sbt Reference Manual

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sbt

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, .sbt ,scopes,

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sbt !

sbt

sbt , :

- sbt
- hello world
  –
  –
- sbt sbt
- .sbt

, Jar Shell , , macOS,Windows, Linux

sbt , (terminal encoding),HTTP ,JVM

macOS sbt

ZIP TGZ

: ,

Homebrew

```
$ brew install sbt
```

SDKMAN!

```
$ sdk install sbt
```

Windows sbt

ZIP TGZ

Windows

msi

: ,

Scoop

```
$ scoop install sbt
```

Linux sbt

Installing from SDKMAN

To install both JDK and sbt, consider using SDKMAN.

```
$ sdk list java
$ sdk install java 11.0.4.hs-adpt
$ sdk install sbt
```

This has two advantages. 1. It will install the official packaging by AdoptOpenJDK, as opposed to the "mystery meat OpenJDK builds". 2. It will install `tgz` packaging of sbt that contains all JAR files. (DEB and RPM packages do not to save bandwidth)

ZIP TGZ

Ubuntu Debian

DEB sbt

Ubuntu Debian DEB , DEB , , (`apt-get`,`aptitude`) (Synaptic) `sbt`(, `sudo`)

```
echo "deb https://dl.bintray.com/sbt/debian /" | sudo tee -a /etc/apt/sources.list.d/sbt.list
curl -sL "https://keyserver.ubuntu.com/pks/lookup?op=get&search=0x2EE0EA64E40A89B84B2DF73499
sudo apt-get update
sudo apt-get install sbt
```

sbt Bintray, Bintray APT
`sbt`, `aptitude` Synaptic , `System Settings ->
Software & Updates -> Other Software`:

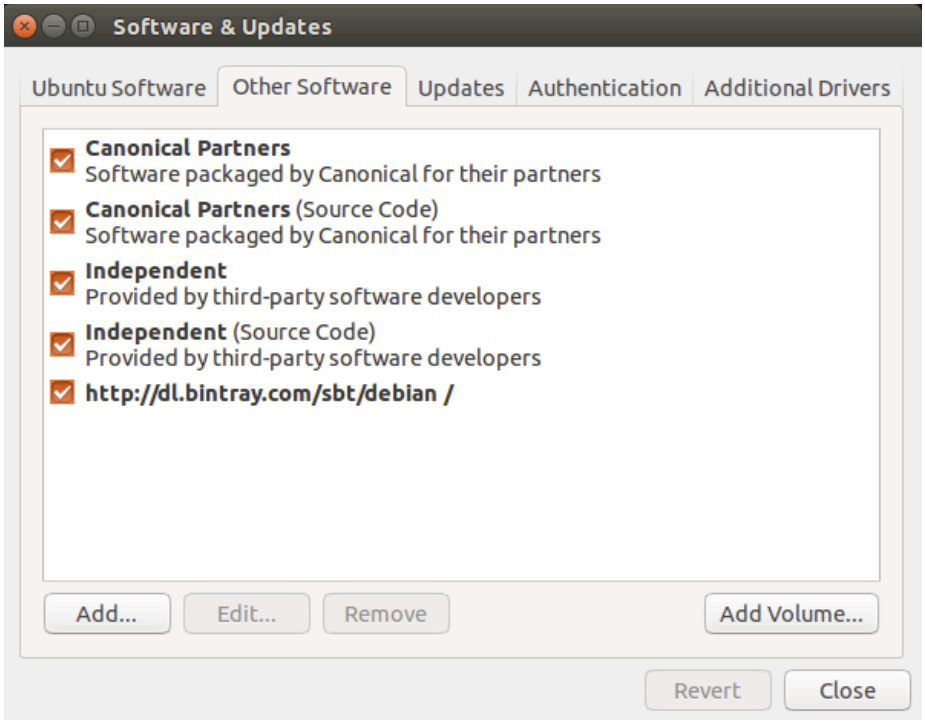

Figure 1: Ubuntu Software & Updates Screenshot

Linux RPM

RPM sbt

Linux RPM RPM `sbt`(, `sudo`)

```
curl https://bintray.com/sbt/rpm/rpm > bintray-sbt-rpm.repo
sudo mv bintray-sbt-rpm.repo /etc/yum.repos.d/
sudo yum install sbt
```

sbt Bintray, Bintray RPM

: sbt-launcher-package

Gentoo

sbt ebuild sbt ebuilds ebuilds sbt:

```
emerge dev-java/sbt
```

Hello, World

sbt

sbt `hello` , `hw.scala`:

```
object Hi {
  def main(args: Array[String]) = println("Hi!")
}
```

`hello` sbt, `run` sbt Linux OS X :

```
$ mkdir hello
$ cd hello
$ echo 'object Hi { def main(args: Array[String]) = println("Hi!") }' > hw.scala
$ sbt
...
> run
...
Hi!
```

,sbt sbt :

-
- `src/main/scala` `src/main/java`
- `src/test/scala` `src/test/java`
- `src/main/resources` `src/test/resources`
- `lib` jar

,sbt Scala `sbt run` `sbt console` Scala REPL `sbt console` classpath, Scala

`build.sbt` , `hello` , `hello/build.sbt` :

```
lazy val root = (project in file("."))
  .settings(
    name := "hello",
    version := "1.0",
    scalaVersion := "2.12.10"
  )
```

.sbt `build.sbt`

jar , `build.sbt` name version

sbt

`hello/project/build.properties` sbt , 1.3.2:

```
sbt.version=1.3.2
```

sbt release 99% `project/build.properties` sbt

sbt Hello, World

sbt ,“ ” , Hello, World `hello` , `hello/build.sbt` `hello/hw.scala`, `hello`

`hello/hw.scala` , , sbt Maven ( ):

```
src/
  main/
    resources/
       <files to include in main jar here>
    scala/
       <main Scala sources>
    scala-2.12/
```

```
      <main Scala 2.12 specific sources>
    java/
      <main Java sources>
  test/
    resources
      <files to include in test jar here>
    scala/
      <test Scala sources>
    scala-2.12/
      <test Scala 2.12 specific sources>
    java/
      <test Java sources>
```

src/ ,

sbt

build.sbt sbt project project .scala , .sbt

```
build.sbt
project/
  Build.scala
```

project/ .sbt , .sbt ,

(classes, jars, ,caches) target

.gitignore ( ) :

```
target/
```

: / ( ) / (target/ project/target/)

sbt sbt Hello, World

sbt :

```
$ sbt
```

sbt (tab)

, sbt `compile`:

```
> compile
```

`compile`, , `run` `exit` Ctrl+D (Unix) Ctrl+Z (Windows)

sbt, sbt , sbt :

```
$ sbt clean compile "testOnly TestA TestB"
```

,`testOnly` `TestA` `TestB` (`clean`, `compile`, `testOnly`)

- - , sbt ~ , , :

```
> ~ compile
```

~

sbt

clean

(target)

compile

(src/main/scala src/main/java)

test

console

classpath Scala :quit, Ctrl+D (Unix), Ctrl+Z (Windows)

sbt

run < >*

sbt main class

package

src/main/resources src/main/scala src/main/java class jar

help < >

,

reload

(build.sbt, project/*.scala, project/*.sbt)

Tab

tab sbt , tab ,

, sbt :

!

!!

!:

!:n

n

!n

!: n

!-n

n

!string

string

!?string

string

.sbt

sbt , “ ” `build.sbt` sbt

1. `.sbt`
2. bare `.sbt`

.sbt , , [bare .sbt][Bare-Def] .scala
( )

, `.scala` , `project/` ,

?

sbt , `Project`

`build.sbt` Project , :

```
lazy val root = (project in file("."))
```

(immutable map)( )

, `name` key, ,

sbt *map*

, `Setting[T]` ,`T` (value) `Setting` *(map)* ,
value (, map —— map)

`Setting[String]`, :

```
lazy val root = (project in file("."))
  .settings(
    name := "hello"
  )
```

`Setting[String]` ( )`name` `"hello"` map map sbt map

map,sbt , key , value key, key , sbt
`Settings` , map

: `Project`, `Setting[T]` ,`Setting[T]` sbt map ,`T`
value

build.sbt

`build.sbt` `Project`, `settings` scala

:

```
ThisBuild / organization := "com.example"
ThisBuild / scalaVersion := "2.12.10"
ThisBuild / version      := "0.1.0-SNAPSHOT"
```

```
lazy val root = (project in file("."))
  .settings(
    name := "hello"
  )
```

Setting Scala settings , , Scala

val,lazy val,def build.sbt object class project/ Scala

,name, version scalaVersion *(keys)* (key) SettingKey[T],TaskKey[T] InputKey[T] ,T value key

(Keys) Setting[T] := Java :

```
lazy val root = (project in file("."))
  .settings(
    name.:=("hello")
  )
```

,Scala name := "hello" (Scala ,)

(key)name := Setting, Setting[String] String name SettingKey[String] , Setting[String] sbt map name , "hello"

value, :

```
lazy val root = (project in file("."))
  .settings(
    name := 42  //
  )
```

(Keys)

(Types)

key:

- SettingKey[T]: key value(,)
- TaskKey[T]: key *task* value, ,
- InputKey[T]: key task Input Tasks

Keys

keys Keys build.sbt import sbt.Keys._, name sbt.Keys.name

Keys

:settingKey,taskKey inputKey keys key value key val , task hello key,

```
lazy val hello = taskKey[Unit]("  task  ")
```

`.sbt` (settings) , `vals` `defs` (settings) `vals` `defs` (settings)

`:` , lazy val val

Task vs Setting keys

`TaskKey[T]` *task* Tasks `compile` `package` `Unit`(`Unit` Scala `void`), task , `package` `TaskKey[File]` task, jar task, sbt `compile`,sbt task

sbt map (setting) , name; task , `compile` – ,

key *task* *(setting)* ,“taskiness” ( ) key (property), (value)

tasks settings

`:=` setting task setting, (value) task, task

, `hello` task:

```
lazy val hello = taskKey[Unit]("An example task")

lazy val root = (project in file("."))
  .settings(
    hello := { println("Hello!") }
  )
```

settings ,

```
lazy val root = (project in file("."))
  .settings(
    name := "hello"
  )
```

Tasks Settings

, task key `Setting` setting key `Setting` `taskKey := 42` `Setting[Task[T]]` `settingKey := 42` `Setting[T]` ;task key `T` (value)

`T` `Task[T]` : setting task, setting ,

sbt Keys

sbt , task name task `compile` `compile` task `compile` task key

setting key name task key name,setting key (value) task key name task (value); `show <task name>` `<task name>` task key name `camelCase`, name Scala

key , sbt `inspect <keyname>` `inspect` , setting value setting

build.sbt

`import` `build.sbt` ;

:

```
import sbt._
import Keys._
```

(, .scala , `Build` `Plugin` .scala)

bare .sbt

bare `.sbt` `Setting[_]` , `Project`

```
name := "hello"
version := "1.0"
scalaVersion := "2.12.10"
```

jar `lib/( )` , `build.sbt` , :

```
val derby = "org.apache.derby" % "derby" % "10.4.1.3"

ThisBuild / organization := "com.example"
ThisBuild / scalaVersion := "2.12.10"
ThisBuild / version      := "0.1.0-SNAPSHOT"

lazy val root = (project in file("."))
  .settings(
    name := "hello",
    libraryDependencies += derby
  )
```

10.4.1.3 Apache Derby

key `libraryDependencies` `:+=` `:=`, `%` `+=` key ,
`%` Ivy ID ,

, ,

Scope

scope .sbt

Key

`name` key sbt map ,

, key , “scope”

:

- , key
- ,key `compile` main test
- Key `packageOptions`(jar) , class `packageBin`, `packageSrc`

key ***name*** , scope

, `scoped` key

,sbt map settings , map key *scope* key set-
ting(`build.sbt`) scope key

scope , , `build.sbt` scope

Scope

Scope , scope(, key)

scope :

- Projects
- Configurations
- Tasks

Project Scope

, settings ,keys

Project , setting setting , setting

Configuration Scope

configuration , classpath, Configuration Ivy MavenScopes

sbt configurations:

- `Compile` (`src/main/scala`)
- `Test` (`src/test/scala`)
- `Runtime` task `run` classpath

, key configuration, configuration task key:`compile`,`package` `run`; key key(`sourceDirectories`,`scalacOptions` `fullClasspath`) configuration

Task Scope

Settings task ,task `packageSrc` setting `packageOptions`

, task key(`packageSrc`) key(`packageOptions`) scope

task(`packageSrc`,`packageBin`,`packageDoc`) key, `artifactName` `packageOptions` key task

Scope

scope (task task), `Global`

`Global` : setting task `Global`, setting task

scope key , key

scope,sbt scope , key scope ,sbt scope(`Global` scope scope)

scope , scope

`inspect` key “ ”

sbt scope key

,sbt ( )scope keys:

```
{<build-uri>}<project-id>/config:intask::key
```

- `{<build-uri>}/<project-id>` project project scope, `<project-id>`
- `config` configuration
- `intask` task

- `key` scope key

“*” , `Global` scope

scoped key, :

- project, project
- configuration task, key configuration

, Configuration

scoped key

- `fullClasspath` key, scope: project,key configuration task scope
- `test:fullClasspath` configuration, `fullClasspath` `test` configuration scope , scope
- `*:fullClasspath` configuration `Global`, configuration
- `doc::fullClasspath` key `fullClasspath` `doc` task ,project configuration
- `{file:/home/hp/checkout/hello/}default-aea33a/test:fullClasspath` project, `{file:/home/hp/checkout/hello/}default-aea33a` ,`{file:/home/hp/checkout/hello/}` project, project id `default-aea33a` configuration `test`, task
- `{file:/home/hp/checkout/hello/}/test:fullClasspath` `{file:/home/hp/checkout/hello/}` project
- `{.}/test:fullClasspath` `{.}` project `{.}` Scala `ThisBuild`
- `{file:/home/hp/checkout/hello/}/compile:doc::fullClasspath` scope

scope

sbt , inspect key scope `inspect test:fullClasspath`,

```
$ sbt
> inspect test:fullClasspath
[info] Task: scala.collection.Seq[sbt.Attributed[java.io.File]]
[info] Description:
[info]  The exported classpath, consisting of build products and unmanaged and managed, internal
[info] Provided by:
[info]  {file:/home/hp/checkout/hello/}default-aea33a/test:fullClasspath
[info] Dependencies:
[info]  test:exportedProducts
[info]  test:dependencyClasspath
[info] Reverse dependencies:
[info]  test:runMain
```

```
[info]  test:run
[info]  test:testLoader
[info]  test:console
[info] Delegates:
[info]  test:fullClasspath
[info]  runtime:fullClasspath
[info]  compile:fullClasspath
[info]  *:fullClasspath
[info]  {.}/test:fullClasspath
[info]  {.}/runtime:fullClasspath
[info]  {.}/compile:fullClasspath
[info]  {.}/*:fullClasspath
[info]  */test:fullClasspath
[info]  */runtime:fullClasspath
[info]  */compile:fullClasspath
[info]  */*:fullClasspath
[info] Related:
[info]  compile:fullClasspath
[info]  compile:fullClasspath(for doc)
[info]  test:fullClasspath(for doc)
[info]  runtime:fullClasspath
```

, task(.sbt setting) task `scala.collection.Seq[sbt.Attributed[java.io.File]]`

“Provided by” scoped key, `{file:/home/hp/checkout/hello/}default-aea33a/test:fullClasspa`
`test` configuration `{file:/home/hp/checkout/hello/}default-aea33a`
project)

“Dependencies” ;

; ,sbt :

- configuration(`runtime:fullClasspath compile:fullClasspath`)
  scoped key ,project “ project” task `Global`
- project “ project” task `Global` ,configuration
  `Global(*:fullClasspath)`
- project ,project `{.} ThisBuild`
- project `Global(*/test:fullClasspath)`(, project cur-
  rent, `Global` ; :* “ project” project ; :`*/test:fullClasspath`
  `test:fullClasspath`)
- project configuration `Global(*/*:fullClasspath)`(task
  `Global`, `*/*:fullClasspath` `Global`)

`inspect fullClasspath`(inspect `test:fullClasspath`) con-
figuration ,sbt `compile` `inspect compile:fullClasspath`
`inspect fullClasspath`

`inspect *:fullClasspath` ,`fullClasspath` `Global` configuration

Configuration

scope

`build.sbt` bare key, project ,configuration task `Global`:

```
lazy val root = (project in file("."))
  .settings(
    name := "hello"
  )
```

sbt `inspect name` `{file:/home/hp/checkout/hello/}default-aea33a/*:name` , ,project `{file:/home/hp/checkout/hello/}default-aea33a`, configuration `*`( ),task ( )

Keys in scope in scope , `name` `Compile` configuration , :

```
name in Compile := "hello"
```

`name` `packageBin` task (!):

```
name in packageBin := "hello"
```

`name` scope , `Compile` configuration `packageBin` task :

```
name in (Compile, packageBin) := "hello"
```

`Global` :

```
name in Global := "hello"
```

(`name in Global` scope `Global` scope `Global`;task configuration `Global`, project `Global`, , `*/*:name` `{file:/home/hp/checkout/hello/}default-aea33a/*:name`)

Scala, :in `:=` , , Scala , Java :

```
name.in(Compile).:=("hello")
```

,

scope

key , scope ,`compile` task `Compile` `Test` configuration scope , scope

key `compile` , `compile in Compile` `compile in Test` `compile` project scope task, configuration scope `compile` task

“ ” , scope , scope key scope sbt ; “ compile:compile?”

,name key , key name scope (scope) ,`packageOptions in (Compile, packageBin)` key name `packageOptions` key name, (in key, scope: project,global config,global task)

`:=` , .sbt scope

`:`

.sbt , `Setting` , `Setting` sbt (map) Setting sbt map map map sbt

setting map .sbt , `:=`

`:=` `Setting` map , `name := "hello"` map , map key `name` `"hello"`

`: +=` `++=`

`:=` , key `SettingKey[T]` `T` , , key sequence,

- `+=`
- `++=`

, key `sourceDirectories in Compile` `Seq[File]` key `src/main/scala` source ( ), :

```
sourceDirectories in Compile += new File("source")
```

, sbt `file()` :

```
sourceDirectories in Compile += file("source")
```

(`file()` `File`)

`++=` :

```
sourceDirectories in Compile ++= Seq(file("sources1"), file("sources2"))
```

`Seq(a, b, c, ...)` Scala

source , `:=` :

```
sourceDirectories in Compile := Seq(file("sources1"), file("sources2"))
```

key

task setting value value :=,+= ++=

, project organization

```
// name our organization after our project (both are SettingKey[String])
organization := name.value
```

, :

```
// name is a Key[String], baseDirectory is a Key[File]
// name the project after the directory it's inside
name := baseDirectory.value.getName
```

java.io.File getName baseDirectory

,

```
name := "project " + name.value + " from " + organization.value + " version " + version.valu
```

name organization version , name

name := baseDirectory.value.getName ,name baseDirectory build.sbt , sbt , inspect name, ( ):

```
[info] Dependencies:
[info]  *:baseDirectory
```

sbt setting setting setting task, task

, inspect compile key compileInputs, inspect compileInputs key compile , sbt update compile sbt update

,sbt key , key !

:=,+= ++= key , ,sbt , “ ” , key scope

sbt , ; ,sbt

key task

task setting task task Def.task :=, += ++=

, classpath source generator

```
sourceGenerators in Compile += Def.task {
  myGenerator(baseDirectory.value, (managedClasspath in Compile).value)
}
```

task

.sbt , := ,task key Setting[Task[T]] Setting[T] Setting Task , Task Setting

key (Keys):

```
val scalacOptions = taskKey[Seq[String]]("Options for the Scala compiler.")
val checksums = settingKey[Seq[String]]("The list of checksums to generate and to verify for
```

(scalacOptions checksums , key, task)

build.sbt scalacOptions checksums, , :

```
// scalacOptions task    checksums setting
scalacOptions := checksums.value
```

, setting key task key setting key , task , task

```
// checksums setting    scalacOptions task
checksums := scalacOptions.value
```

:+= ++=

setting task key, := , , :

```
cleanFiles += file("coverage-report-" + name.value + ".txt")
```

, , .sbt ,Scopes

:

- lib jar
- , (repository)

: jar lib , classpath !

jar lib , ScalaCheck,Specs2,ScalaTest

lib classpaths(compile, test, run console) classpath,
, dependencyClasspath in Compile dependencyClasspath in
Runtime

, build.sbt , unmanagedBase key, lib

custom_lib lib:

```
unmanagedBase := baseDirectory.value / "custom_lib"
```

baseDirectory , baseDirectory unmanagedBase,
value

unmanagedBase jar task unmanagedJars ,
task unmanagedJars task, Compile configuration , lib :

```
unmanagedJars in Compile := Seq.empty[sbt.Attributed[java.io.File]]
```

sbt Apache Ivy , Ivy Maven ,

libraryDependencies Key

, libraryDependencies Maven POM Ivy , sbt

, groupId, artifactId revision :

```
libraryDependencies += groupID % artifactID % revision
```

, Configuration val configuration:

```
libraryDependencies += groupID % artifactID % revision % configuration
```

libraryDependencies Keys :

```
val libraryDependencies = settingKey[Seq[ModuleID]]("Declares managed dependencies.")
```

% ModuleID , ModuleID libraryDependencies
, sbt(Ivy) sbt , ,Apache Derby Maven2 :

```
libraryDependencies += "org.apache.derby" % "derby" % "10.4.1.3"
```

build.sbt , update,sbt Derby ~/.ivy2/cache/org.apache.derby/ (,
compile update, update)

, ++= :

```
libraryDependencies ++= Seq(
  groupID % artifactID % revision,
  groupID % otherID % otherRevision
)
```

, libraryDependencies :=

%% Scala

groupID %% artifactID % revision groupID % artifactID % revision(groupID %%),sbt Scala %%:

```
libraryDependencies += "org.scala-tools" % "scala-stm_2.11" % "0.3"
```

scalaVersion 2.11.1, ("org.scala-tools" %%):

```
libraryDependencies += "org.scala-tools" %% "scala-stm" % "0.3"
```

Scala , jar

Ivy

groupID % artifactID % revision revision Ivy
"latest.integration","2.9.+" "[1.0,)", , "1.6.1" Ivy

,sbt Maven2 , *resolver* Ivy
:

```
resolvers += name at location
```

at

:

```
resolvers += "Sonatype OSS Snapshots" at "https://oss.sonatype.org/content/repositories/snap
```

resolvers key Keys :

```
val resolvers = settingKey[Seq[Resolver]](" ")
```

at Resolver

sbt Maven :

```
resolvers += "Local Maven Repository" at "file://"+Path.userHome.absolutePath+"/.m2/reposit
```

, :

```
resolvers += Resolver.mavenLocal
```

resolvers ,
sbt resolvers externalResolvers
, , externalResolvers resolvers

Per-configuration dependencies

(`src/test/scala` , `Test` configuration)

`Test` configuration classpath `Compile` configuration, `% "test"`:

```
libraryDependencies += "org.apache.derby" % "derby" % "10.4.1.3" % "test"
```

`Test` configuration:

```
libraryDependencies += "org.apache.derby" % "derby" % "10.4.1.3" % Test
```

, sbt `show compile:dependencyClasspath`, derby jar `show test:dependencyClasspath`, derby jar

, , ScalaCheck, Specs2 ScalaTest `% "test"`

, .sbt

, ,

, jar ,

Project lazy val , :

```
lazy val util = project

lazy val core = project
```

val ID ID `in` , :

```
lazy val util = project.in(file("util"))

lazy val core = project in file("core")
```

To factor out common settings across multiple projects, create a sequence named `commonSettings` and call `settings` method on each project.
, `commonSettings` , `settings`

```
lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0",
  scalaVersion := "2.12.10"
```

```
)

lazy val core = (project in file("core"))
  .settings(
    commonSettings,
    // other settings
  )

lazy val util = (project in file("util"))
  .settings(
    commonSettings,
    // other settings
  )
```

version, ,

, :aggregate classpath

Aggregation

Aggregation aggregate task aggregated ,

```
lazy val root = (project in file(".")).aggregate(util, core)

lazy val util = project

lazy val core = project
```

,root util core , sbt,

, root , task , update task:

```
lazy val root = (project in file("."))
  .aggregate(util, core)
  .settings(
    aggregate in update := false
  )

[...]
```

aggregate in update update task scope key (scopes)

: task,task

Classpath

dependsOn , core classpath util, core:

```
lazy val core = project.dependsOn(util)
```

core util ; core ,util

, dependsOn(bar, baz) dependsOn

configuration classpath

foo dependsOn(bar) foo compile configuration bar compile configuration :dependsOn(bar % "compile->compile")

"compile->compile" -> “depends on”, "test->compile" foo test configuration bar compile configuration

->config ->compile, dependsOn(bar % "test") foo test configuration bar Compile configuration

"test->test" test test , bar/src/test/scala , foo/src/test/scala ,

configuration, , :dependsOn(bar % "test->test;compile->compile")

root

,sbt

hello-foo base = file("foo"), foo foo , foo/Foo.scala, foo/src/main/scala sbt foo

foo .sbt , foo/build.sbt, , hello-foo scope

hello , hello/build.sbt,hello/bar/build.sbt hello/foo/build.sbt (version := "0.6") sbt show version ( ):

```
> show version
[info] hello-foo/*:version
[info]  0.7
[info] hello-bar/*:version
[info]  0.9
[info] hello/*:version
[info]  0.5
```

hello-foo/*:version hello/foo/build.sbt ,hello-bar/*:version hello/bar/build.sbt ,hello/*:version hello/build.sbt scoped keys version key scope , build.sbt build.sbt

.sbt , .scala , *.scala*

, , .scala

, project/*.scala foo/project/Build.scala

sbt , `projects` , `project <projectname>` task `compile`, root ,

ID task, `subProjectID/compile`

`.sbt` `.sbt` `.sbt` , `project/` Scala

, build.sbt

, task , `codeCoverage` task

`hello` , sbt-site , `hello/project/site.sbt` Ivy ID `addSbtPlugin`:

```
addSbtPlugin("com.typesafe.sbt" % "sbt-site" % "0.7.0")
```

sbt-assembly, `hello/project/assembly.sbt` :

```
addSbtPlugin("com.eed3si9n" % "sbt-assembly" % "0.11.2")
```

, :

```
resolvers += Resolver.sonatypeRepo("public")
```

,

0.13.5 sbt, , ,

, `build.sbt` :

```
lazy val util = (project in file("util"))
  .enablePlugins(FooPlugin, BarPlugin)
  .settings(
    name := "hello-util"
  )
```

enablePlugins

disablePlugins , util IvyPlugin , build.sbt :

```
lazy val util = (project in file("util"))
  .enablePlugins(FooPlugin, BarPlugin)
  .disablePlugins(plugins.IvyPlugin)
  .settings(
    name := "hello-util"
  )
```

, sbt plugins

:

```
> plugins
In file:/home/jsuereth/projects/sbt/test-ivy-issues/
        sbt.plugins.IvyPlugin: enabled in scala-sbt-org
        sbt.plugins.JvmPlugin: enabled in scala-sbt-org
        sbt.plugins.CorePlugin: enabled in scala-sbt-org
        sbt.plugins.JUnitXmlReportPlugin: enabled in scala-sbt-org
```

, plugins sbt sbt 3 :

1. CorePlugin: task
2. IvyPlugin:
3. JvmPlugin: Java/Scala

,JUnitXmlReportPlugin junit-xml

, , ,

, sbt-site , , site.sbt

site.settings

, :

```
//  `util`    site
lazy val util = (project in file("util"))

// `core`    site
lazy val core = (project in file("core"))
  .settings(site.settings)
```

, $HOME/.sbt/1.0/plugins/ $HOME/.sbt/1.0/plugins/
classpath sbt , $HOME/.sbt/1.0/plugins/ .sbt .scala
project/

, $HOME/.sbt/1.0/plugins//build.sbt addSbtPlugin()
,

:

- IDE (sbt IDE)
- web , xsbt-web-plugin

, , ,

, sbt , .sbt

SettingKey TaskKey .sbt InputKey

Keys :

```
val scalaVersion = settingKey[String]("scala ")
val clean = taskKey[Unit](" , source , ")
```

: ("scalaVersion") (" scala ")

.sbt , T SettingKey[T] T TaskKey [T] .sbt
, , “ ”(batch)

.sbt ,.scala autoImport val .sbt

, , ; := :

```
val sampleStringTask = taskKey[String]("A sample string task.")
val sampleIntTask = taskKey[Int]("A sample int task.")

ThisBuild / organization := "com.example"
ThisBuild / version      := "0.1.0-SNAPSHOT"
ThisBuild / scalaVersion := "2.12.10"

lazy val library = (project in file("library"))
  .settings(
    sampleStringTask := System.getProperty("user.home"),
    sampleIntTask := {
      val sum = 1 + 2
      println("sum: " + sum)
      sum
    }
  )
```

, , value

sbt ; Scala , , , HTML, , HTML (HTML)

sbt , API IO

value , ,

sampeIntTask , :

```
sampleIntTask := {
  val sum = 1 + 2        // first
  println("sum: " + sum) // second
  sum                    // third
}
```

,JVM sum 3,

startServer stopServer, sampeIntTask, :

```
val startServer = taskKey[Unit]("start server")
val stopServer = taskKey[Unit]("stop server")
val sampleIntTask = taskKey[Int]("A sample int task.")
val sampleStringTask = taskKey[String]("A sample string task.")

ThisBuild / organization := "com.example"
ThisBuild / version      := "0.1.0-SNAPSHOT"
ThisBuild / scalaVersion := "2.12.10"

lazy val library = (project in file("library"))
```

```
  .settings(
    startServer := {
      println("starting...")
      Thread.sleep(500)
    },
    stopServer := {
      println("stopping...")
      Thread.sleep(500)
    },
    sampleIntTask := {
      startServer.value
      val sum = 1 + 2
      println("sum: " + sum)
      stopServer.value // THIS WON'T WORK
      sum
    },
    sampleStringTask := {
      startServer.value
      val s = sampleIntTask.value.toString
      println("s: " + s)
      s
    }
  )
```

sbt sampleIntTask :

```
> sampleIntTask
stopping...
starting...
sum: 3
[success] Total time: 1 s, completed Dec 22, 2014 5:00:00 PM
```

, sampleIntTask :

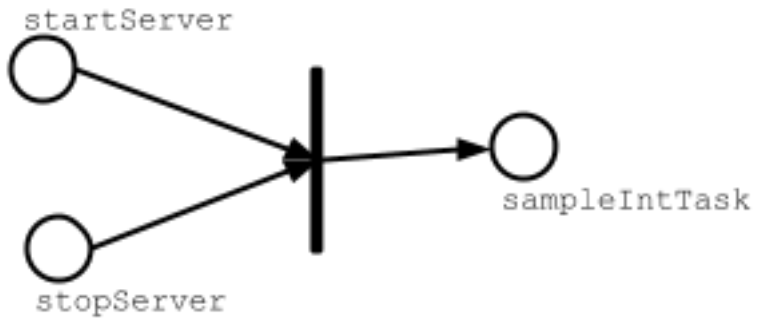

Figure 2: task-dependency

Scala , value , sampleIntTask startServer stopServer sampleIntTask ,sbt :

- sampleIntTask ( )
- , ( )
- , ( )

, sbt sampleStringTask

```
> sampleStringTask
stopping...
starting...
sum: 3
s: 3
[success] Total time: 1 s, completed Dec 22, 2014 5:30:00 PM
```

sampleStringTask startServer sampleIntTask , sampleIntTask startServer , Scala , , value , sampeStringTask :

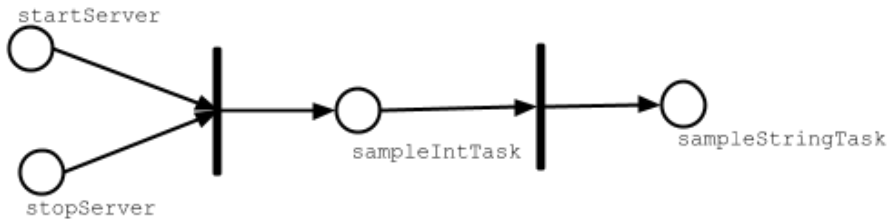

Figure 3: task-dependency

, test , compile in Test test in Test

stopServer ? , stopServer sampleStringTask, stopServer sampleStringTask

```
lazy val library = (project in file("library"))
  .settings(
    startServer := {
      println("starting...")
      Thread.sleep(500)
    },
    sampleIntTask := {
      startServer.value
      val sum = 1 + 2
      println("sum: " + sum)
```

```
      sum
    },
    sampleStringTask := {
      startServer.value
      val s = sampleIntTask.value.toString
      println("s: " + s)
      s
    },
    sampleStringTask := {
      val old = sampleStringTask.value
      println("stopping...")
      Thread.sleep(500)
      old
    }
  )
```

, sampleStringTask:

```
> sampleStringTask
starting...
sum: 3
s: 3
stopping...
[success] Total time: 1 s, completed Dec 22, 2014 6:00:00 PM
```

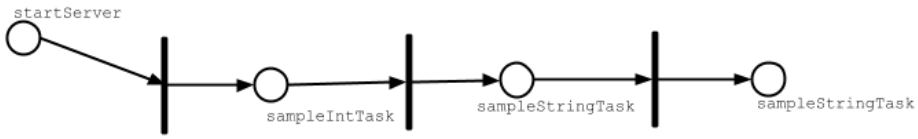

Figure 4: task-dependency

Scala

Scala , project/ServerUtil.scala , :

```
sampleIntTask := {
  ServerUtil.startServer
  try {
    val sum = 1 + 2
    println("sum: " + sum)
  } finally {
    ServerUtil.stopServer
  }
  sum
}
```

, ,

, ,

,

;

, build.sbt,

sbt

`build.sbt` , sbt sbt Scala sbt ?

`project` , , , `project`
sbt

, `project/project/`

:

```
hello/                  #
    Hello.scala         #     (  src/main/scala)
    build.sbt           # build.sbt  project/
    project/            #
        Build.scala     #       ,
        build.sbt       #     --project/project  ;
        project/        #       ;
            Build.scala # project/project/
```

! `project/project/`

, `.scala` `.sbt` , `build.sbt` `Build.scala`

project .scala project/Dependencies.scala

```
import sbt._

object Dependencies {
  // Versions
  lazy val akkaVersion = "2.3.8"

  // Libraries
  val akkaActor = "com.typesafe.akka" %% "akka-actor" % akkaVersion
  val akkaCluster = "com.typesafe.akka" %% "akka-cluster" % akkaVersion
  val specs2core = "org.specs2" %% "specs2-core" % "2.4.17"

  // Projects
  val backendDeps =
    Seq(akkaActor, specs2core % Test)
}
```

Dependencies build.sbt val , Dependencies._

```
import Dependencies._

ThisBuild / organization := "com.example"
ThisBuild / version      := "0.1.0-SNAPSHOT"
ThisBuild / scalaVersion := "2.12.10"

lazy val backend = (project in file("backend"))
  .settings(
    name := "backend",
    libraryDependencies ++= backendDeps
  )
```

, ,

.scala

.scala , Scala ,

build.sbt , project/*.scala .scala scala

, project/*.scala ,

sbt, , , sbt sbt

,

sbt:

- Scala , Scala Programming in Scala,Scala
- .sbt
- `Setting` ,sbt `Setting` task
- `Setting`, key `::=,+=` `++=`
- , ; , `Setting` sbt
- , key
- *tasks* , key value task Non-task
- Scopes
- key value, scope
- scope :configuration,project,task
- scope task configuration
- configuration , `Compile` `Test`
- project “ ” scope
- scopes scope
- `build.sbt` , `.scala` task
- sbt ,
-
- `addSbtPlugin` `project/plugins.sbt` (`build.sbt`)

, , sbt

!

sbt , !