

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

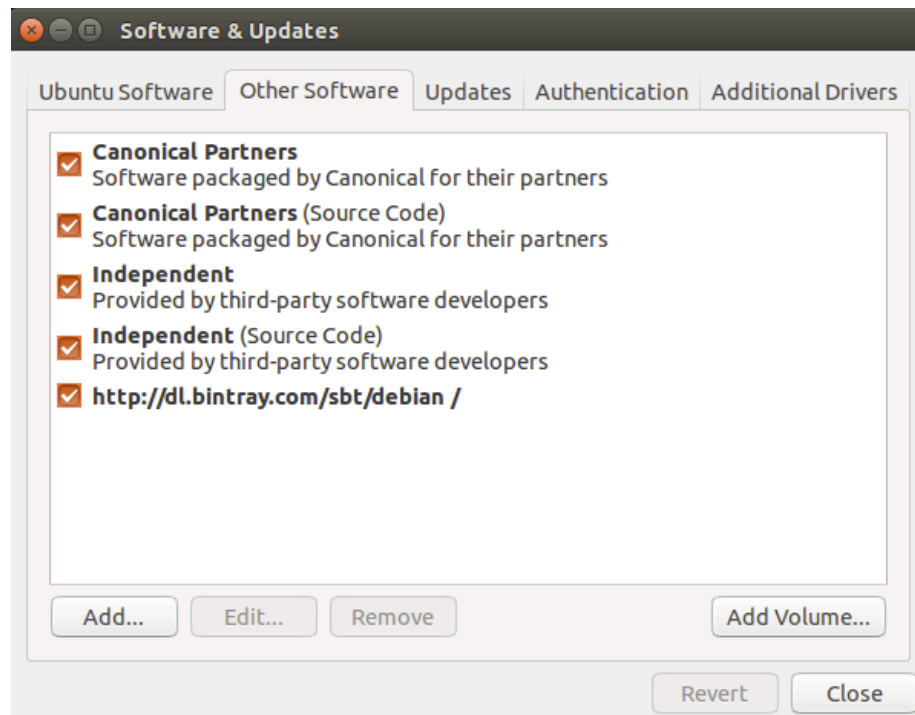


Figure 1: Ubuntu Software & Updates Screenshot

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" 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
---------------------	-----	--------------	---------------	-----------	-----

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      0.13.13
sbt.version=0.13.13

```



```
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
---------------	-------

<i>configuration</i>	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
1. Data Collection and Preprocessing	Collecting data from various sources (e.g., sensors, databases) and cleaning/preprocessing it for analysis.
2. Feature Engineering	Identifying and extracting relevant features from the raw data to improve model performance.
3. Model Selection and Training	Choosing an appropriate machine learning model and training it on the prepared data.
4. Model Evaluation and Validation	Assessing the performance of the trained model using various metrics and validation techniques.
5. Deployment and Monitoring	Deploying the trained model into a production environment and monitoring its performance over time.

```

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
•
•

```

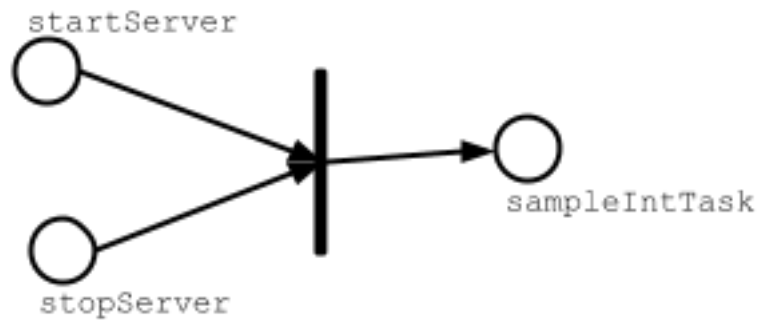


Figure 2: task-dependency

```

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

```

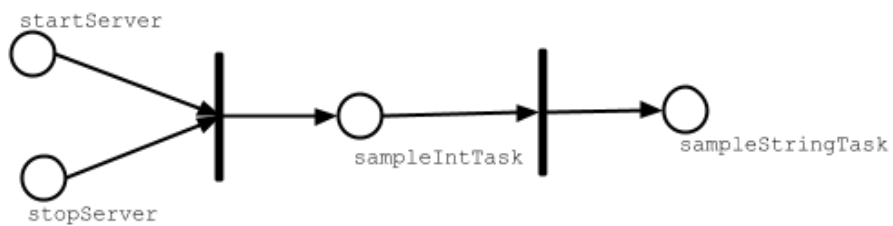


Figure 3: task-dependency

```

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

```

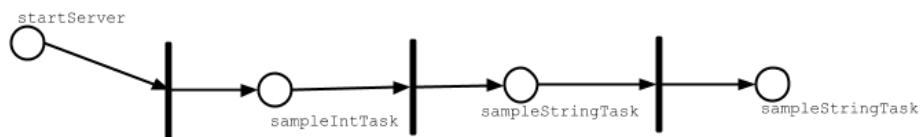


Figure 4: task-dependency

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/