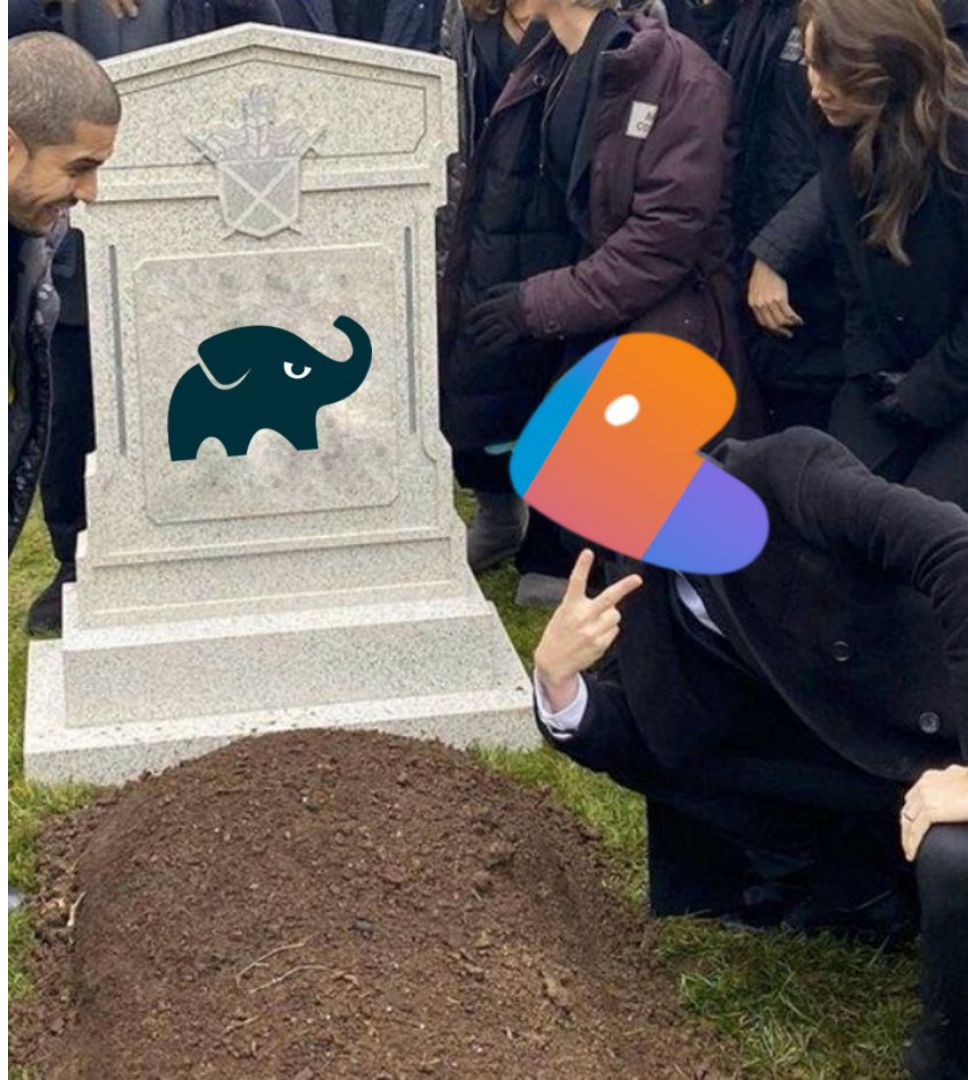


GSoC 2021:
在 Gentoo 上从源码编译 Kotlin;
持续测试以确保软件包质量始终如一

廖远
2021-08-07

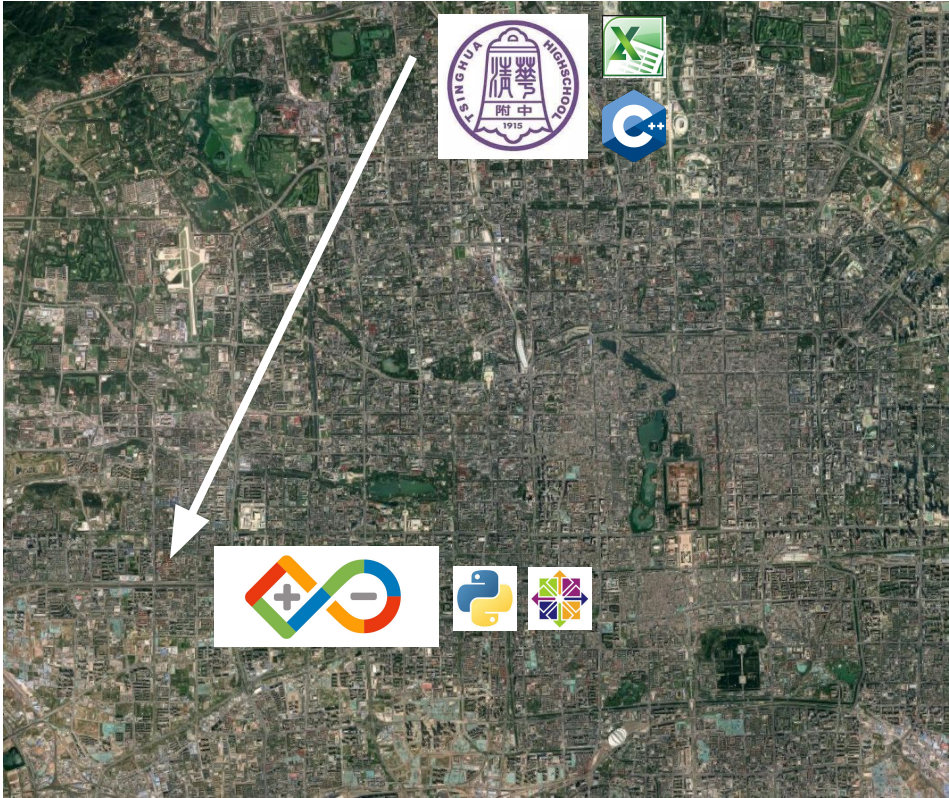
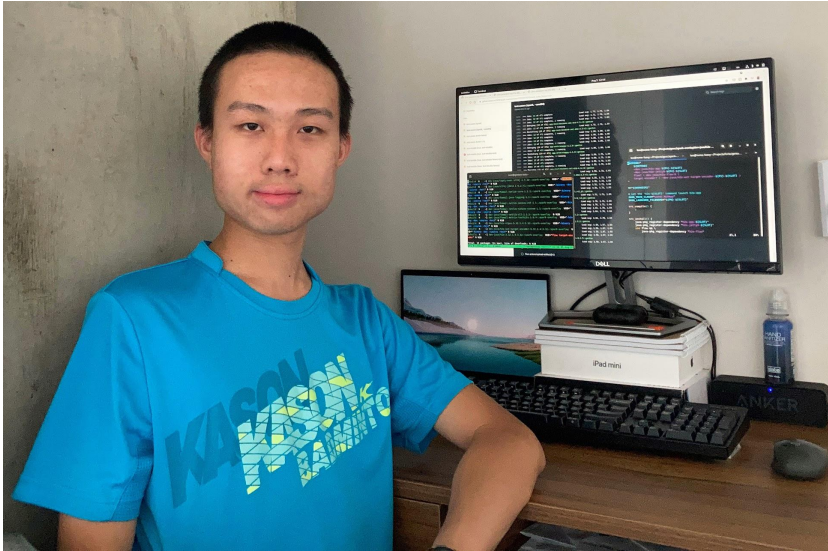
<https://leo3418.github.io/zh/>



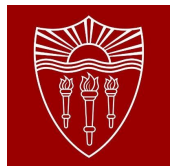
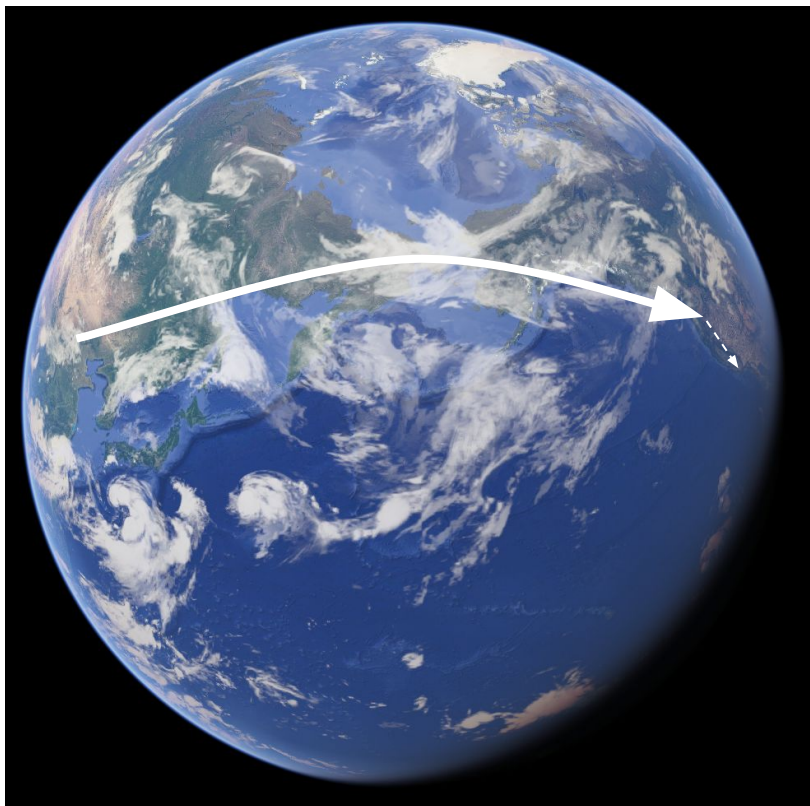
内容

- 背景介绍
- GNU/Linux 和 Gentoo 上的 Java 现状
- 绕过 Gradle, 编译 Kotlin
- 软件包测试
- 未来展望

关于我



关于我



关于各位观众

你对下列专题的熟悉程度如何？

- 常用 Java 构建工具，如 Maven 和 Gradle
- Kotlin 开发中常用的工具和库
- 高级 Gentoo 使用，包括 overlay 的大致原理和使用、甚至 ebuild 制作



Java 构建工具

- JAR
- Maven POM (**P**roject **O**bject **M**odel) 与 pom.xml
- Maven coordinate (坐标?): groupId:artifactId:version
 - ai.h2o:h2o-core:3.32.1.5
 - com.squareup.okio:okio:2.6.0
 - org.jetbrains.kotlin:kotlin-stdlib:1.5.21
 - com.google.guava:guava:30.1.1-jre



Kotlin 工具和库

构建和编译工具:

- Kotlin Gradle 插件
- `kotlinc` 命令行编译器

核心库:

- `kotlin-stdlib`
- `kotlin-reflect`
- `kotlin.test`
- `kotlin-annotations-jvm`

Gentoo



- Portage 和 emerge
- USE flag (Gentoo Wiki 译作“USE 标志/标记”)
- Overlay
- eclass

关于我的 GSoC 项目



原计划

- 简单改进 Spark overlay 中的 Kotlin 软件包
 - 由于 Gentoo 对 Gradle 支持受限, 没有从源代码编译 Kotlin 的计划
- 研究 ebuild 测试方案, 在 Spark overlay 中的软件包因外界因素变化导致不能再被安装时, 第一时间通知维护人员
- 制作 H2O.ai 软件包

实际成果

- 意外发现绕过 Gradle 编译 Kotlin 的方法, 并成功做出 Gentoo Kotlin 支持框架
 - 同时可用于编译第三方 Kotlin 库, 如 Okio 和 OkHttp 等
- Spark overlay 的 GitHub 仓库每天自动运行一次可覆盖所有软件包的安装测试
- 一套最基础的 H2O 软件包已制作完毕



GNU/Linux 发行版上的 Java 现状

没有统一的文件路径标准！

- Python: `/usr/lib/python3.9/site-packages`
- npm: `/usr/lib64/node_modules`
- Java: ????

各发行版都有着自己的“村规”：

- Fedora: `/usr/share/java/foo.jar`
- Arch Linux: `/usr/share/java/foo/foo.jar`
- Gentoo: `/usr/share/foo/lib/foo.jar`



GNU/Linux 发行版上的 Java 现状

Clean Java packaging has historically been a daunting task. **Lack of any standard addressing the physical location of files** on the system... has led to the systematic release of **self-sufficient** applications with **built-in copies of external components**.

As a consequence..., a complete Java system suffers from **endless duplication** of the same modules... Any security or compatibility upgrade must be performed **for each** of those duplicated elements.

-- Fedora Java Packaging HOWTO (<https://fedora-java.github.io/howto/29/>)



GNU/Linux 发行版上的 Java 现状

如果每个使用 Java 库的程序都自己下载一份，
Gentoo 用户将难以对 Java 软件包应用自己的补丁

```
leo@nvme-fussy:~ — vi /etc/portage/patches/dev-libs/capnpro...
From fafae040026e9b9247c2eb3a5cbc23d8294665fd Mon Sep 17 00:00:00 2001
From: Leo <liaoyuan@gmail.com>
Date: Sat, 5 Jun 2021 11:09:31 -0700
Subject: [PATCH] Fix CAPNP_INCLUDE_DIRECTORY value on /usr-merged systems

---
c++/configure.ac | 2 +-
1 file changed, 1 insertion(+), 1 deletion(-)

diff --git a/c++/configure.ac b/c++/configure.ac
index 39977ea6..84242d12 100644
--- c++/configure.ac
+++ c++/configure.ac
@@ -131,7 +131,7 @@ AC_SUBST([CAPNP_CMAKE_CONFIG_FILES])

# CapnProtoConfig.cmake.in needs these PACKAGE_* output variables.
PACKAGE_INIT="set([CAPNP_PKG_CONFIG_FILES] CAPNP_PKG_CONFIG_FILES)"
-PACKAGE_CMAKE_INSTALL_FULL_INCLUDEDIR="\${CMAKE_CURRENT_LIST_DIR}/../../usr/incl
ude"
+PACKAGE_CMAKE_INSTALL_FULL_INCLUDEDIR="\${CMAKE_CURRENT_LIST_DIR}/../../usr/
include"
"/etc/.save/portage/portage/patches/dev-libs/capnproto/0001-Fix-CAPNP_INCLUDE_DI
RECTORY-value-on-usr-merged-syst.patch" [Modified][readonly] 27 lines --3%--
Press ENTER or type command to continue
```

```
leo@nvme-fussy:/var/db/repos/gentoo/dev-libs/capnproto — sudo ebuild capnproto-0
.7.0.ebuild clean compile
* capnproto-0.7.0.tar.gz BLAKE2B SHA512 size ;-) ... [ ok ]
* checking ebuild checksums ;-) ... [ ok ]
* checking miscfile checksums ;-) ... [ ok ]
>>> Unpacking source...
>>> Unpacking capnproto-0.7.0.tar.gz to /var/tmp/portage/dev-libs/capnproto-0.7.
0/work
>>> Source unpacked in /var/tmp/portage/dev-libs/capnproto-0.7.0/work
>>> Preparing source in /var/tmp/portage/dev-libs/capnproto-0.7.0/work/capnproto
-0.7.0/c++ ...
* Applying 0001-Fix-CAPNP_INCLUDE_DIRECTORY-value-on-usr-merged-syst.pa [ ok ]
* User patches applied.
* Running eautoreconf in '/var/tmp/portage/dev-libs/capnproto-0.7.0/work/capnpr
oto-0.7.0/c++' ...
* Running 'libtoolize --install --copy --force --automake' ... [ ok ]
* Running 'aclocal -I m4' ... [ ok ]
* Running 'autoconf --force' ... [ ok ]
* Running 'autoheader' ... [ ok ]
* Running 'automake --add-missing --copy --foreign --force-missing' ... [ ok ]
* Running elibtoolize in: capnproto-0.7.0/c++
* Running elibtoolize in: capnproto-0.7.0/c++/build-aux/
* Applying portage/1.2.0 patch ...
* Applying sed/1.5.6 patch ...
```

Gentoo Java 现状

- 暂无系统软件包级别的 Maven 或 Gradle 的支持

At this time there are plans for Maven integration into portage but **no ETA**. Several efforts have been made to both building Maven from source (bootstrap) and for building packages with Maven. Unfortunately those efforts and work **never made it beyond the Java overlay**.

It is **not feasible** to use Gradle to build Java packages on Gentoo at this time. You may attempt such, but will likely run into **other issues**.

-- Gentoo Java Packing Policy (https://wiki.gentoo.org/wiki/Gentoo_Java_Packing_Policy)

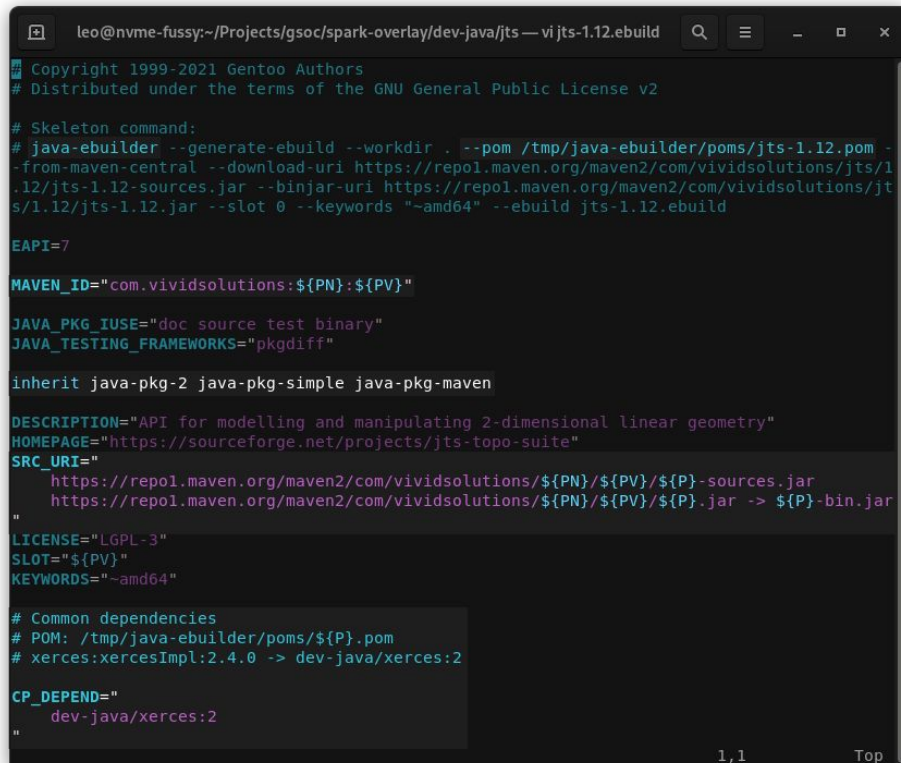
- Portage 默认禁用软件包构建期间的互联网访问
(FEATURES="network-sandbox")

在 Gentoo 上构建 Maven 或 Gradle 项目

- 仅凭 `javac` 等 JDK 中的工具就能编译的软件包依然可在 Gentoo 上提供
- `java-ebuilder`: 给定 Maven coordinate 或 POM, 生成 ebuild

成功案例:

- Maven: JUnit 4, Gson
- Gradle: H2O



```
leo@nvme-fussy:~/Projects/gsoc/spark-overlay/dev-java/jts — vi jts-1.12.ebuild
Copyright 1999-2021 Gentoo Authors
# Distributed under the terms of the GNU General Public License v2

# Skeleton command:
# java-ebuilder --generate-ebuild --workdir . --pom /tmp/java-ebuilder/poms/jts-1.12.pom -
-from-maven-central --download-uri https://repol.maven.org/maven2/com/vividolutions/jts/1
.12/jts-1.12-sources.jar --binjar-uri https://repol.maven.org/maven2/com/vividolutions/jt
s/1.12/jts-1.12.jar --slot 0 --keywords "~amd64" --ebuild jts-1.12.ebuild

EAPI=7

MAVEN_ID="com.vividolutions:${PN}:${PV}"

JAVA_PKG_IUSE="doc source test binary"
JAVA_TESTING_FRAMEWORKS="pkgdiff"

inherit java-pkg-2 java-pkg-simple java-pkg-maven

DESCRIPTION="API for modelling and manipulating 2-dimensional linear geometry"
HOMEPAGE="https://sourceforge.net/projects/jts-topo-suite"
SRC_URI="
    https://repol.maven.org/maven2/com/vividolutions/${PN}/${PV}/${P}-sources.jar
    https://repol.maven.org/maven2/com/vividolutions/${PN}/${PV}/${P}.jar -> ${P}-bin.jar
"
LICENSE="LGPL-3"
SLOT="${PV}"
KEYWORDS=""

# Common dependencies
# POM: /tmp/java-ebuilder/poms/${P}.pom
# xerces:xercesImpl:2.4.0 -> dev-java/xerces:2

CP_DEPEND="
    dev-java/xerces:2
"

1,1 Top
```



Kotlin 现状

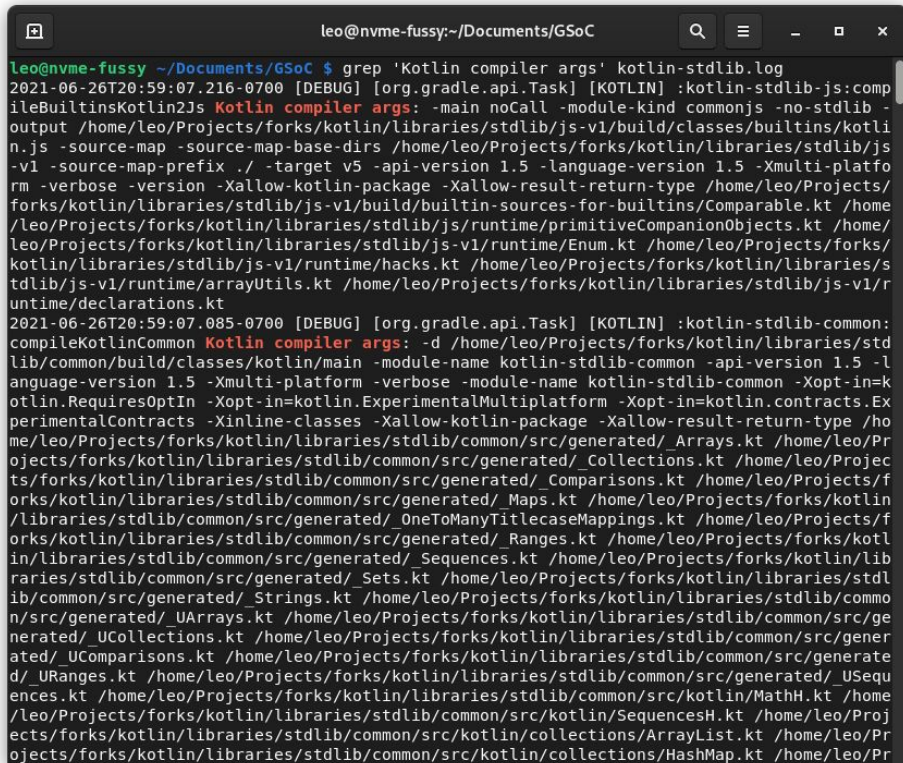
- 使用 Gradle 管理 Kotlin 项目已是惯例
 - Kotlin 编程语言项目自己也使用 Gradle
- Gradle 后来也支持起了用 Kotlin DSL 来写 `build.gradle`



- 一切的基础: Kotlin Gradle 插件

偶然发现

- 尝试使用 `kotlinc` 编译测试, 未果
- 开启 Gradle `--debug` 输出, 发现线索
- 将调试日志中的命令行参数传入 `kotlinc`, 编译 `kotlin-stdlib`, 编译器无报错, 只是没有生成 `*.kotlin_builtins` 文件



```
leo@nvme-fussy:~/Documents/GSoC
2021-06-26T20:59:07.216-0700 [DEBUG] [org.gradle.api.Task] [KOTLIN] :kotlin-stdlib-js:compileBuiltinsKotlin2Js Kotlin compiler args: -main noCall -module-kind commonjs -no-stdlib -output /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/build/classes/builtins/kotlin.js -source-map -source-map-base-dirs /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1 -source-map-prefix ./ -target v5 -api-version 1.5 -language-version 1.5 -Xmulti-platform -verbose -version -Xallow-kotlin-package -Xallow-result-return-type /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/build/builtin-sources-for-builtins/Comparable.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/js/runtime/primitiveCompanionObjects.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/runtime/Enum.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/runtime/hacks.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/runtime/arrayUtils.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/js-v1/runtime/declarations.kt
2021-06-26T20:59:07.085-0700 [DEBUG] [org.gradle.api.Task] [KOTLIN] :kotlin-stdlib-common:compileKotlinCommon Kotlin compiler args: -d /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/build/classes/kotlin/main -module-name kotlin-stdlib-common -api-version 1.5 -language-version 1.5 -Xmulti-platform -verbose -module-name kotlin-stdlib-common -Xopt-in=kotlin.RequiresOptIn -Xopt-in=kotlin.ExperimentalMultiplatform -Xopt-in=kotlin.ExperimentalContracts -Xinline-classes -Xallow-kotlin-package -Xallow-result-return-type /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Arrays.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Collections.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Comparisons.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Maps.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_OneToManyTitlecaseMappings.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Ranges.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Sequences.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Sets.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_Strings.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_UArrays.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_UCollections.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_UComparisons.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_URanges.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/generated/_USequences.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/kotlin/MathH.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/kotlin/SequencesH.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/kotlin/collections/ArrayList.kt /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/src/kotlin/collections/HashMap.kt /home/leo/Pr
```


特殊情况 1: kotlin-stdlib 中的内建类

```
$ kotlinc
Exception in thread "main" java.lang.reflect.InvocationTargetException
    at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.lang.reflect.Method.invoke(Method.java:498)
    at org.jetbrains.kotlin.preloading.Preloader.run(Preloader.java:87)
    at org.jetbrains.kotlin.preloading.Preloader.main(Preloader.java:44)
Caused by: java.lang.AssertionError: Built-in class kotlin.Any is not found
    at kotlin.reflect.jvm.internal.impl.builtins.KotlinBuiltIns$3.invoke(KotlinBuiltIns.java:93)
    at kotlin.reflect.jvm.internal.impl.builtins.KotlinBuiltIns$3.invoke(KotlinBuiltIns.java:88)
    ...
```

```
$ find -name "*.kotlin_builtins"
./core/builtins/build/serialize/kotlin/reflect/reflect.kotlin_builtins
./core/builtins/build/serialize/kotlin/kotlin.kotlin_builtins
./core/builtins/build/serialize/kotlin/collections/collections.kotlin_builtins
./core/builtins/build/serialize/kotlin/coroutines/coroutines.kotlin_builtins
./core/builtins/build/serialize/kotlin/ranges/ranges.kotlin_builtins
./core/builtins/build/serialize/kotlin/annotation/annotation.kotlin_builtins
./core/builtins/build/serialize/kotlin/internal/internal.kotlin_builtins
./idea/testData/decompiler/builtins/test/test.kotlin_builtins
```

```
2021-06-26T20:59:06.995-0700 [DEBUG] [org.gradle.internal.execution.steps.SkipUpToDateStep] Determining if
2021-06-26T20:59:06.995-0700 [INFO] [org.gradle.internal.execution.steps.SkipUpToDateStep] Task ':core:bui
    No history is available.
2021-06-26T20:59:06.996-0700 [DEBUG] [org.gradle.internal.execution.steps.CreateOutputsStep] Ensuring dire
2021-06-26T20:59:06.996-0700 [DEBUG] [org.gradle.api.internal.tasks.execution.ExecuteActionsTaskExecuter]
2021-06-26T20:59:07.000-0700 [DEBUG] [org.gradle.internal.operations.DefaultBuildOperationRunner] Build op
2021-06-26T20:59:07.000-0700 [DEBUG] [org.gradle.internal.operations.DefaultBuildOperationRunner] Build op

2021-06-26T20:59:07.004-0700 [INFO]
[org.gradle.process.internal.DefaultExecHandle] Starting process 'command '/usr/lib64/openjdk-8/bin/java''
Working directory: /home/leo/Projects/forks/kotlin/core/builtins
Command:
/usr/lib64/openjdk-8/bin/java -Didea.io.use.nio2=true -Dfile.encoding=UTF-8
-Duser.country=US -Duser.language=en -Duser.variant
-cp /home/leo/.nbackup/gradle/.gradle/caches/modules-2/files-2.1/org.jetbrains.kotlin/kotlin-compiler-emb
org.jetbrains.kotlin.serialization.builtins.RunKt build/serialize src native build/src

2021-06-26T20:59:07.004-0700 [DEBUG] [org.gradle.process.internal.DefaultExecHandle] Changing state to: ST
2021-06-26T20:59:07.004-0700 [DEBUG] [org.gradle.process.internal.DefaultExecHandle] Waiting until process
2021-06-26T20:59:07.007-0700 [DEBUG] [org.gradle.process.internal.DefaultExecHandle] Changing state to: ST
2021-06-26T20:59:07.007-0700 [INFO] [org.gradle.process.internal.DefaultExecHandle] Successfully started p
```

特殊情况 2: 编译 Java 源文件

```
leo@nvme-fussy:~/Documents/GSoC
leo@nvme-fussy ~/Documents/GSoC $ grep 'NormalizingJavaCompiler' kotlin-stdlib.log
2021-06-26T20:59:17.561-0700 [DEBUG] [org.gradle.api.internal.tasks.compile.NormalizingJavaCompiler] Compiler arguments: -source 1.6 -target 1.6 -d /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/build/classes/java/main -encoding UTF-8 -h /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/build/generated/sources/headers/java/main -g -sourcepath -proc:none -s /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/build/generated/sources/annotationProcessor/java/main -XDuseUnsharedTable=true -classpath /home/leo/Projects/foraks/kotlin/core/builtins/build/libs/builtins-1.5.255-SNAPSHOT.jar:/home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/build/classes/kotlin/main -proc:none -proc:none /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/src/kotlin/annotations/jvm/MigrationStatus.java /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/src/kotlin/annotations/jvm/Mutable.java /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/src/kotlin/annotations/jvm/ReadOnly.java /home/leo/Projects/foraks/kotlin/libraries/tools/kotlin-annotations-jvm/src/kotlin/annotations/jvm/UnderMigration.java
2021-06-26T21:01:07.709-0700 [DEBUG] [org.gradle.api.internal.tasks.compile.NormalizingJavaCompiler] Compiler arguments: -source 1.6 -target 1.6 -d /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/build/classes/java/main -encoding UTF-8 -h /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/build/generated/sources/headers/java/main -g -sourcepath -proc:none -s /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/build/generated/sources/annotationProcessor/java/main -XDuseUnsharedTable=true -classpath /home/leo/Projects/foraks/kotlin/libraries/stdlib/common/build/libs/kotlin-stdlib-common-1.5.255-SNAPSHOT.jar:/home/leo/Projects/foraks/kotlin/core/builtins/build/libs/builtins-1.5.255-SNAPSHOT.jar:/home/leo/.nbackup/gradle/.gradle/caches/modules-2/files-2.1/org.jetbrains.annotations/13.0/919f0dfef92fb4e063e7dacadee7f8bb9a2672a9/annotations-13.0.jar:/home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/build/classes/kotlin/main -proc:none -proc:none /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/InlineMarker.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/MagicApiIntrinsics.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/Ref.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/SpreadBuilder.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/TypeIntrinsics.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/AdaptedFunctionReference.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/CallableReference.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/DefaultConstructorMarker.java /home/leo/Projects/foraks/kotlin/libraries/stdlib/jvm/runtime/kotlin/jvm/internal/FunctionAdapter.java /ho
```

```
leo@nvme-fussy:~/Projects/gsoc/spark-overlay/eclass — vi kotlin-utils.eclass
#@ECLASS-VARIABLE: KOTLIN JAVA SOURCE ROOTS
#@DEFAULT UNSET
#@DESCRIPTION:
# An array of the arguments to kotlinc's -Xjava-source-roots option. This
# eclass will concatenate each element in the array into a single string, using
# a comma to separate each pair of adjacent elements, and pass the string as
# the option's value to kotlinc. All Java sources in the specified directory
# will be compiled after the Kotlin sources. Default is unset, can be
# overridden from ebuild anywhere.
kotlin-utils.eclass [+] 80,21 10%
IFS=' '
local java_source_roots="${KOTLIN JAVA SOURCE ROOTS:+-Xjava-source-roots=${KOTLIN JAVA SOURCE ROOTS[*]}}"
IFS="${OLD_IFS}"

local compiler_command_args=(
    "${compiler_executable}"
    "${KOTLIN WANT_TARGET:+-api-version ${KOTLIN WANT_TARGET}}"
    "${KOTLIN WANT_TARGET:+-language-version ${KOTLIN WANT_TARGET}}"
    "${KOTLIN_MODULE_NAME:+-module-name ${KOTLIN_MODULE_NAME}}"
    "${common_sources}"
    "${java_source_roots}"
    "${KOTLIN_KOTLINC_ARGS[@]}"
    "$@"
)
local compiler_command="${compiler_command_args[@]}"

ebegin "Compiling"
JAVA_OPTS="${KOTLIN_KOTLINC JAVA_OPTS}" ${compiler_command} || \
die "${FUNCNAME} failed"
}

#@FUNCTION: kotlin-utils_src_compile
#@DESCRIPTION:
kotlin-utils.eclass [+] 453,0-1 63%
```



特殊情况 3: Java 包重定位

```
root@nvme-fussy:/var/tmp/portage/dev-java/kotlin-protobuf-L...
// A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
// OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
// SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
// LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
// DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
// OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

package org.jetbrains.kotlin.protobuf;

import java.io.InputStream;

/**
 * Abstract interface for parsing Protocol Messages.
 *
 * The implementation should be stateless and thread-safe.
 *
 * @author liujisi@google.com (Pherl Liu)
 */
public interface Parser<MessageType> {
    /**
     * Parses a message of {@code MessageType} from the input.
     */
}
```



```
root@nvme-fussy:/var/tmp/portage/dev-java/kotlin-protobuf-L...
// A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
// OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
// SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
// LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
// DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
// OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

package kotlin.reflect.jvm.internal.impl.protobuf;

import java.io.InputStream;

/**
 * Abstract interface for parsing Protocol Messages.
 *
 * The implementation should be stateless and thread-safe.
 *
 * @author liujisi@google.com (Pherl Liu)
 */
public interface Parser<MessageType> {
    /**
     * Parses a message of {@code MessageType} from the input.
     */
}
```



特殊情况 3: Java 包重定位

Changes report for the `kotlin-reflect` package between `1.5.20-bin` and `1.5.20` versions

added	unchanged
changed	removed

Test info

Package Name	kotlin-reflect
Package Format	JAR
Version #1	1.5.20-bin
Version #2	1.5.20

Test Results

Total Packages	2
Total Files	68
Verdict	Changed (0.3%)

Changes In Files

File Type	Total	Added	Removed	Changed
Directory	68	1	0	0

Directories (68)

Name	Status
kotlin	unchanged
kotlin/reflect	unchanged
kotlin/reflect/full	unchanged
kotlin/reflect/jvm	unchanged
kotlin/reflect/jvm/internal	unchanged
kotlin/reflect/jvm/internal/calls	unchanged
kotlin/reflect/jvm/internal/impl	unchanged
kotlin/reflect/jvm/internal/impl/builtins	unchanged
kotlin/reflect/jvm/internal/impl/builtins/functions	unchanged
kotlin/reflect/jvm/internal/impl/builtins/jvm	unchanged
kotlin/reflect/jvm/internal/impl/container	added
kotlin/reflect/jvm/internal/impl/descriptors	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/annotations	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/deserialization	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/impl	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/java	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/runtime	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/runtime/components	unchanged
kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure	unchanged

最终成果

Package	Maven Central Artifact	Description	Status	Comments
Kotlin Standard Library				
dev-java/kotlin-stdlib	org.jetbrains.kotlin:kotlin-stdlib org.jetbrains.kotlin:kotlin-stdlib-common	Kotlin Standard Library for JVM	✓ Works	
dev-java/kotlin-stdlib-jdk7	org.jetbrains.kotlin:kotlin-stdlib-jdk7	Kotlin Standard Library JDK 7 extension	✓ Works	
dev-java/kotlin-stdlib-jdk8	org.jetbrains.kotlin:kotlin-stdlib-jdk8	Kotlin Standard Library JDK 8 extension	✓ Works	
dev-java/kotlin-stdlib-js	org.jetbrains.kotlin:kotlin-stdlib-js	Kotlin Standard Library for JavaScript	✗ Unchecked	There is not a known method to reproduce a JAR that is equivalent to the upstream's pre-built JAR from Portage. The upstream provides a Mocha test suite, which is yet to be integrated with the ebuild.
kotlin.test				
dev-java/kotlin-test	org.jetbrains.kotlin:kotlin-test org.jetbrains.kotlin:kotlin-test-common	Kotlin Test Multiplatform library	✓ Works	
dev-java/kotlin-test-junit	org.jetbrains.kotlin:kotlin-test-junit	Kotlin Test Support for JUnit 4	✓ Works	
dev-java/kotlin-test-js	org.jetbrains.kotlin:kotlin-test-js	Kotlin Test for JavaScript	✗ Unchecked	There is not a known method to reproduce a JAR that is equivalent to the upstream's pre-built JAR from Portage, and the upstream does not have a test suite that can be used to test this package.
Other Library Components				
dev-java/kotlin-reflect	org.jetbrains.kotlin:kotlin-reflect	Kotlin Full Reflection Library	✓ Should Work	There is not a known method to reproduce a JAR that is structurally identical to the upstream's pre-built JAR from Portage, and the upstream does not have a test suite that can be used to test this package. However, when this package is used with the Kotlin compiler, no undesired or unexpected behavior would be exhibited.
dev-java/kotlin-annotations-jvm	org.jetbrains.kotlin:kotlin-annotations-jvm	Kotlin annotations for JVM	✓ Works	
Compiler				
dev-lang/kotlin-bin	org.jetbrains.kotlin:kotlin-compiler	Binary package for the Kotlin compiler	✓ Works	
virtual/kotlin	N/A	Virtual for the Kotlin compiler	✓ Works	

<https://wiki.gentoo.org/wiki/User:Leo3418/Kotlin>

软件包测试

一个测试工程师走进一家酒吧，要了一杯啤酒
一个测试工程师走进一家酒吧，要了一杯咖啡
一个测试工程师走进一家酒吧，要了0.7杯啤酒
一个测试工程师走进一家酒吧，要了-1杯啤酒
一个测试工程师走进一家酒吧，要了2^32杯啤酒
一个测试工程师走进一家酒吧，要了一杯洗脚水
一个测试工程师走进一家酒吧，要了一杯蜥蜴
一个测试工程师走进一家酒吧，要了一份asdfQwer@24dg!&* (@
一个测试工程师走进一家酒吧，什么也没要
一个测试工程师走进一家酒吧，又走出去又从窗户进来又从后门出去从下水道钻进来
一个测试工程师走进一家酒吧，又走出去又进来又出去又进来又出去，最后在外面把老板打了一顿
一个测试工程师走进一
一个测试工程师走进一家酒吧，要了一杯烫烫烫的银斤拷

一个测试工程师走进一家酒吧，要了NaN杯Null
1T测试工程师冲进一家酒吧，要了500T啤酒咖啡洗脚水野猫狼牙棒奶茶
1T测试工程师把酒吧拆了
一个测试工程师化装成老板走进一家酒吧，要了500杯啤酒并且不付钱
一万个测试工程师在酒吧门外呼啸而过
一个测试工程师走进一家酒吧，要了一杯啤酒';DROP TABLE 酒吧

测试工程师们满意地离开了酒吧。然后一名顾客点了一份炒饭，酒吧炸了

目的

- 尽早发现导致软件包不能被安装的问题
- 测试软件包能否在不同配置下安装
- 确保对软件包的修改不会引入新的 bug

```
leo@nvme-fussy:~  
leo@nvme-fussy ~ $ emerge -p dev-java/velocity:1.7  
These are the packages that would be merged, in order:  
  
Calculating dependencies... done!  
[ebuild N ] dev-java/log4j-1.2.17-r3 USE="-doc -javamail -jms -source"  
[ebuild N ] dev-java/commons-collections-3.2.2 USE="-doc -source -test"  
[ebuild N ] dev-java/commons-lang-2.6-r1 USE="-doc -source -test"  
[ebuild N ] dev-java/jakarta-oro-2.0.8-r5 USE="-doc -examples -source"  
[ebuild N ] dev-java/commons-logging-1.2-r3 USE="-avalon-framework -avalon  
-logkit -doc -log4j -servletapi -source -test"  
[ebuild N ] dev-java/jdom-1.1.3-r1 USE="-doc -examples -source"  
[ebuild N #] dev-java/werken-xpath-0.9.4 USE="-doc -source"  
[ebuild N ] dev-java/tomcat-servlet-api-9.0.50 USE="-source"  
[ebuild N ] dev-java/oracle-javamail-1.5.6-r1 USE="-doc -source"  
[ebuild N ~] dev-java/glassfish-jms-api-1.1.2.2.04-r2 USE="-doc -source"  
[ebuild N ] dev-java/tomcat-servlet-api-7.0.109 USE="-source"  
[ebuild N ] java-virtuals/servlet-api-4.0  
[ebuild N ] java-virtuals/jms-1.1  
[ebuild N ] java-virtuals/servlet-api-3.0-r2  
[ebuild N ] dev-java/avalon-logkit-2.1-r9 USE="-doc -source -test"  
[ebuild N ~] dev-java/velocity-1.7 USE="-binary -doc -source -test"  
leo@nvme-fussy ~ $
```

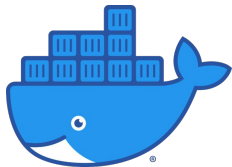
```
leo@nvme-fussy:~  
leo@nvme-fussy ~ $ USE="binary" emerge -p dev-java/velocity:1.7  
These are the packages that would be merged, in order:  
  
Calculating dependencies... done!  
[ebuild N ] dev-java/commons-collections-3.2.2 USE="-doc -source -test"  
[ebuild N ] dev-java/commons-lang-2.6-r1 USE="-doc -source -test"  
[ebuild N ] dev-java/jakarta-oro-2.0.8-r5 USE="-doc -examples -source"  
[ebuild N ~] dev-java/velocity-1.7 USE="binary -doc -source -test"  
leo@nvme-fussy ~ $
```

需求

- 测试应基于全新的 Gentoo 系统映像运行
- 既可在 CI 环境运行, 也能在开发者自己的电脑上运行
- 同样的测试逻辑, 可以应用不同的 Portage 配置, 形成多个测试用例

No.	KEYWORD	USE	FEATURES
1	"amd64"	""	""
2	"amd64"	""	"test"
3	"amd64"	"binary"	""
4	"amd64"	"binary"	"test"
5	"~amd64"	""	""
6	"~amd64"	""	"test"
7	"~amd64"	"binary"	""
8	"~amd64"	"binary"	"test"

实现



- Docker: Gentoo Docker 映像相当于全新的 Gentoo 环境, 可用于测试
- ebuild-commander: 受已有的 [ebuildtester](#) 启发, 但允许运行任意命令
- 一些调用 ebuild-commander 的 Bash 脚本
- GitHub Actions

```
leo@nvme-fussy:~/Projects/gsoc/spark-overlay/tests/test-case...
$ run_test() {
# Update dependencies pre-installed in the Docker image
emerge -1 dev-java/jsr305

# Dependency bootstrap stage 1
mkdir -p /etc/portage/package.use
echo "dev-java/kotlin-stdlib binary" \
  >> /etc/portage/package.use/spark-deps-binary
echo "dev-java/kotlin-reflect binary" \
  >> /etc/portage/package.use/spark-deps-binary
echo "dev-java/gpars binary" \
  >> /etc/portage/package.use/spark-deps-binary
echo "dev-java/yecht binary" \
  >> /etc/portage/package.use/spark-deps-binary
emerge -1 dev-lang/kotlin-bin:1.4 dev-java/gpars dev-java/yecht

# Dependency bootstrap stage 2
rm /etc/portage/package.use/spark-deps-binary
emerge -N1 dev-java/kotlin-{stdlib,reflect}:1.4 \
  dev-java/gpars dev-java/yecht

emerge dev-java/spark-demo
spark-demo-2.12 "${nproc}"
}
7,1 Bot
```

```
leo@nvme-fussy:~$ ebuild-cmdr --help
usage: ebuild-cmdr [OPTION]... [SCRIPT]...

Run the SCRIPTs in a Docker container derived from a Gentoo stage3 image.
With no SCRIPT, or when SCRIPT is -, read standard input.

optional arguments:
  --portage-config DIR  copy configuration in DIR to container's /etc/portage,
                        ignoring make.profile and repos.conf; can be set
                        repeatedly to overlay configuration directories on top
                        of directories specified earlier in the command
                        (default: /etc/portage if this option is never used)
  --profile TARGET     run 'eselect profile set TARGET' when container starts
                        (default: default/linux/amd64/17.1)
  --gentoo-repo DIR    use Gentoo repository at DIR
                        (default: /var/db/repos/gentoo)
  --custom-repo DIR    add a custom ebuild repository at DIR
                        (can be set repeatedly to use multiple repositories)
  --threads JOBS       specify '-j JOBS' in MAKEOPTS
                        (default: number of CPU threads)
  --emerge-opts OPTS   run emerge with OPTS added to command-line arguments
                        (default: --color y --verbose)
  --docker-image IMAGE create the container from the specified Docker IMAGE
                        (default: gentoo/stage3)
  --pull               download the latest version of the Docker image
  --storage-opt OPTS  set '--storage-opt OPTS' in Docker's arguments
  --skip-cleanup {always,on-fail,never}
                        skip container clean-up before exiting
                        (default: on-fail)
  --help              display this help and exit
  --version            output version information and exit

exit status:
  0 if OK,
  1 if minor problems (e.g. cannot access any SCRIPT),
  2 if unrecognized arguments,
  3 if serious trouble (e.g. cannot run a Docker command).
leo@nvme-fussy ~$
```

实现



Search or jump to... Pull requests Issues Marketplace Explore

6-6-6 / spark-overlay Unwatch 3 Star 2 Fork 3

<> Code Issues 1 Pull requests 2 Actions Projects Wiki Security Insights

Test ebuids in Docker container Test ebuids in Docker container #6

Triggered via schedule 5 hours ago Status Success Total duration 3h 5m 29s Artifacts 6

Leo3418 -> e89a0b

Summary

Jobs

- test-cases (spark)
- test-cases (spark, ~amd64)
- test-cases (kotlin-latest)
- test-cases (kotlin-1.4)
- leaf-ebuids (leaf-ebuids, true)
- leaf-ebuids (leaf-ebuids, ~amd64, true)
- leaf-ebuids (leaf-ebuids-test, true)
- leaf-ebuids (leaf-ebuids-test, ~amd64, true)
- leaf-ebuids (leaf-ebuids-binary-test, true)
- leaf-ebuids (leaf-ebuids-binary-test, ~amd64, true)
- leaf-ebuids (leaf-ebuids-binary, false)
- leaf-ebuids (leaf-ebuids-binary, ~amd64, false)

docker.yml

orc: schedule

Matrix: leaf-ebuids

- leaf-ebuids (leaf-ebuids... 2h 56m)
- leaf-ebuids (leaf-ebuids... 3h 5m)
- leaf-ebuids (leaf-ebuid... 42m 34s)
- leaf-ebuids (leaf-ebuid... 47m 57s)
- leaf-ebuids (leaf-ebuids... 2h 31m)
- leaf-ebuids (leaf-ebuids... 2h 47m)
- leaf-ebuids (leaf-ebuids... 2h 5m)
- leaf-ebuids (leaf-ebuids... 2h 7m)

Matrix: test-cases

- test-cases (spark) 2h 10m
- test-cases (spark, ~amd... 2h 39m)
- test-cases (kotlin-latest) 47m 54s

Annotations

6 errors

- leaf-ebuids (leaf-ebuids-test, true)

<https://github.com/6-6-6/spark-overlay/tree/master/.github>

效果

前几天还真抓到了一个问题！

```
test-cases (spark)
failed 2 days ago in 15m 52s

▼ ❌ Run //github/actions/run-test-case

639 >>> Jobs: 59 of 76 complete, 1 running      Load avg: 1.43, 1.44, 0.85
640 >>> Installing (60 of 76) dev-java/xpp2-2.1.10-r3:gentoo
641 >>> Jobs: 59 of 76 complete, 1 running      Load avg: 1.37, 1.43, 0.85
642 >>> Jobs: 59 of 76 complete                 Load avg: 1.37, 1.43, 0.85
643 >>> Jobs: 60 of 76 complete                 Load avg: 1.37, 1.43, 0.85
644 >>> Jobs: 60 of 76 complete, 1 running      Load avg: 1.37, 1.43, 0.85
645 >>> Emerging (61 of 76) dev-java/ant-ivy-2.4.0:spark-overlay
646 >>> Jobs: 60 of 76 complete, 1 running      Load avg: 1.37, 1.43, 0.85
647 >>> Failed to emerge dev-java/ant-ivy-2.4.0, Log file:
648 >>> Jobs: 60 of 76 complete, 1 running      Load avg: 1.16, 1.38, 0.84
649 >>> '/var/log/emerge/dev-java:ant-ivy-2.4.0:20210805-151537.log'
650 >>> Jobs: 60 of 76 complete, 1 running      Load avg: 1.16, 1.38, 0.84
651 >>> Jobs: 60 of 76 complete, 1 running, 1 failed Load avg: 1.16, 1.38, 0.84
652 >>> Jobs: 60 of 76 complete, 1 failed      Load avg: 1.16, 1.38, 0.84
653
```

```
>>> Downloading 'http://distfiles.gentoo.org/distfiles/ae/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:37-- http://distfiles.gentoo.org/distfiles/ae/apache-ivy-2.4.0-src.tar.gz
Resolving distfiles.gentoo.org... 89.187.164.37, 89.187.164.10, 2a02:6ea0:d200::5, ...
Connecting to distfiles.gentoo.org|89.187.164.37|:80... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:37 ERROR 404: Not Found.

>>> Downloading 'https://apache.lauf-forum.at/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:37-- https://apache.lauf-forum.at/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving apache.lauf-forum.at... 136.243.81.188, 2a01:4f8:212:2f98::101
Connecting to apache.lauf-forum.at|136.243.81.188|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:38 ERROR 404: Not Found.

>>> Downloading 'https://apache.mirror.digionline.de/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:38-- https://apache.mirror.digionline.de/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving apache.mirror.digionline.de... 62.96.182.142
Connecting to apache.mirror.digionline.de|62.96.182.142|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:39 ERROR 404: Not Found.

>>> Downloading 'https://ftp.halifax.rwth-aachen.de/apache/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:39-- https://ftp.halifax.rwth-aachen.de/apache/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving ftp.halifax.rwth-aachen.de... 137.226.34.46, 2a00:8a60:e012:a00::21
Connecting to ftp.halifax.rwth-aachen.de|137.226.34.46|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:40 ERROR 404: Not Found.

>>> Downloading 'https://apache.mirror.iphh.net/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:40-- https://apache.mirror.iphh.net/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving apache.mirror.iphh.net... 62.201.161.83, 2001:868:0:182::3
Connecting to apache.mirror.iphh.net|62.201.161.83|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:41 ERROR 404: Not Found.

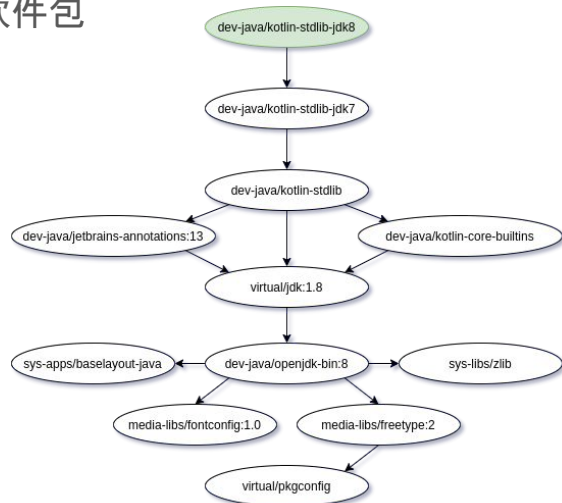
>>> Downloading 'https://apache.mirrors.hoobly.com/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:41-- https://apache.mirrors.hoobly.com/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving apache.mirrors.hoobly.com... 69.64.41.166
Connecting to apache.mirrors.hoobly.com|69.64.41.166|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:41 ERROR 404: Not Found.

>>> Downloading 'https://apache.osuosl.org/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:41-- https://apache.osuosl.org/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving apache.osuosl.org... 140.211.166.134, 64.50.236.52, 64.50.233.100, ...
Connecting to apache.osuosl.org|140.211.166.134|:443... connected.
HTTP request sent, awaiting response... 404 Not Found
2021-08-05 15:15:41 ERROR 404: Not Found.

>>> Downloading 'http://www.gtlib.gatech.edu/pub/apache/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz'
--2021-08-05 15:15:41-- http://www.gtlib.gatech.edu/pub/apache/ant/ivy/2.4.0/apache-ivy-2.4.0-src.tar.gz
Resolving www.gtlib.gatech.edu... 128.61.111.7, 128.61.111.11, 128.61.111.9, ...
Connecting to www.gtlib.gatech.edu|128.61.111.7|:80... connected.
HTTP request sent, awaiting response... 404 Not Found
```

应用

- 叶子软件包屈指可数，剩下的几乎全是它们的依赖的 overlay，如 Spark overlay
- 叶子软件包较多的 overlay：可使用图论中的算法找出所有叶子软件包，然后分别安装
- 规模浩大的 Gentoo 官方仓库：无法完全测试，但仍可用于测试子集
 - 提交 ebuild Pull Request 时，测试有变动的 ebuild 和受影响的软件包
 - 维护少量固定软件包的维护人员可以只测试他们维护的包



未来展望

- 找出在 Portage 中重现上游编译的 `kotlin-reflect.jar` 的方法
- 将分析 Gradle 调试日志、收集编译器选项并生成 ebuild 的过程自动化, 方便未来更新及扩充 Kotlin 软件包
- 修复 Spark overlay 中失败的 ebuild 测试, 或者屏蔽无法通过的测试

鸣谢

- 本达老师对项目的指导、提供此次交流机会
- Gentoo 开发者 fordfrog 的指导与合作
- Harry Chen 同学组织本次 Tunight
- 每一位观众的参与

问答