

# 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` `Lightbend`

Activator

`sbt` `terminal encoding` `HTTP` `JVM`

## Mac `sbt`

### Macports

```
$ port install sbt
```

### Homebrew

```
$ brew install sbt
```

`ZIP` `TGZ`

## Lightbend Activator

Lightbend Activator .

## Windows `sbt`

### Windows

`msi`

ZIP TGZ

## Lightbend Activator

Lightbend 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 hkp://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

## 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



Figure 1: Ubuntu Software & Updates Screenshot

## 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
```

## Lightbend Activator

Lightbend 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 "%SCRIP
```

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
```

## Lightbend Activator ( sbt)

Lightbend 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 := "2.11.7"
  )
.sbt                build.sbt
    jar    build.sbt    name    version
```

```

sbt

    hello/project/build.properties      sbt      0.13.11
sbt.version=0.13.11
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
<td><tt>clean</tt></td>
<td>      <tt>target</tt>      </td>
<td><tt>compile</tt></td>
<td>      <tt>src/main/scala</tt>
src/main/java
<td><tt>test</tt></td>
<td>      </td>
<td><tt>console</tt></td>
<td>      classpath  Scala      <tt>:quit</tt>
Ctrl+D Unix  Ctrl+Z Windows  sbt
<td><nobr><tt>run &lt; &gt;*</tt></nobr></td>
<td>  sbt      main class </td>
<td><tt>package</tt></td>
<td> <tt>src/main/resources</tt>      <tt>src/main/scala</tt>      <tt>src/main/java</tt>      cla
<td><tt>help &lt; &gt;</tt></td>
<td>      </td>
<td><tt>reload</tt></td>
<td>      <tt>build.sbt</tt> <tt>project/*.scala</tt> <tt>project/*.sbt</tt>      )

```

## Tab

```

tab  sbt      tab

sbt
<td><tt>!</tt></td>
<td>      </td>

```

```

<td><tt>!!</tt></td>
<td>      </td>

<td><tt>!:</tt></td>
<td>      </td>

<td><tt>!<n</tt></td>
<td>      <tt>n</tt>    </td>

<td><tt>!n</tt></td>
<td>  <tt>!:</tt>      <tt>n</tt>    </td>

<td><tt>!-n</tt></td>
<td>      n    </td>

<td><tt>!string</tt></td>
<td>      string    </td>

<td><tt>!<?string</tt></td>
<td>      string    </td>

```

## .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 := "2.11.7"
)

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 property value

```

```

tasks settings

:= setting task setting value task task

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

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

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

```

## Tasks Settings

```

task key Setting setting key Setting taskKey := 42
Setting[Task[T]] settingKey := 42 Setting[T] task key
T value
T Task[T] setting task setting

```

## sbt Keys

```

sbt task name task compile compile task compile
task key

setting key name task key name setting key value task
key name task value show <task name> <task name>
task key name camelCase name Scala

key sbt inspect <keyname> inspect setting
value setting

```

## build.sbt

```

import build.sbt

import sbt._
import 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 := "2.11.7"
)

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    scope
inspect    key    " "
```

**sbt scope key**

```

sbt    scope    keys
{<build-uri><project-id>/config:intask::key
• {<build-uri><project-id>    project    project    scope
  <project-id>
• config    configuration
• intask    task
• key    scope    key
```

“\*” Global scope

scoped key

- project project
  - configuration task key configuration
- Configuration

**scoped key**

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

- {file:/home/hp/checkout/hello/}/compile:doc::fullClasspath  
scope

## scope

```
sbt          inspect    key      scope  inspect test:fullClasspath

$ sbt
> inspect test:fullClasspath
[info] Task: scala.collection.Seq[sbt.Attributed[java.io.File]]
[info] Description:
[info] The exported classpath, consisting of build products and unmanaged and managed, internal
[info] Provided by:
[info] {file:/home/hp/checkout/hello/}default-aea33a/test:fullClasspath
[info] Dependencies:
[info]   test:exportedProducts
[info]   test:dependencyClasspath
[info] Reverse dependencies:
[info]   test:runMain
[info]   test:run
[info]   test:testLoader
[info]   test:console
[info] Delegates:
[info]   test:fullClasspath
[info]   runtime:fullClasspath
[info]   compile:fullClasspath
[info]   *:fullClasspath
[info]   {.}/test:fullClasspath
[info]   {.}/runtime:fullClasspath
[info]   {.}/compile:fullClasspath
[info]   {.}/*:fullClasspath
[info]   */test:fullClasspath
[info]   */runtime:fullClasspath
[info]   */compile:fullClasspath
[info]   */*:fullClasspath
[info] Related:
[info]   compile:fullClasspath
[info]   compile:fullClasspath(for doc)
[info]   test:fullClasspath(for doc)
[info]   runtime:fullClasspath

task .sbt      setting    task      scala.collection.Seq[sbt.Attributed[java.io.File]]
“Provided by”  scoped key   {file:/home/hp/checkout/hello/}default-aea33a/test:fullClasspa
test configuration {file:/home/hp/checkout/hello/}default-aea33a
project
```

“Dependencies”

```
sbt
• configuration runtime:fullClasspath compile:fullClasspath
  scoped key project “ project” task Global
• project “ project” task Global configuration
  Global *:fullClasspath
• project project {..} ThisBuild
• project Global */test:fullClasspath project current
  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    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]    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_2.11.1" % "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]]("resolvers")

```

```

at      Resolver
sbt      Maven

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

resolvers += Resolver.mavenLocal

```

```

resolvers

sbt resolvers      externalResolvers
      externalResolvers  resolvers

```

### Per-configuration dependencies

```

      src/test/scala  Test configuration
      Test configuration classpath  Compile configuration  % "test"
libraryDependencies += "org.apache.derby" % "derby" % "10.4.1.3" % "test"
      Test configuration
libraryDependencies += "org.apache.derby" % "derby" % "10.4.1.3" % Test
      sbt      show compile:dependencyClasspath  derby jar  show
test:dependencyClasspath  derby jar
      ScalaCheck Specs2  ScalaTest  % "test"

```

```

.sbt

```

```

      jar
Project lazy val

```

```

lazy val util = project

lazy val core = project
val      ID      ID      in
lazy val util = project.in(file("util"))

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

```

To factor out common settings across multiple projects, create a sequence named `commonSettings` and call `settings` method on each project. Note `_*` is required to pass sequence into a vararg method.

```

commonSettings settings _*

lazy val commonSettings = Seq(
  organization := "com.example",
  version := "0.1.0",
  scalaVersion := "2.11.7"
)

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 config-
uration      dependsOn(bar % "compile->compile")

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

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

    "test->test"  test      test      bar/src/test/scala
foo/src/test/scala
    configuration      dependsOn(bar % "test->test;compile->compile")

```

## root

```

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

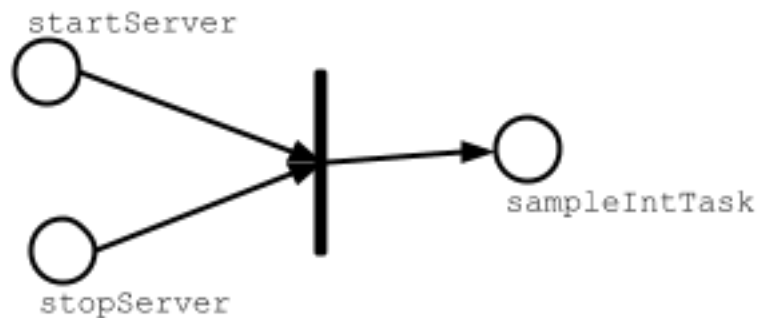


Figure 2: task-dependency

```
Scala      value      sampleIntTask startServer stopServer      sampleIntTask sbt
• sampleIntTask
•
•

sbt      sampleStringTask

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

sampleStringTask startServer sampleIntTask      sampleIntTask startServer
Scala            value      sampeStringTask

test            compile in Test test in Test

stopServer      stopServer sampleStringTask stopServer
sampleStringTask

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



Figure 3: task-dependency

```

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



Figure 4: task-dependency

```

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
  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 := "2.11.7"
)

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 := "2.11.7"

( 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/`