

Don't Let Ephemeral CI Kill Your Developer Productivity

Louis Jacomet - Gradle



Table of Contents

- Problem statement
- Gradle build profile
- Possible actions



Problem statement

- Gradle Build Tool performance
- vs.
- Ephemeral environments trend



Gradle Build Tool performance

- Enable parallel execution
- Enable the Gradle daemon
- Enable the configuration cache
- Enable incremental build for custom tasks
- Enable the build cache
- Create build for specific developer workflows
- Increase the heap size
- Optimize configuration
- Optimize dependency resolution
- Optimize [Java|Android] projects



Ephemeral environments

- Industry trend
- Isolation → no state problems
- Short lived → no clean up jobs



Gradle Build Tool performance

- Enable parallel execution
 - ✓
- Enable the Gradle daemon
- Enable the configuration cache
- Enable incremental build for custom tasks
- Enable the build cache
- Create build for specific developer workflows
- Increase the heap size
- Optimize configuration
- Optimize dependency resolution
- Optimize [Java|Android] projects



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
- Enable incremental build for custom tasks
- Enable the build cache
- Create build for specific developer workflows
- Increase the heap size
- Optimize configuration
- Optimize dependency resolution
- Optimize [Java|Android] projects



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
- Enable the build cache
- Create build for specific developer workflows
- Increase the heap size
- Optimize configuration
- Optimize dependency resolution



Gradle Build Tool performance

- Enable parallel execution



- Enable the Gradle daemon



- Enable the configuration cache



- Enable incremental build for custom tasks



- Enable the build cache

- Create build for specific developer workflows

- Increase the heap size

- Optimize configuration

- Optimize dependency resolution



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
- Increase the heap size
- Optimize configuration



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
✓
- Increase the heap size
- Optimize configuration



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
✓
- Increase the heap size
✓



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
✓
- Increase the heap size
✓



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
✓
- Increase the heap size
✓



Gradle Build Tool performance

- Enable parallel execution
✓
- Enable the Gradle daemon
?
- Enable the configuration cache
?
- Enable incremental build for custom tasks
✗
- Enable the build cache
✓
- Create build for specific developer workflows
✓
- Increase the heap size
✓



Key Gradle Build Tool performance elements

- Caches
 - Dependency cache
 - Task cache
 - ...
- Incrementality
 - Execution history
- Parallelism
 - Tasks
 - Tests



Key Gradle Build Tool performance elements

- Caches
 - Dependency cache
 - Task cache
 - ...
- Incrementality
 - Execution history
- Parallelism
 - Tasks
 - Tests



Gradle Build profile

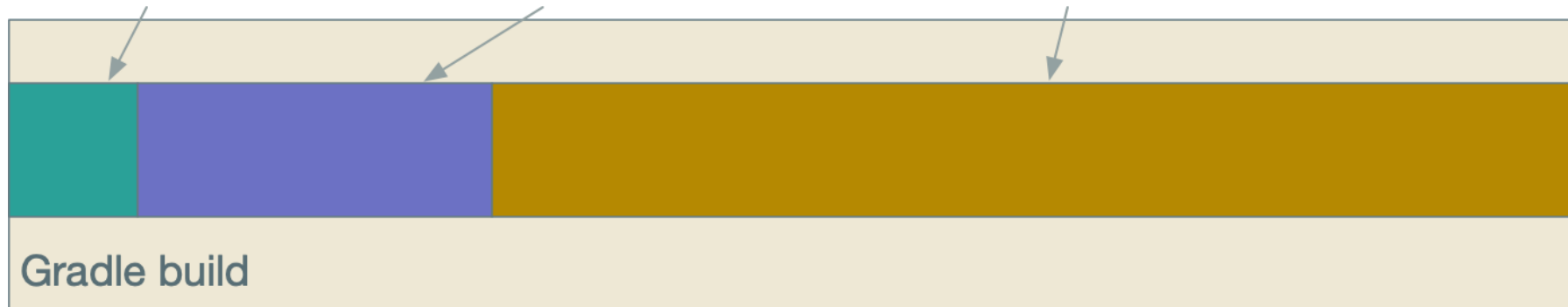




Gradle startup

Gradle configuration

Gradle execution



Bars not at scale





JVM startup **Distribution download** **Distribution first use** **Daemon startup**

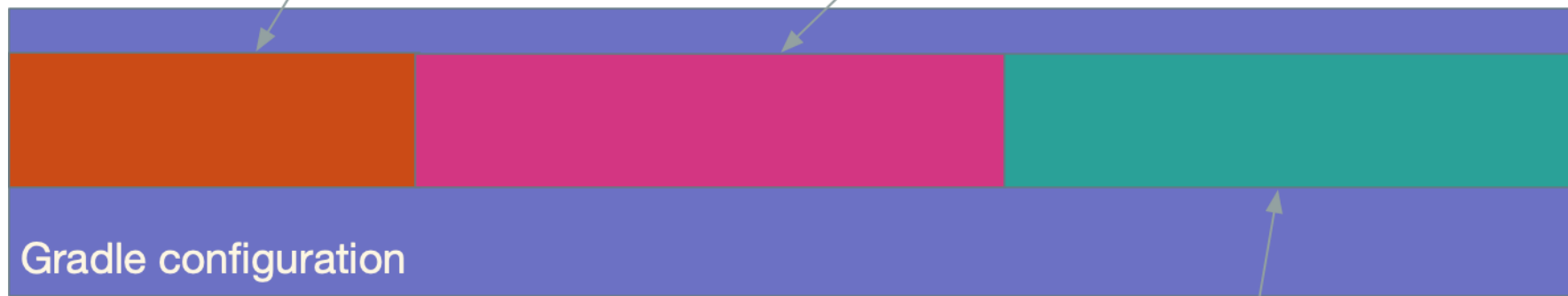


Bars not at scale





Plugin dependency resolution Build logic compilation



Gradle configuration

Model and task graph building

Bars not at scale

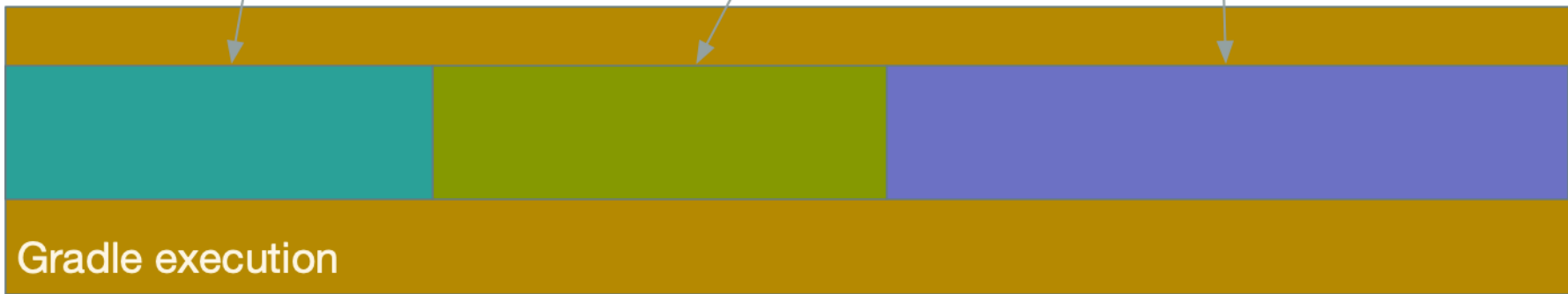




Dependency resolution

Inputs fingerprinting

Task execution



Gradle execution

Bars not at scale



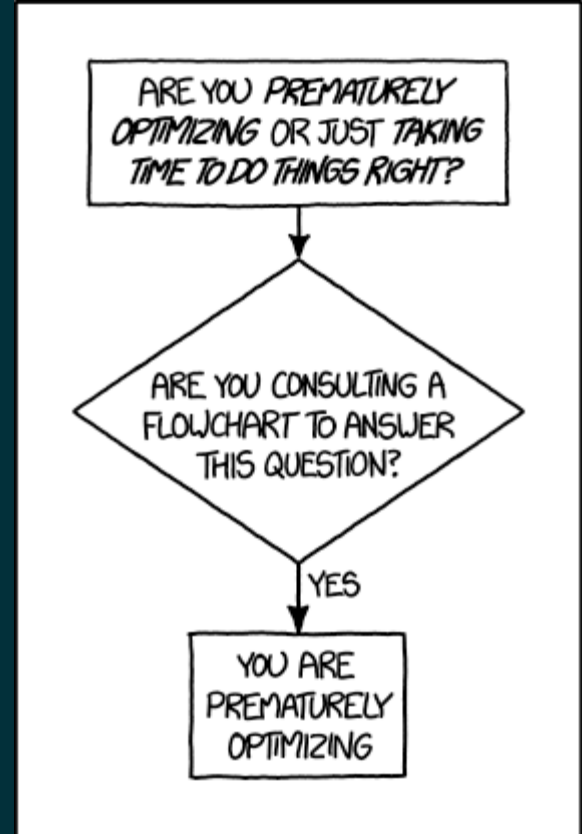


Possible actions



Dealing with performance

- Measure
- Change
- Measure
- Compare



Optimize Gradle startup

- Distribution availability
 - Always use the `-bin` one
 - Already in the image / docker file / ...
 - OR Downloaded from a closer location
 - OR Save and restore `<GUH>/wrapper/dists`
- Prime distribution
 - Run it once to have the first use elements
 - OR Save and restore `<GUH>/caches/<version>/generated-gradle-jars`



JVM startup Distribution download Distribution first use Daemon startup

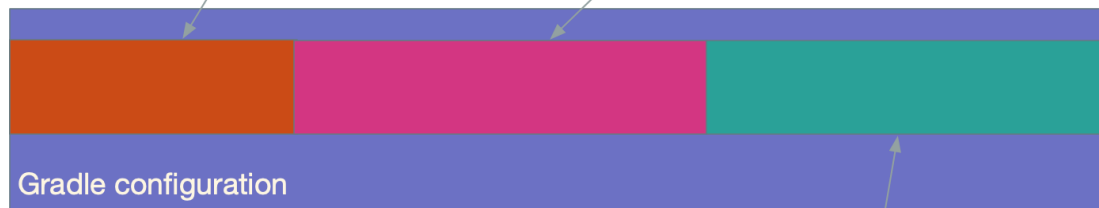


Optimize Gradle configuration

- Dependency cache
 - Read-only cache feature
 - OR save and restore `<GUH>/caches/modules-2`
- Script compilation cache
 - Remote build cache
 - OR save and restore `<GUH>/caches/<version>/kotlin-dsl` and `<GUH>/caches/<version>/scripts` and `<GUH>/caches/jars-9`



Plugin dependency resolution Build logic compilation



Model and task graph building

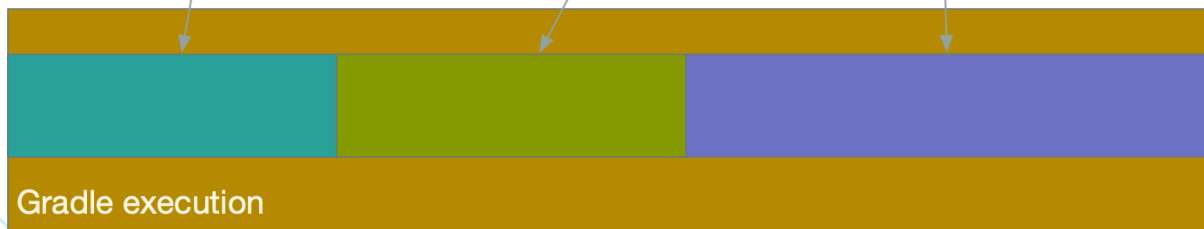


Optimize Gradle execution

- *Dependency cache*
- Task execution cache
 - Remote build cache
 - OR save and restore `<GUH>/caches/build-cache-1`
 - (Android mostly) save and restore `<GUH>/caches/transforms-3`



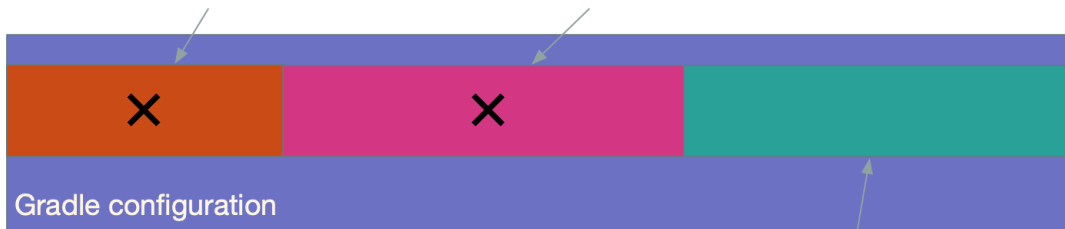
Dependency resolution Inputs fingerprinting Task execution



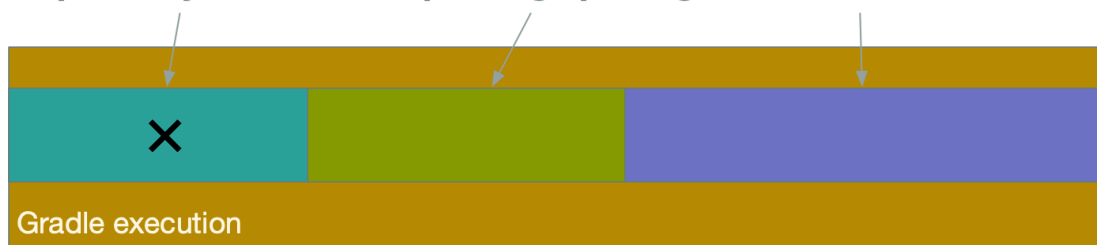
JVM startup Distribution download Distribution first use Daemon startup



Plugin dependency resolution Build logic compilation



Model and task graph building
Dependency resolution Inputs fingerprinting Task execution





Thank you!

