

# sbt Reference Manual

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Jar      Shell

Mac Windows Linux

sbt                  terminal encoding HTTP    JVM

**Mac**      sbt

**Macports**

```
$ port install sbt
```

**Homebrew**

```
$ brew install sbt
```

ZIP    TGZ

**Windows**      sbt

**Windows**

msi

ZIP    TGZ

Linux    sbt

ZIP    TGZ

Ubuntu    Debian

DEB    sbt

Ubuntu    Debian    DEB    DEB    apt-get aptitude  
Synaptic    sbt    sudo

```
echo "deb https://dl.bintray.com/sbt/debian /" | sudo tee -a /etc/apt/sources.list.d/sbt.list
sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv 2EE0EA64E40A89B84B2DF73499E8
sudo apt-get update
sudo apt-get install sbt
```

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

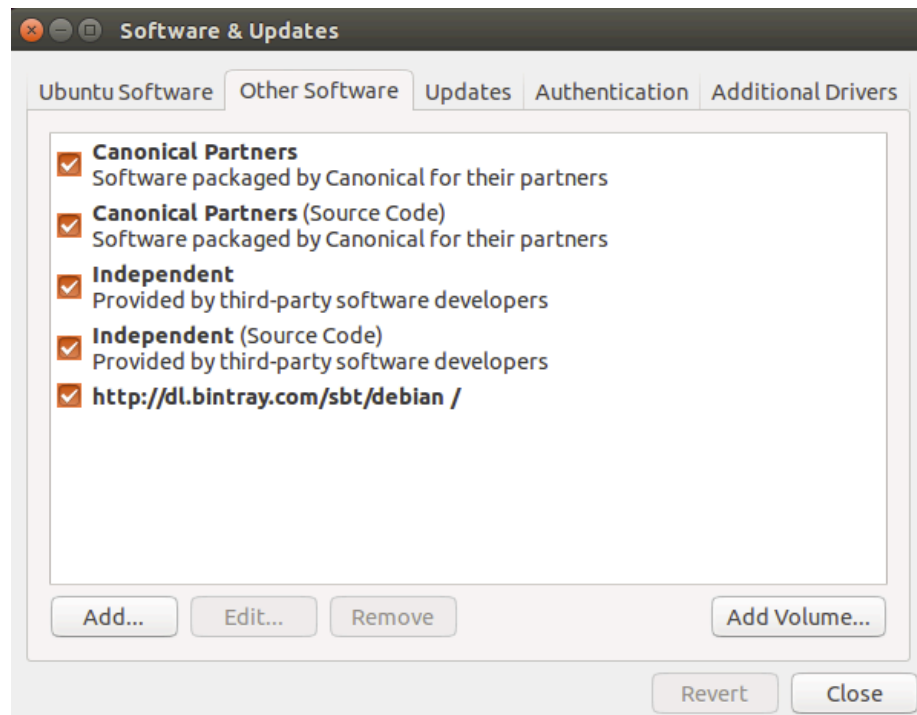


Figure 1: Ubuntu Software & Updates Screenshot

## Linux RPM

```
RPM    sbt
Linux  RPM    RPM          sbt          sudo
curl https://bintray.com/sbt/rpm/rpm > bintray-sbt-rpm.repo
sudo mv bintray-sbt-rpm.repo /etc/yum.repos.d/
sudo yum install sbt
sbt     Bintray Bintray    RPM
          sbt-launcher-package
```

## Gentoo

```
sbt     ebuild      sbt ebuilds      ebuilds  sbt
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 "%SCRIPT_DIR%\sbt-launch.jar" %*
```

## 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
---------------------	-----	--------------	---------------	-----------	-----

## 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 := "2.11.8"
  )

.sbt      build.sbt

jar      build.sbt      name      version

sbt

hello/project/build.properties      sbt      0.13.12
sbt.version=0.13.12

```



```
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 := "2.11.8"
)

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 := "2.11.8"
)

```

```
)

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 configu-  
  ration scope scope
- \*:fullClasspath configuration Global configuration
- doc::fullClasspath key fullClasspath doc task project config-  
  uration
- {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
:=  "2.10.4"      %%      2.10.1      2.10.1      scalaVersion
                                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 := "2.11.8"
)

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

Scala      value      sampleIntTask  startServer stopServer      sampleIntTask sbt
•  sampleIntTask
•
•

```

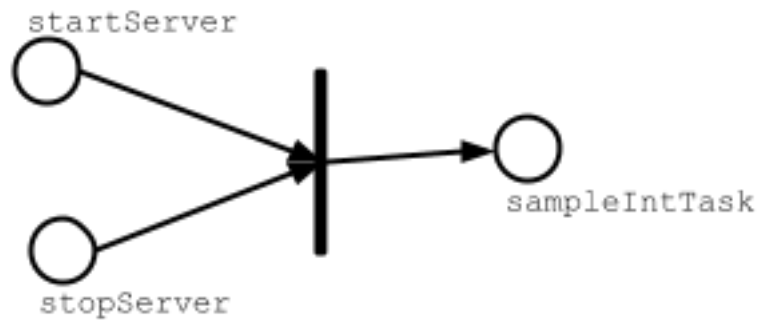


Figure 2: task-dependency

```

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

sampleStringTask  startServer sampleIntTask  sampleIntTask  startServer
Scala              value        sampeStringTask

```

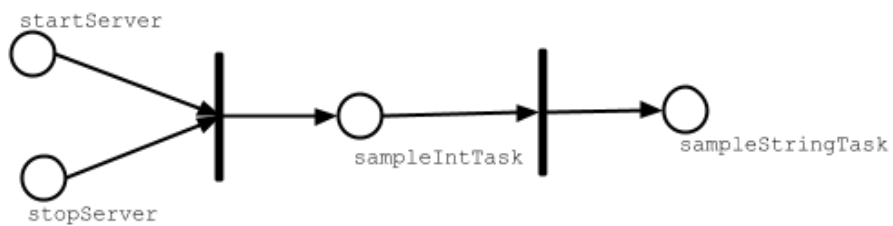


Figure 3: task-dependency

```

test      compile in Test test in Test

```

```

stopServer
sampleStringTask

stopServer  sampleStringTask  stopServer

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

```

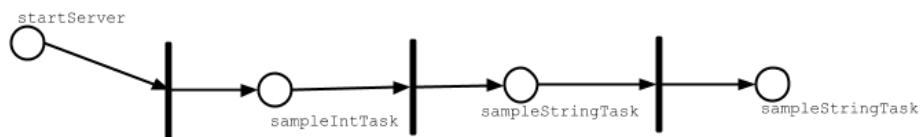


Figure 4: task-dependency

## Scala

```

Scala    project/ServerUtil.scala
sampleIntTask := {

```

```

ServerUtil.startServer
try {
  val sum = 1 + 2
  println("sum: " + sum)
} finally {
  ServerUtil.stopServer
}
sum
}

```

build.sbt

sbt

```

build.sbt      sbt      sbt      Scala      sbt
project
  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 := "2.11.8"
)

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 := "2.11.8"
```

( 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/