

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

```
object Hi {
  def main(args: Array[String]) = println("Hi!")
}

$ mkdir hello
$ cd hello
$ echo 'object Hi { def main(args: Array[String]) = println("Hi!") }' > hw.scala
$ sbt
...
> run
...
Hi!
```

```
•
• src/main/scala src/main/java
• src/test/scala src/test/java
• src/main/resources src/test/resources
• lib jar

sbt console      Scala classpath      sbt run      sbt console      Scala REPL sbt
```

```
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/