

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 2EE0EA64E40A89B84B2DF73499E
sudo apt-get update
sudo apt-get install sbt
```

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

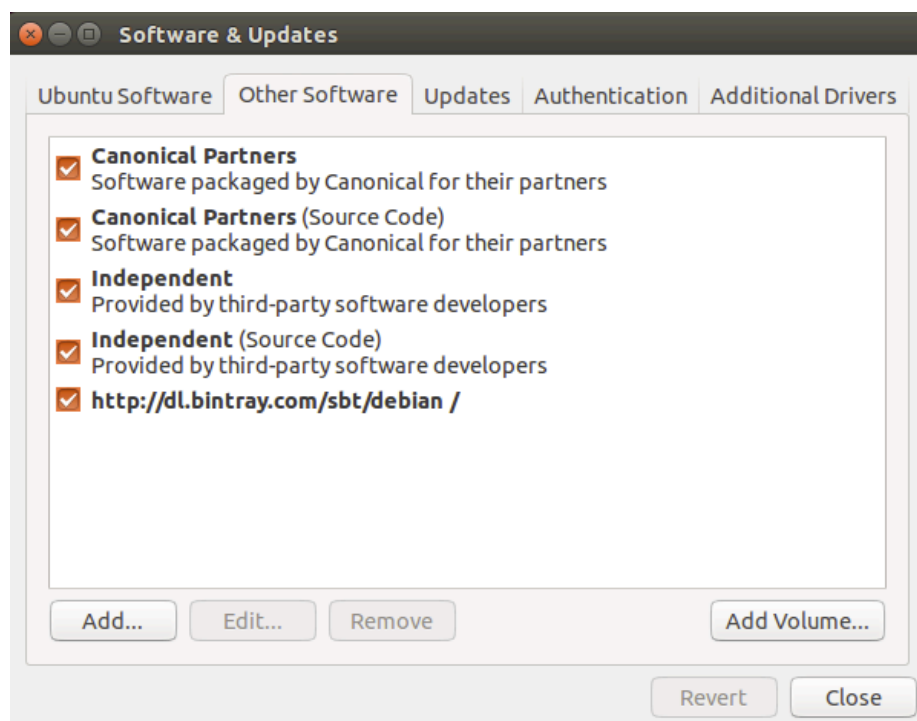


Figure 1: Ubuntu Software & Updates Screenshot

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
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 := "2.12.8"
  )
.sbt      build.sbt
      jar , build.sbt      name version

```

sbt

```

      hello/project/build.properties      sbt      ,      1.3.0:
sbt.version=1.3.0
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
:
ThisBuild / organization := "com.example"
ThisBuild / scalaVersion := "2.12.8"
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 := "2.12.8"

```

```

      jar lib/( ), build.sbt , :

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

ThisBuild / organization := "com.example"
ThisBuild / scalaVersion := "2.12.8"
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: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 ; :*/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, 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      ,      ,sbts      ,      "      "      ,      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 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 := "2.12.8"
)

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)

, ~/.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.")

ThisBuild / organization := "com.example"
ThisBuild / version      := "0.1.0-SNAPSHOT"
ThisBuild / scalaVersion := "2.12.8"

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 := "2.12.8"

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> val 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 :

```

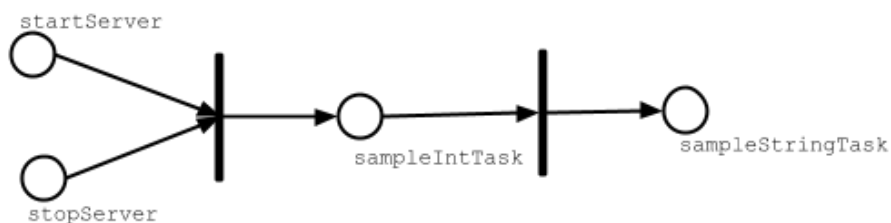


Figure 3: task-dependency

```

, 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

```

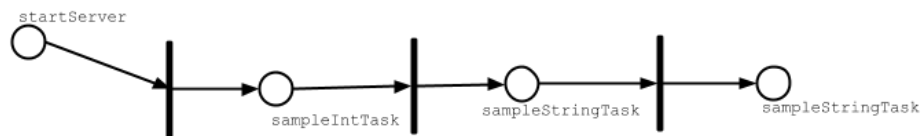


Figure 4: task-dependency

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 := "2.12.8"

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 , !