploymentDir deployment*
- Easier, Faster
 - Archive created from active process (no need to perform loading from class path in second step)

A photograph of a workspace on a dark wooden desk. A silver laptop is open on the left, showing a keyboard with Cyrillic and Latin characters. To its right is a light blue ceramic mug filled with a brown liquid, likely tea. A pair of white earbuds with a black cord lies on the desk near the laptop. A white diagonal shape, resembling a folded piece of paper, is overlaid on the right side of the image.

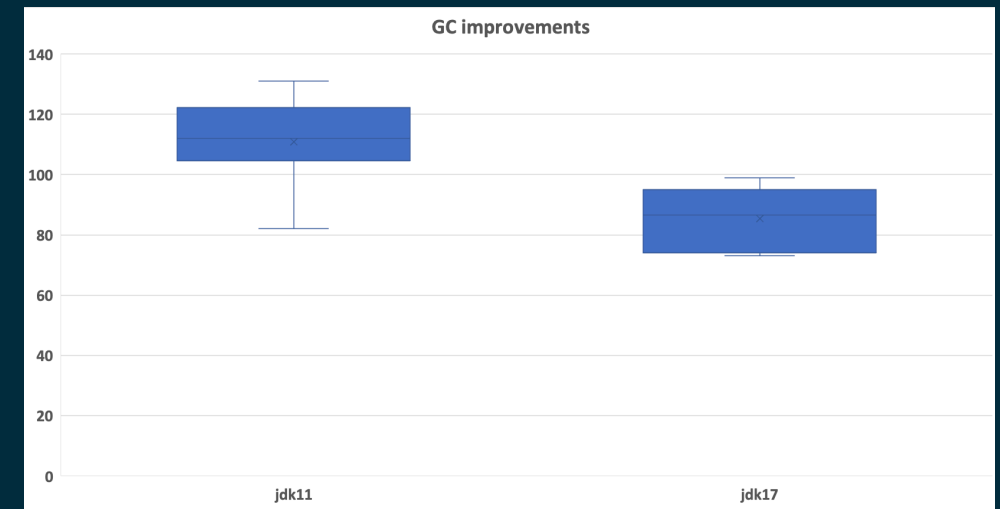
Demo

Garbage Collectors (1)

- Ultra-low pause time
- Concurrently with Java statement execution
- Implementations
 - Shenandoah
 - ZGC (Performs GC, it is not Epsilon GC)
- Experiment to find out which is ideal for your case
 - Throughput
 - Latency

Garbage Collectors (2)

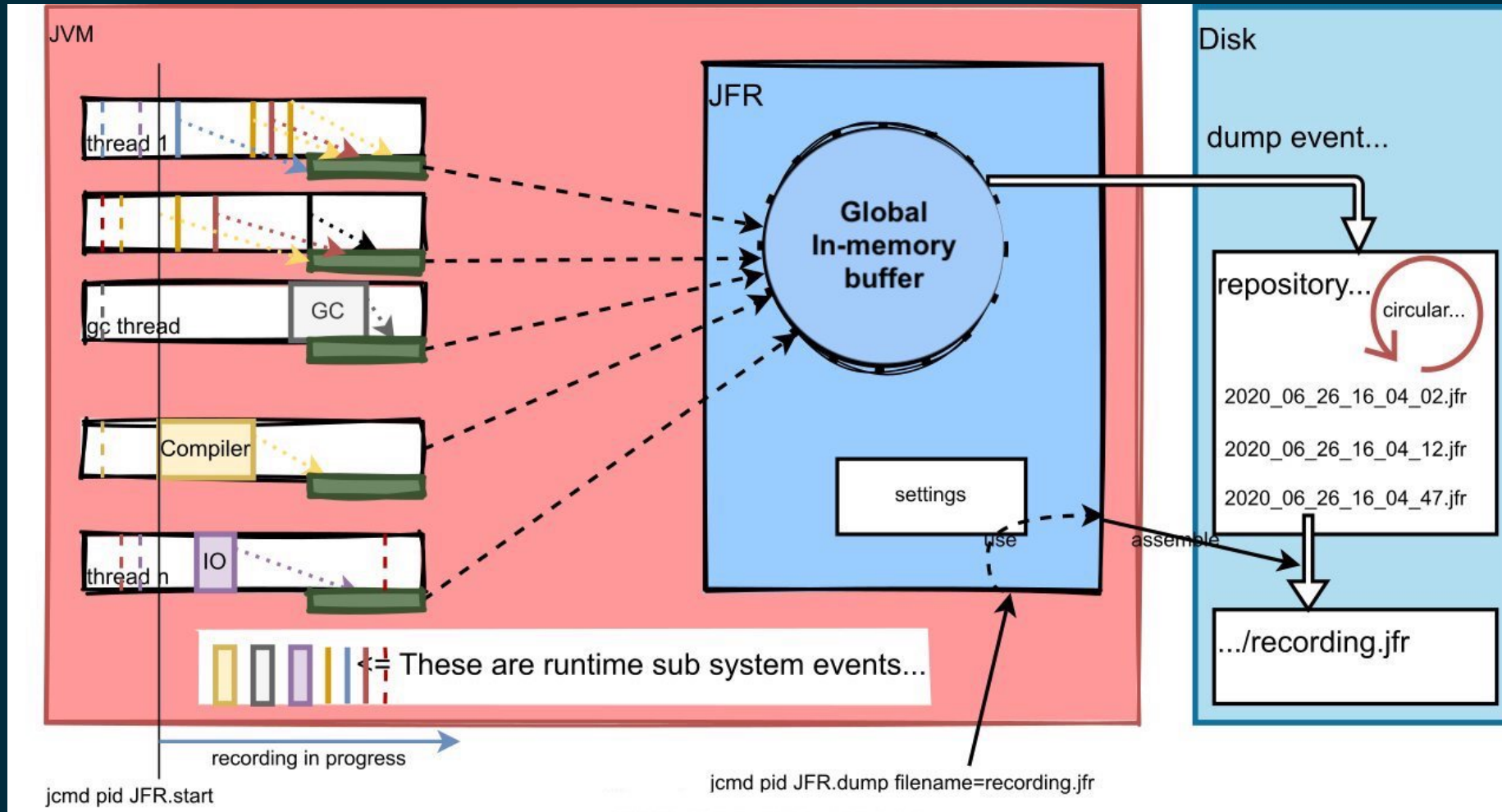
- Comparison G1 (JDK 11 - JDK 17)
- Indication
- Same conditions
 - Same Payara Micro binary
 - 256 Mb Heap
 - Same App
 - Request with high CPU and Mem
- Up to 20 % faster



Flight Recorder

- Profiling - Diagnostics
- Monitoring
 - JFR Event Streaming
- Classic
 - Collect - Buffer - Repository - Write to File
- Event Stream
 - Listen to buffer (temporary file chunks when out-of-process)
 - Receive selected events
 - React on events (optional)

Flight Recorder



A photograph of a workspace on a dark wooden desk. On the left, a silver laptop is open, showing a keyboard with Cyrillic characters and a trackpad. To its right is a light blue ceramic mug filled with a brown liquid, likely tea. Below the mug, a pair of white earbuds with black cables lies on the desk. A white, diamond-shaped graphic element is positioned on the right side of the image, partially overlapping the desk and the text.

Demo

Context-Specific Deserialization Filters

- Java Serialization/Deserialization
- *readObject()* immediately executed
- Loading a carefully crafted content leads to Security vulnerability
- Combination of certain classes
 - Gadget Chain
- *ObjectInputFilter.allowFilter*
- *-Djdk.serialFilter System Property.*

A photograph of a workspace on a dark wooden desk. On the left is a silver laptop with a black keyboard. To its right is a light blue ceramic mug filled with a brown liquid, likely tea. Below the mug are a pair of white earbuds with black cables. A white diagonal shape, resembling a folded piece of paper, is overlaid on the right side of the image.

Demo

Thank You

Download the open source software:
payara.fish/downloads

Get Started:
payara.fish/get-started