

# 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 , , [Mac](#), [Windows](#), [Linux](#)

sbt , (terminal encoding),HTTP ,JVM

### Mac sbt

[ZIP](#) [TGZ](#)

: ,

## Homebrew

```
$ brew install sbt@1
```

## Macports

```
$ port install sbt
```

## Windows sbt

## ZIP TGZ

## Windows

msi

## Linux sbt

## 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
sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv 2EE0EA64E40A89B84B2DF73499E8
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 := "2.12.4"
  )

.sbt      build.sbt
      jar , build.sbt      name version

```

```

sbt

      hello/project/build.properties      sbt      ,      1.1.0:

sbt.version=1.1.0

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>
    java/
      <main Java sources>
  test/
    resources
      <files to include in test jar here>
    scala/
      <test Scala 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
    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
:

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0",
  scalaVersion := "2.12.4"
)

lazy val root = (project in file("."))
  .settings(
    commonSettings,
    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 := "2.12.4"

jar lib/( ) , build.sbt , :

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

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0",
  scalaVersion := "2.12.4"
)

lazy val root = (project in file("."))
  .settings(
    commonSettings,
    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: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    ,    ,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/snapshots"

    resolvers key Keys      :

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

    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 := "2.12.4"
)

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 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
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)

, ~/.sbt/1.0/plugins/ ~/.sbt/1.0/plugins/ classpath
sbt , ~/.sbt/1.0/plugins/ .sbt .scala project/

, ~/.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.")

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0-SNAPSHOT"

```

```

)

lazy val library = (project in file("library"))
  .settings(
    commonSettings,
    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.")

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0-SNAPSHOT"
)

```

```

lazy val library = (project in file("library"))
  .settings(
    commonSettings,
    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 :
Scala    , value      ,      sampleIntTask startServer stopServer      sampleIntTask ,sbt      :

• sampleIntTask      ( )
•      ,      ( )
•      ,      ( )

      , sbt      sampleStringTask

```



Figure 2: task-dependency

```
> 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(
  commonSettings,
  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._

lazy val commonSettings = Seq(
    version := "0.1.0",
    scalaVersion := "2.12.4"
)

lazy val backend = (project in file("backend"))
    .settings(
        commonSettings,
        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 , !