

# sbt Reference Manual

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## Preface

## sbt

sbt , sbt , ,

    sbt

    !

    , .sbt ,scopes,

    ,

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:

## 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



Figure 1: Ubuntu Software & Updates Screenshot

## 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      ,      1.3.4:
sbt.version=1.3.4
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 (Win-
dows)
```

```
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

!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 (prop-
erty), (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 setting(
  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:fullClasspath
    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(*/*:fullClasspath)( , project cur-
      rent, Global ; :* “ project” project ; /*: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, configu-
ration *( ),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 se-
quence,
    • +=
    • ++=

    , 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.value
    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 ,    ,sbtsbt    ,    “    ”    ,    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] Set-
ting    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 (Test) 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/snapshots"
    resolvers key Keys :
    val resolvers = settingKey[Seq[Resolver]]("resolvers")
    at Resolver
    sbt Maven :
    resolvers += "Local Maven Repository" at "file://" + Path.userHome.absolutePath + "/.m2/repository"
    , :
    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 config-
uration :dependsOn(bar % "compile->compile")

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

->config ->compile, dependsOn(bar % "test") foo test configu-
ration 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

sbt , projects , project <projectname> task
compile, root ,
ID task, subProjectID/compile

.sbt .sbt .sbt , project/ Scala

```

## Appendix: Subproject build definition files

```

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

```

Style choices:

- Each subproject's settings can go into \*.sbt files in the base directory of that project, while the root build.sbt declares only minimum project declarations in the form of lazy val foo = (project in file("foo")) without the settings.

- We recommend putting all project declarations and settings in the root `build.sbt` file in order to keep all build definition under a single file. However, it up to you.

```
,      project/*.scala  foo/project/Build.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 ,    ,
sampleIntTask ,    :
sampleIntTask := {
    val sum = 1 + 2    // first
    println("sum: " + sum) // second
    sum    // third
}

,JVM    sum 3,

    startServer stopServer, sampleIntTask, :

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

```

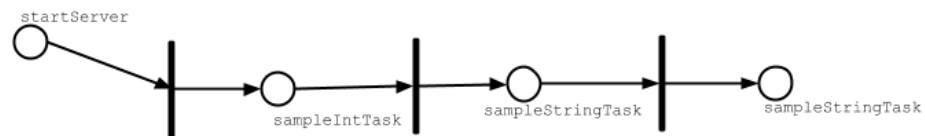


Figure 4: task-dependency

## 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` `,` `!`