

sbt

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Preface

sbt , sbt , ,
sbt
!
, .sbt ,scopes,
,
sbt !

sbt

sbt , :

- sbt
- hello world

—

- [sbt](#) `sbt`
- [.sbt](#)

, `Jar` `Shell` , [Mac](#), [Windows](#), [Linux](#), [Typesafe Activator](#),

`sbt` , (terminal encoding), `HTTP` , `JVM`

Mac `sbt`

:

[Macports](#)

```
$ port install sbt
```

[Homebrew](#)

```
$ brew install sbt
```

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

Typesafe Activator

[Typesafe Activator](#) .

Windows sbt

Windows

msi

ZIP TGZ

Typesafe Activator

Typesafe Activator .

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 hkps://keyserver.ubuntu.com:80 --recv 642AC823
sudo apt-get update
sudo apt-get install sbt
```

```

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

```

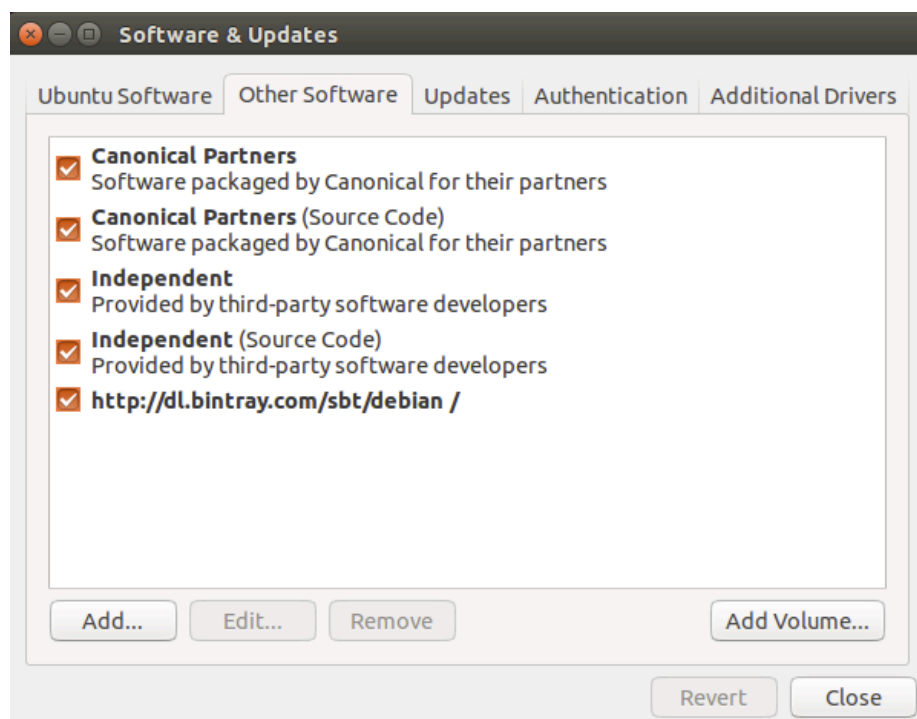


Figure 1: Ubuntu Software & Updates Screenshot

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:

```
mkdir -p /usr/local/portage && cd /usr/local/portage
git clone git://github.com/whiter4bbit/overlays.git
echo "PORTDIR_OVERLAY=$PORTDIR_OVERLAY /usr/local/portage/overlays" >> /etc/make.conf
emerge sbt-bin
```

: ebuild

Typesafe Activator

[Typesafe Activator](#) .

sbt

[sbt-launch.jar](#),

Unix

```
sbt-launch.jar ~/bin jar, ~/bin/sbt :

#!/bin/bash
SBT_OPTS="-Xms512M -Xmx1536M -Xss1M -XX:+CMSClassUnloadingEnabled -XX:MaxPermSize=256M"
java $SBT_OPTS -jar ` $0`/sbt-launch.jar "$@"

:

$ chmod u+x ~/bin/sbt
```

Windows

Windows Cygwin , batch path , sbt
sbt , , JVM

Non-Cygwin Windows Cygwin , sbt.bat batch :

```
set SCRIPT_DIR=%~dp0
java -Xms512M -Xmx1536M -Xss1M -XX:+CMSClassUnloadingEnabled -XX:MaxPermSize=256M -jar "%SCRIPT_DIR%\sbt-launch.jar" sbt.bat
```

Cygwin Windows Cygwin Windows , bash ~/bin/sbt:

```
SBT_OPTS="-Xms512M -Xmx1536M -Xss1M -XX:+CMSClassUnloadingEnabled -XX:MaxPermSize=256M"
java $SBT_OPTS -jar sbt-launch.jar "$@"
```

sbt-launch.jar sbt-launch.jar, cygpath :

```
$ chmod u+x ~/bin/sbt
```

Cygwin **Ansi** Cygwin **Ansi** (**Ansi** stty), bash
~/bin/sbt:

```
SBT_OPTS="-Xms512M -Xmx1536M -Xss1M -XX:+CMSClassUnloadingEnabled -XX:MaxPermSize=256M"
stty -icanon min 1 -echo > /dev/null 2>&1
java -Djline.terminal=jline.UnixTerminal -Dsbt.cygwin=true $SBT_OPTS -jar sbt-launch.jar "$@"
stty icanon echo > /dev/null 2>&1
```

```
sbt-launch.jar      sbt-launch.jar,      cygpath      :
```

```
$ chmod u+x ~/bin/sbt
```

```
(backspace) Scala      ,      (erase character), stty      cygwin
(mintty),      ->      ,      cygwin      ^H,“      ^H”
```

```

: pull request

```

Typesafe Activator (sbt)

Typesafe Activator sbt , activator ui activator new activator sbt
typesafe.com Activator

If you see a command line such as `sbt ~test` in the documentation, you will also be able to type `activator ~test`. Any Activator project can be opened in sbt and vice versa because Activator is “sbt powered.”

```
sbt ~test,      activator ~test  Activator      sbt , , Activator“ sbt”
Activator  activator  activator-launch.jar,      sbt  jar  Activator      sbt  :
```

- activator activator shell activator ui ; activator shell
- activator new , play-scala [Play FrameworkScala](#)
- activator ui , ()

Activator ; “minimal” jar, “full” Ivy , Scala, Akka Play

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 := "2.11.4"
  )
```

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

```
sbt
```

```
hello/project/build.properties      sbt      ,      0.13.9:
```

```
sbt.version=0.13.9
```

```
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
3. .scala

    .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 := "2.11.4"
)

lazy val root = (project in file(".")).
  settings(commonSettings: _*).
  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 Process._
import Keys._

( , .scala , Build Plugin .scala )

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 := "2.11.4"
)

lazy val root = (project in file(".")).
  settings(commonSettings: _*).
  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 ; :/*: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
taskValue :=, += +=

    , classpath source generator

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

    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_2.11.1" % "0.3"

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

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

      Scala      ,      jar

      Scala      ;      %%      2.10.1,      scalaVersion
:=      "2.10.4",      %%      2.10.1      %%      ,      Scala
,      (      )

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. Note `_*` is required to pass sequence into a vararg method.

```

    ,      commonSettings ,      settings      _*

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0",
  scalaVersion := "2.11.4"
)

lazy val core = (project in file("core")).
  settings(commonSettings: _*).
  settings(
    // other settings
  )

lazy val util = (project in file("util")).
  settings(commonSettings: _*).
  settings(
    // 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/0.13/plugins/ ~/.sbt/0.13/plugins/ classpath
sbt , ~/.sbt/0.13/plugins/ .sbt .scala project/

, ~/.sbt/0.13/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: _*).
  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.")

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

```

```

lazy val library = (project in file("library")).
  settings(commonSettings: _*).
  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    :

```

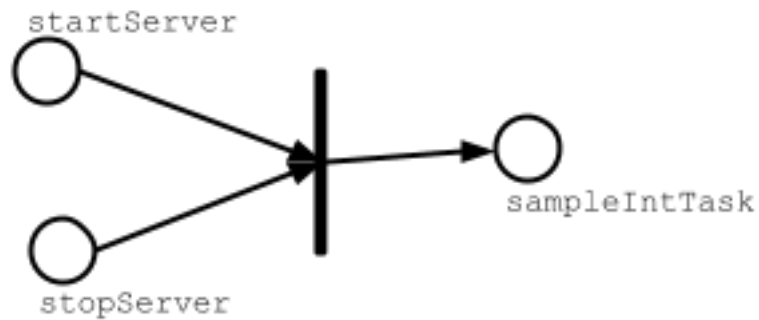


Figure 2: task-dependency

```
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 , sampleStringTask :
```

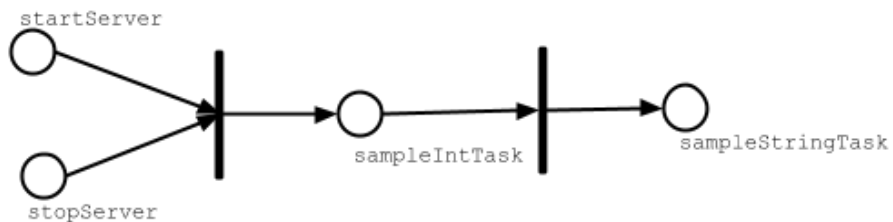


Figure 3: task-dependency

```
, test , compile in Test test in Test
```

```

        stopServer ? , stopServer sampleStringTask, stopServer
sampleStringTask

```

```

lazy val library = (project in file("library")).
  settings(commonSettings: _*).
  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

```

Scala Scala , project/ServerUtil.scala , :

```

sampleIntTask := {
  ServerUtil.startServer

```




Figure 4: task-dependency

```

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" % "2.4.14"

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

Dependencies  build.sbt      val      ,  Dependencies._

import Dependencies._

lazy val commonSettings = Seq(

```

```

    version := "0.1.0",
    scalaVersion := "2.11.4"
  )

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

:Bare .sbt

.sbt .sbt

bare .sbt

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

name := "hello"

version := "1.0"

scalaVersion := "2.11.4"

(0.13.7)

: 0.13.7

bare build.sbt:

```
// ,
name := "hello"
version := "1.0"
scalaVersion := "2.10.3"
```

sbt ,

..scala

```
.scala          sbt ,.scala          , sbt 0.13      .sbt      ,  
      ,      .sbt
```

build.sbt Build.scala

```
.sbt .scala      ,  
      ,      hello      , hello/project/Build.scala:
```

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

```
object HelloBuild extends Build {  
  val sampleKeyA = settingKey[String]("demo key A")  
  val sampleKeyB = settingKey[String]("demo key B")  
  val sampleKeyC = settingKey[String]("demo key C")  
  val sampleKeyD = settingKey[String]("demo key D")  
  
  override lazy val settings = super.settings ++  
    Seq(  
      sampleKeyA := "A: in Build.settings in Build.scala",  
      resolvers := Seq()  
    )  
  
  lazy val root = Project(id = "hello",  
    base = file("."),  
    settings = Seq(  
      sampleKeyB := "B: in the root project settings in Build.scala"  
    ))  
}
```

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

```
sampleKeyC in ThisBuild := "C: in build.sbt scoped to ThisBuild"
```

```
sampleKeyD := "D: in build.sbt"
```

```
sbt      inspect sampleKeyA, :
```

```
[info] Setting: java.lang.String = A: in Build.settings in Build.scala  
[info] Provided by:  
[info] {file:/home/hp/checkout/hello/}/*:sampleKeyA
```

```

inspect sampleKeyC, :

[info] Setting: java.lang.String = C: in build.sbt scoped to ThisBuild
[info] Provided by:
[info] {file:/home/hp/checkout/hello/}/*:sampleKeyC

    "Provided by"      value      .sbt      sampleKeyC in ThisBuild
.scala Build.settings      sbt      ,

,inspect sampleKeyB:

[info] Setting: java.lang.String = B: in the root project settings in Build.scala
[info] Provided by:
[info] {file:/home/hp/checkout/hello/}hello/*:sampleKeyB

    sampleKeyB      : ({file:/home/hp/checkout/hello/}hello)
({file:/home/hp/checkout/hello/})

    ,inspect sampleKeyD      sampleKeyB:

[info] Setting: java.lang.String = D: in build.sbt
[info] Provided by:
[info] {file:/home/hp/checkout/hello/}hello/*:sampleKeyD

sbt .sbt      Build.settings      Project.setting      , .sbt
Build.scala,      sampleC      sampleD,      build.sbt      build.sbt      " "
Build.sbt

    :sampleKeyC      sampleKeyD      build.sbt      sbt      Build      .sbt
    ,import HelloBuild._      build.sbt

:

• .scala , Build.settings ,
• .scala , Project.settings ,
• .scala Build .sbt
• .sbt .scala
• .sbt ,

sbt , project/      reload plugins

```

```

> reload plugins
[info] Set current project to default-a0e8e4 (in build file:/home/hp/checkout/hello/project/)
> show sources
[info] ArrayBuffer(/home/hp/checkout/hello/project/Build.scala)
> reload return
[info] Loading project definition from /home/hp/checkout/hello/project
[info] Set current project to hello (in build file:/home/hp/checkout/hello/)
> show sources
[info] ArrayBuffer(/home/hp/checkout/hello/hw.scala)
>

```

```

, reload return ,

```

```

:

```

```

build.sbt      Build Project settings      ,Build Project
settings      , build.sbt      ,      sbt      Build Project
“      ”

```

```

,      :

```

- .scala Build.settings Project.settings
- ; ~/.sbt/0.13/global.sbt
- ,
- .sbt
- (project) (~/.sbt/0.13/plugins/)