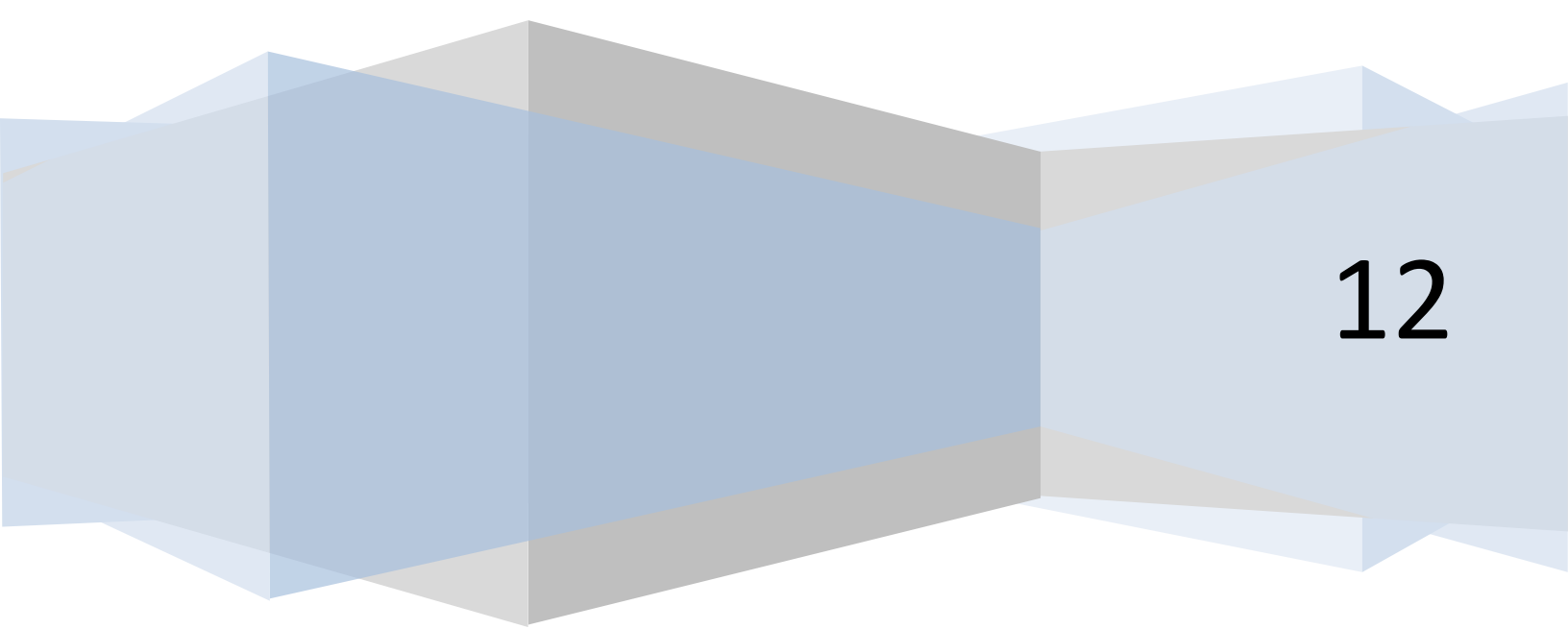


Progoti Systems Limited

Technical Instruction

GETTING STARTED WITH 'GRAILS 2.x'

Md. Afzalur Rashid



12

Technical Instruction Grails -Getting Started

Contents

GETTING STARTED WITH 'GRAILS 2.X'	1
1. Introductions.....	4
2. Install and Configure JDK	4
2.1 Download	4
2.2 Installation	4
2.2.1 Step 1: Download and run jdk-6u31-windows-x64.exe	4
2.2.2 Step 2: Choose the installation folder & packages	6
2.2.3 Step 3: Wait for the jdk installation processing	7
2.2.4 Step 4: Choose the destination folder for jre installation.....	8
2.2.5 Step 5: Wait for the installation to complete	9
2.3 Configure Environment Variables	10
2.3.1 Configure JAVA_HOME environment variable	14
2.3.2 Configure/Edit path environment variable	18
3. Grails Basics.....	20
4. Install and Configure GRAILS.....	20
4.1 Download Grails.....	21
4.2 Install Grails.....	21
4.3 Configure Environment Variable for grails.....	24
4.3.1 Configure GRAILS_HOME environment variable	28
4.3.2 Configure/Edit path environment variable	32
4.3.3 Tip.....	34
5. Creating grails Application	34
5.1 A Hello World Example	34
6. Getting Set Up in an IDE.....	36
6.1 IntelliJ IDEA	36
6.2 Eclipse	36
7. Convention over Configuration.....	37
8. Running an Application	37
9. Testing an Application.....	38
10. Deploying an Application	38

Technical Instruction Grails -Getting Started

1. Introductions

Grails is an open source web application framework which uses the [Groovy](#) programming language (which is in turn based on the [Java platform](#)). It is intended to be a high-productivity framework by following the "[coding by convention](#)" paradigm, providing a stand-alone development environment and hiding much of the configuration detail from the developer.

Grails is a dynamic web application framework built on Java and Groovy, leveraging best of breed APIs including Spring, Hibernate and SiteMesh. Grails brings to Java and Groovy developers the joys of convention-based rapid development while allowing them to leverage their existing knowledge and capitalize on the proven and performant APIs Java developers have been using for years.

Grails was previously known as 'Groovy on Rails'; in March 2006 that name was dropped in response to a request by [David Heinemeier Hansson](#), founder of the [Ruby on Rails](#) framework. Work began in July 2005, with the 0.1 release on March 29, 2006 and the 1.0 release announced on February 18, 2008. The latest version is 2.0.3 which is released on April 2012.

Since grails built on Java, I will explain steps for installing both java and grails in windows 7 so that developers can start working on grails without any further difficulty.

2. Install and Configure JDK

2.1 Download

Download latest version of Java (JDK) form [Oracle website](#)

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

2.2 Installation

There are two ways to install JDK

1. Install Binary distribution for windows at your favorite folder (I have installed jdk1.6.0_23 to C:\Program Files (x86)\Java\jdk1.6.0_23 folder)\
2. Download plug and play zipped distribution and extract to any folder (say C:\Program Files (x86)\Java\jdk1.6.0_23)

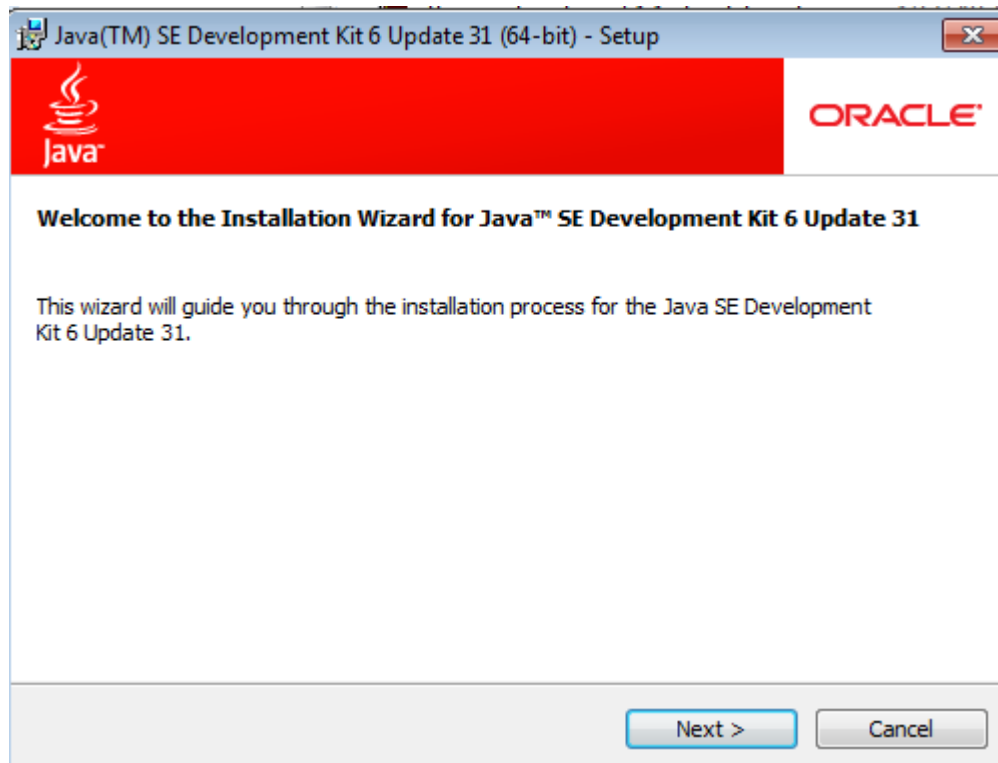
The following screenshots will help you to install java sdk:

2.2.1 Step 1: Download and run jdk-6u31-windows-x64.exe

A dialogue will popup and will ask to allow the application installation

Click on Yes button to start the installation

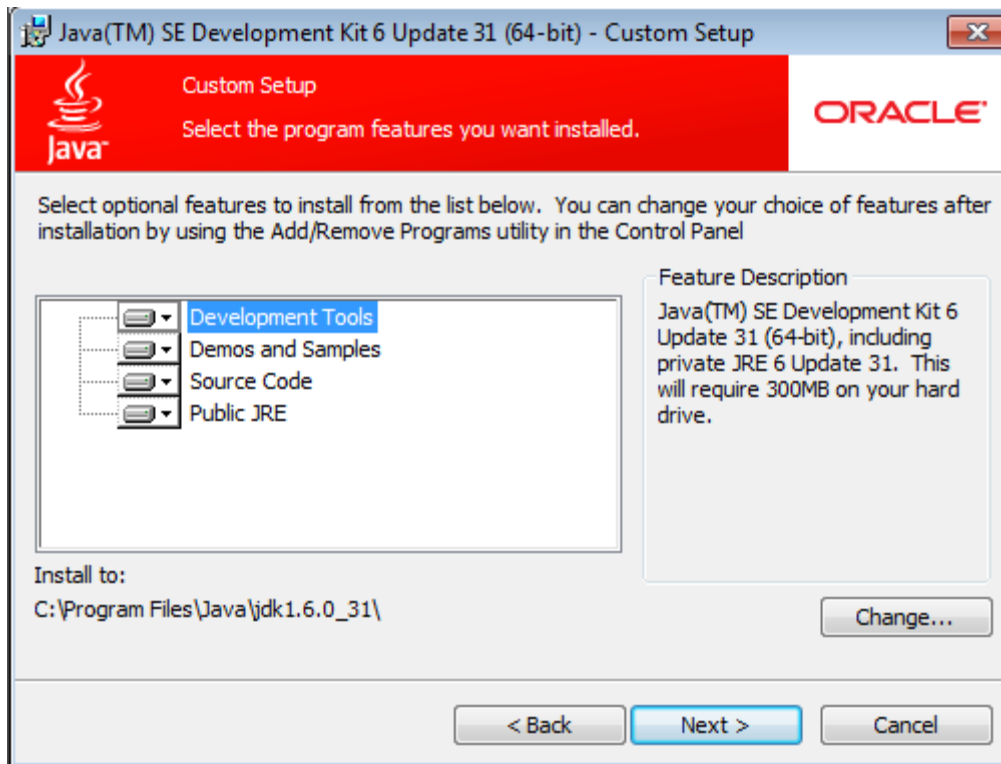
Technical Instruction Grails -Getting Started



Click on next button

Technical Instruction Grails -Getting Started

2.2.2 Step 2: Choose the installation folder & packages

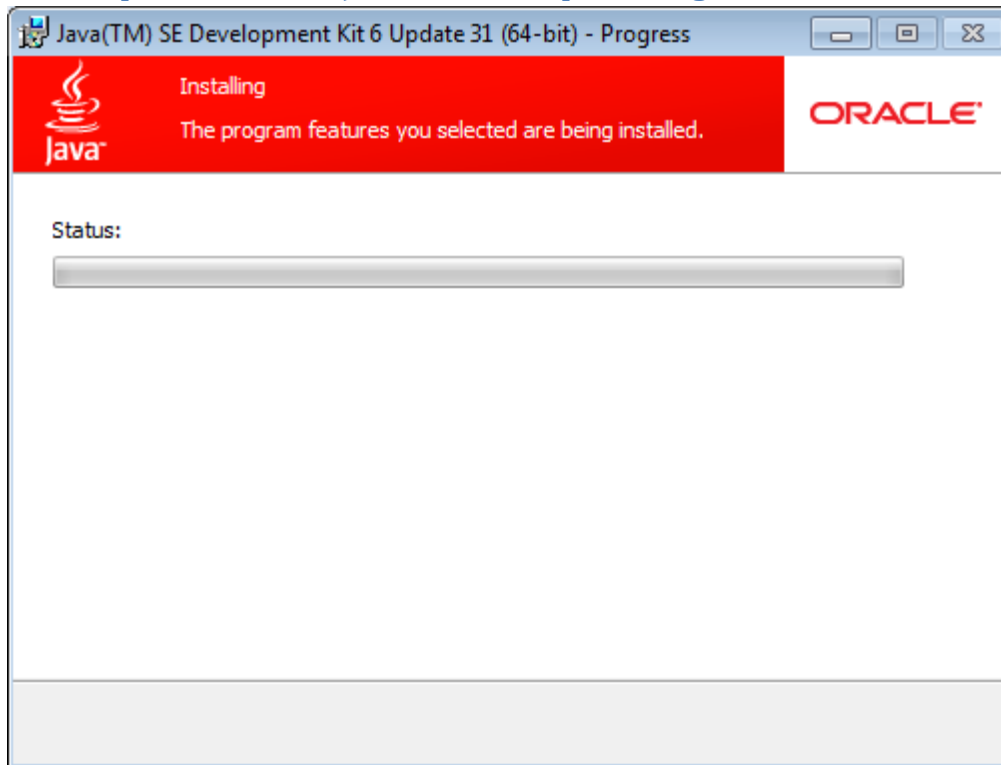


Choose the installation folder and packages. By default C:\Program Files\Java\jdk1.6.0_31 will be picked up , you may change this by clicking on Change... button.

Click on next

Technical Instruction Grails -Getting Started

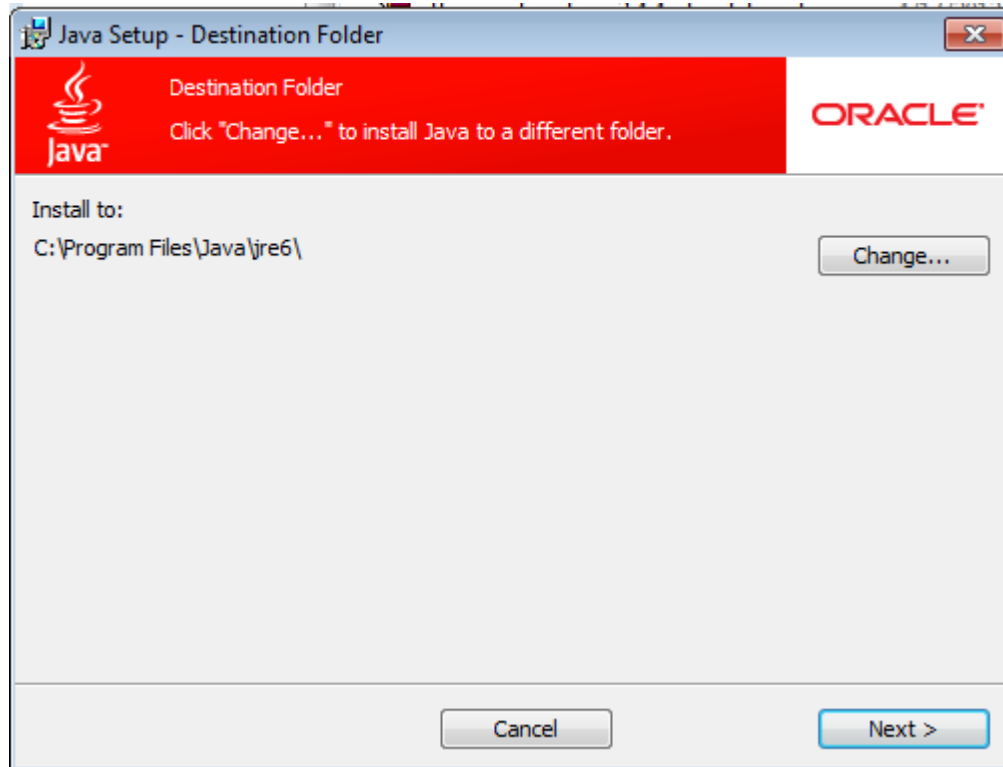
2.2.3 Step 3: Wait for the jdk installation processing



Technical Instruction Grails -Getting Started

2.2.4 Step 4: Choose the destination folder for jre installation.

By default By default C:\Program Files\Java\jre will be picked up. You may change this by clicking Change... button



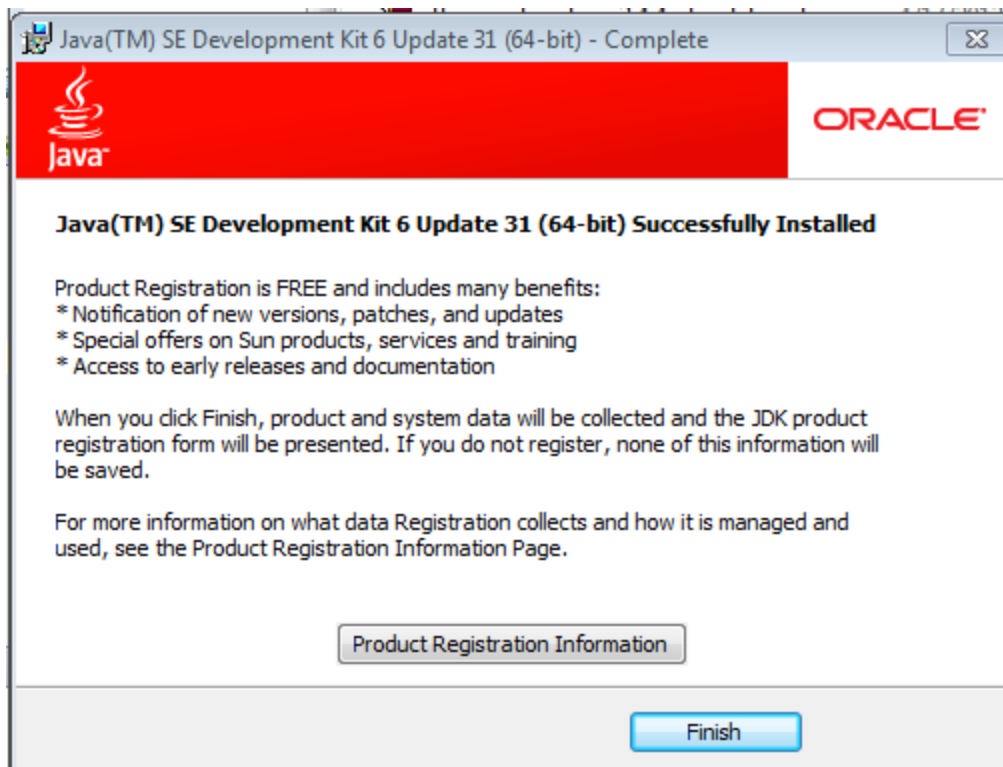
Click on Next Button

Technical Instruction Grails -Getting Started

2.2.5 Step 5: Wait for the installation to complete



After the completion of the installation the following screen will be displayed.



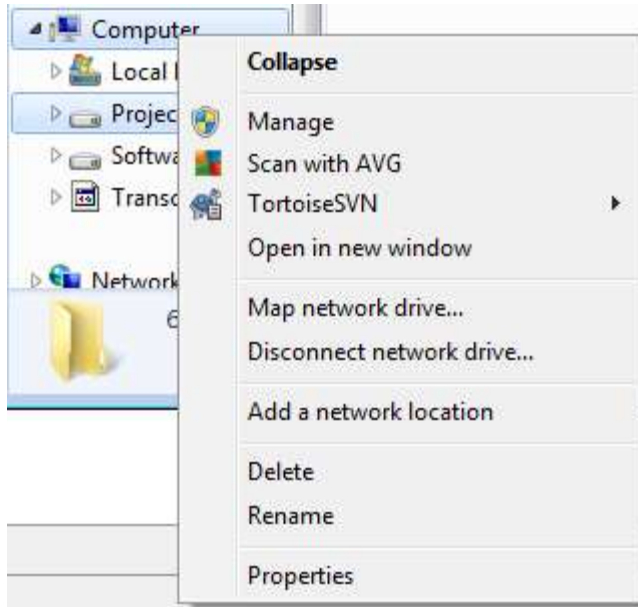
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You may Register the product by clicking the 'Product Registration Information' button. Registration process is free of cost. The installation does not have any impact on registration, so you can just click finish to end the installation process.

2.3 Configure Environment Variables

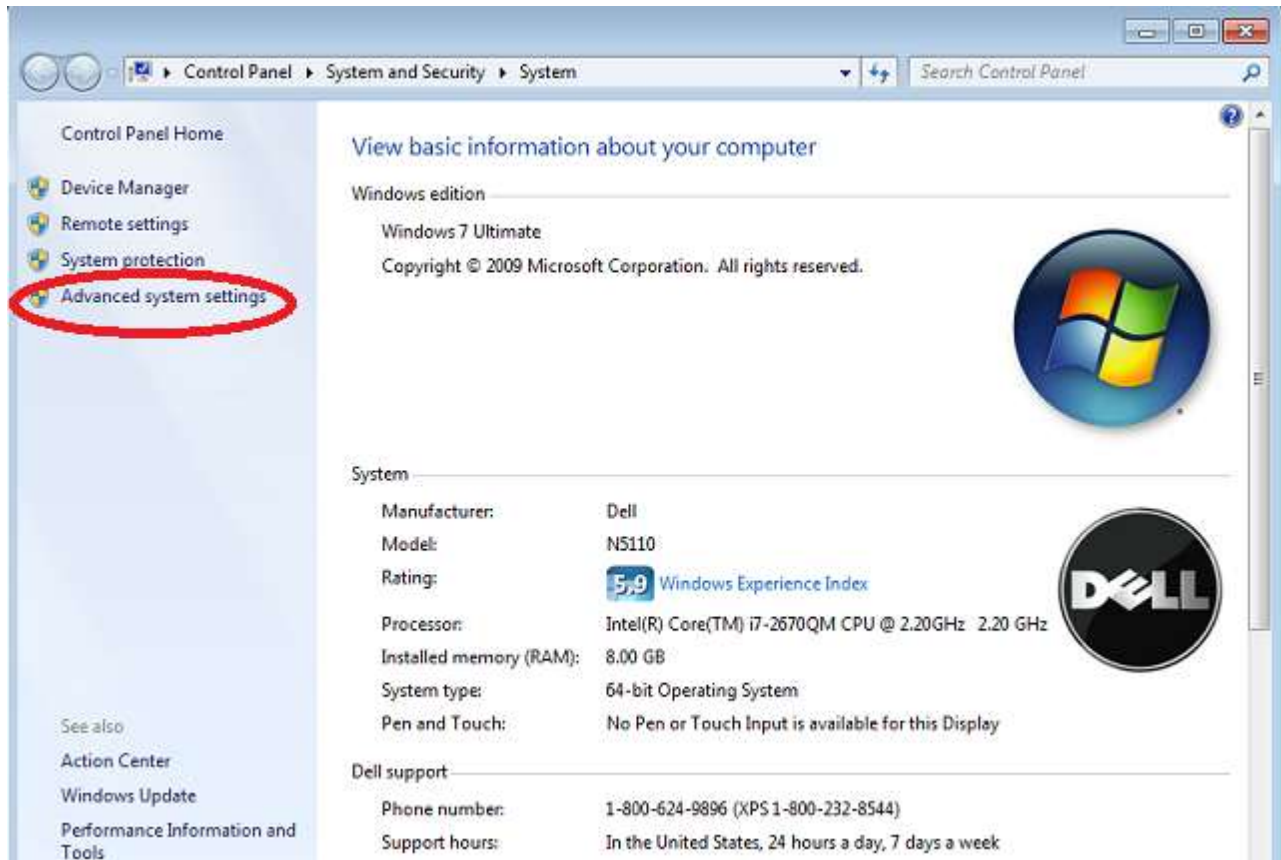
Now you have to configure environment variable JAVA_HOME and path to make sure any application looks JDK through these variables.

To configure environment variables right click on Computer and then choose properties



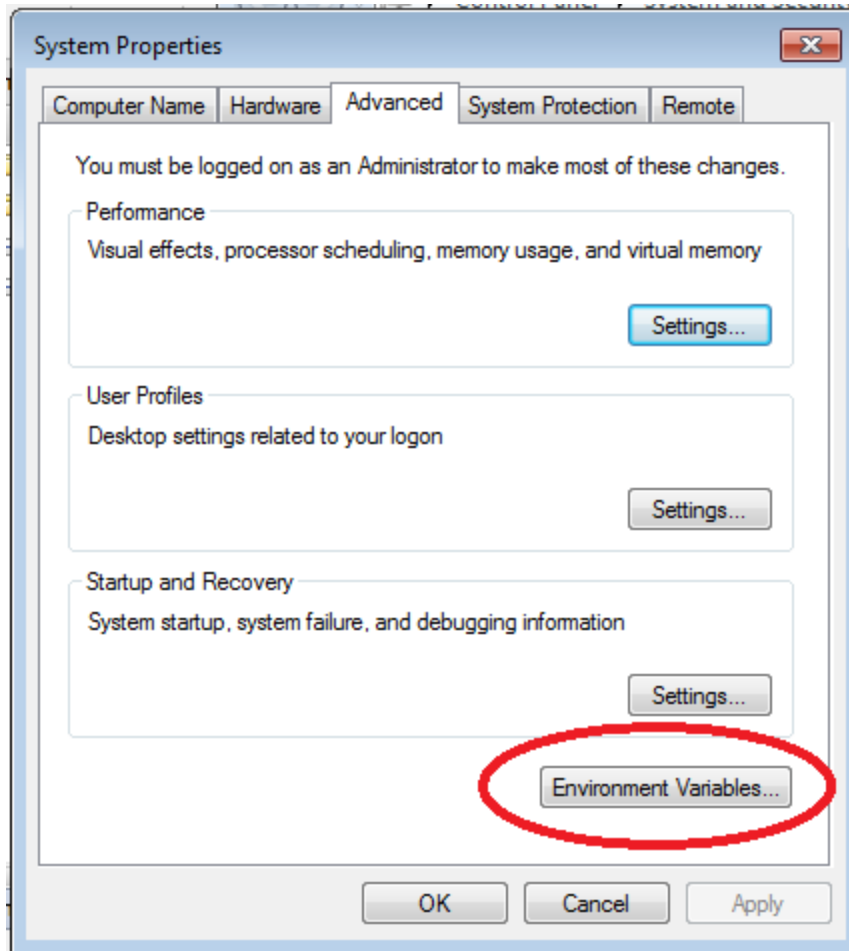
Once you click on properties on the previous screen the following screen will appear.

Technical Instruction Grails -Getting Started



Now click on Advanced System settings. The following screen will appear.

Technical Instruction Grails -Getting Started



Click on 'Environment variable' button to get the window to configure environment variables.

Technical Instruction Grails -Getting Started

The following System Properties window will appear

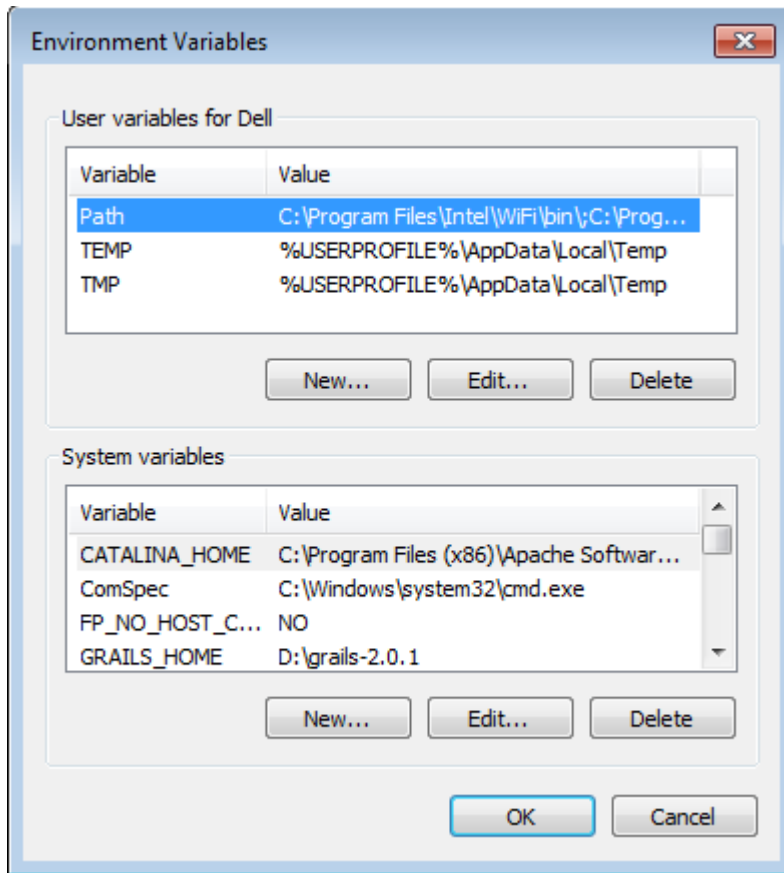
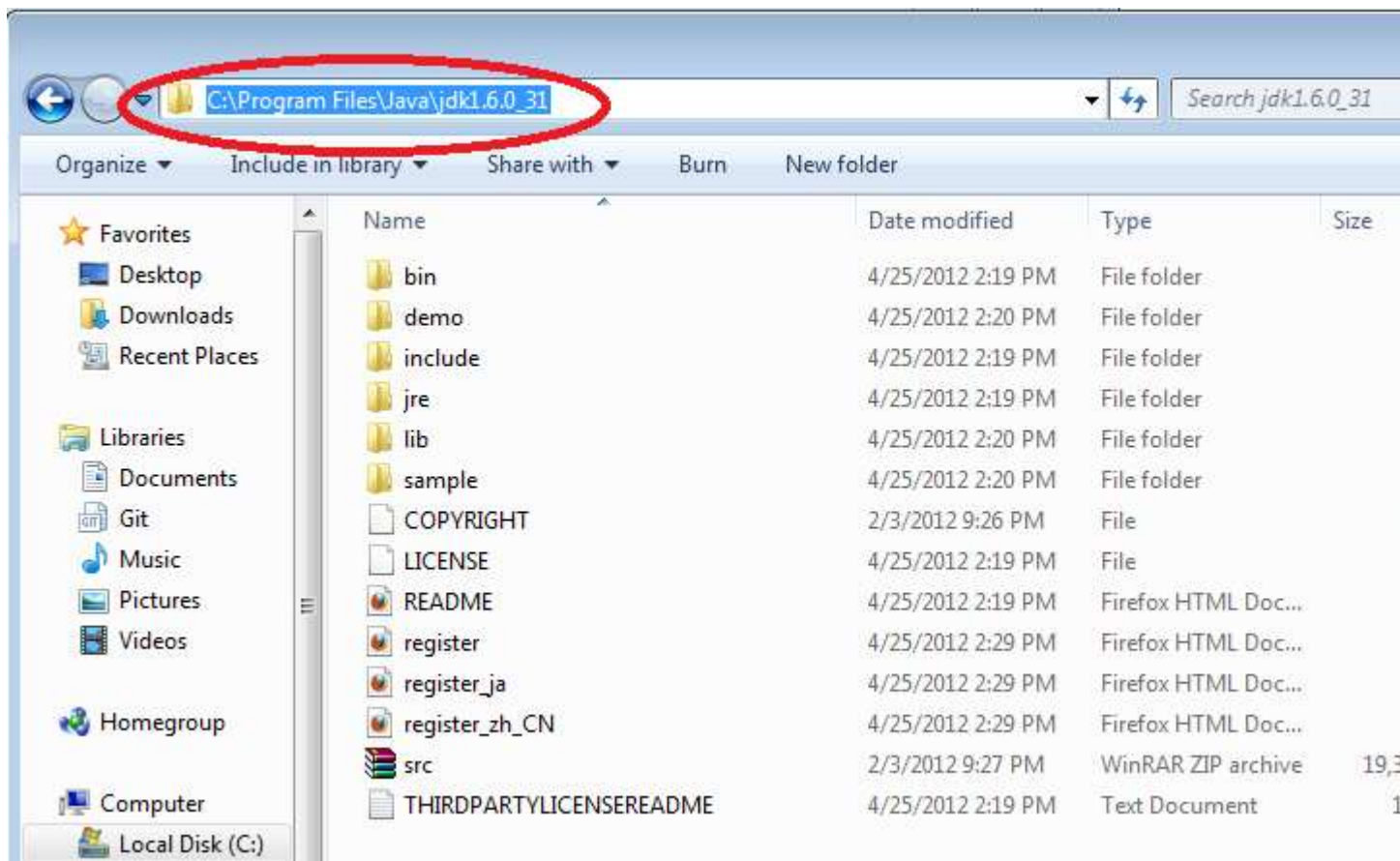


Figure - Environment variables

Remember to setup system variables not user variables. If you setup user variables other users will not get this variables.

2.3.1 Configure JAVA_HOME environment variable

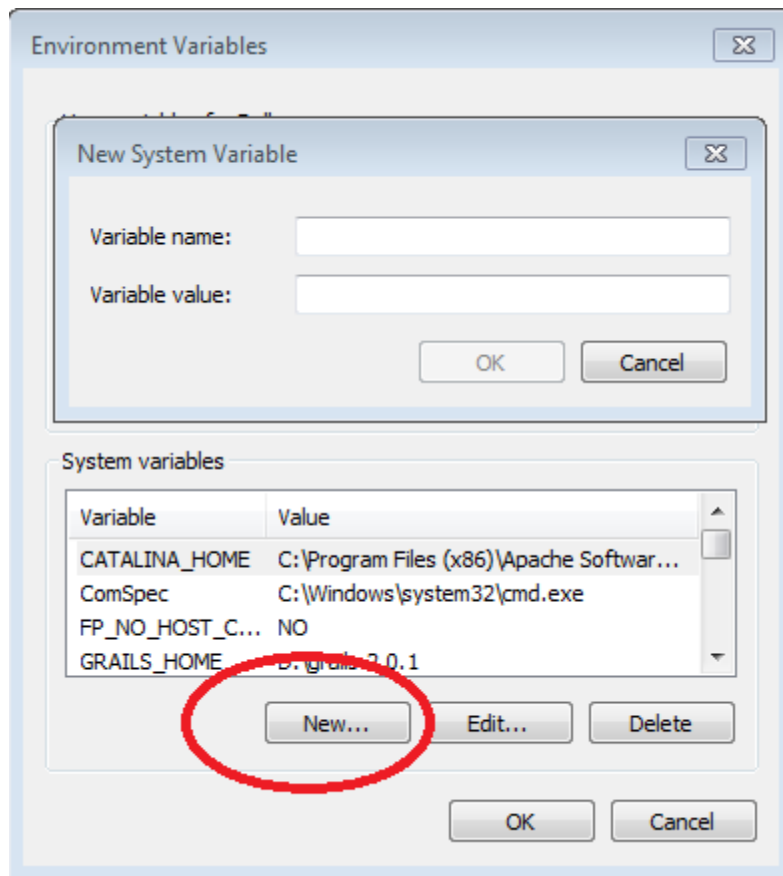
To configure JAVA_HOME environment variable copy the location of jdk installation (C:\Program Files\Java\jdk1.6.0_31). Make sure bin,demo,include,jre etc. folders are available inside this folder



Now click on new in Figure - Environment variables screen

A small popup will appear like the following

Technical Instruction Grails -Getting Started

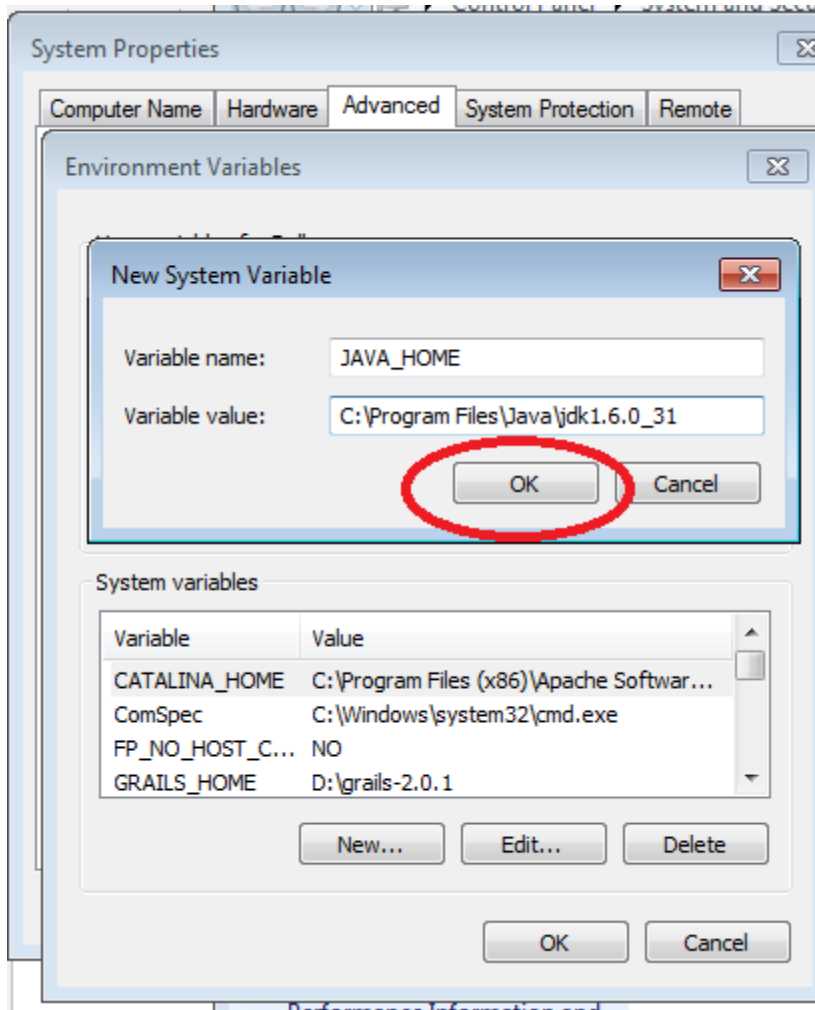


Type JAVA_HOME in variable name text field

and paste the copied location of the jdk installation

help from the following screen

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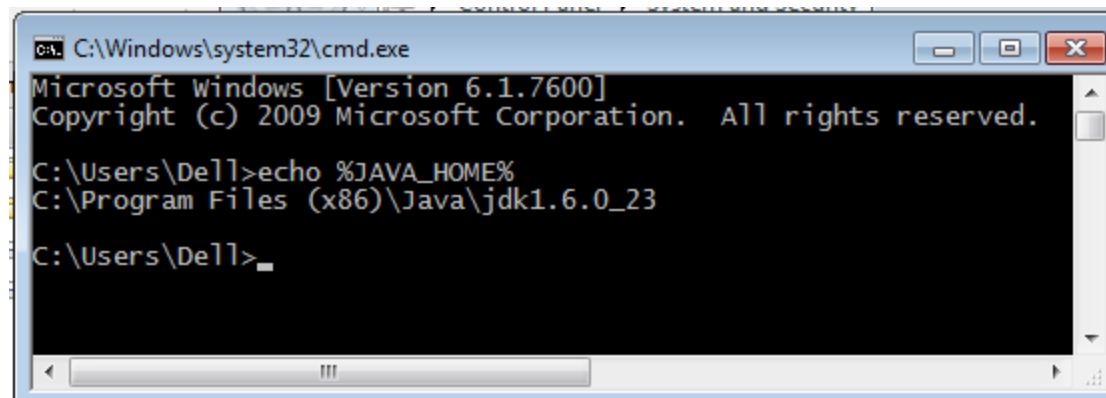
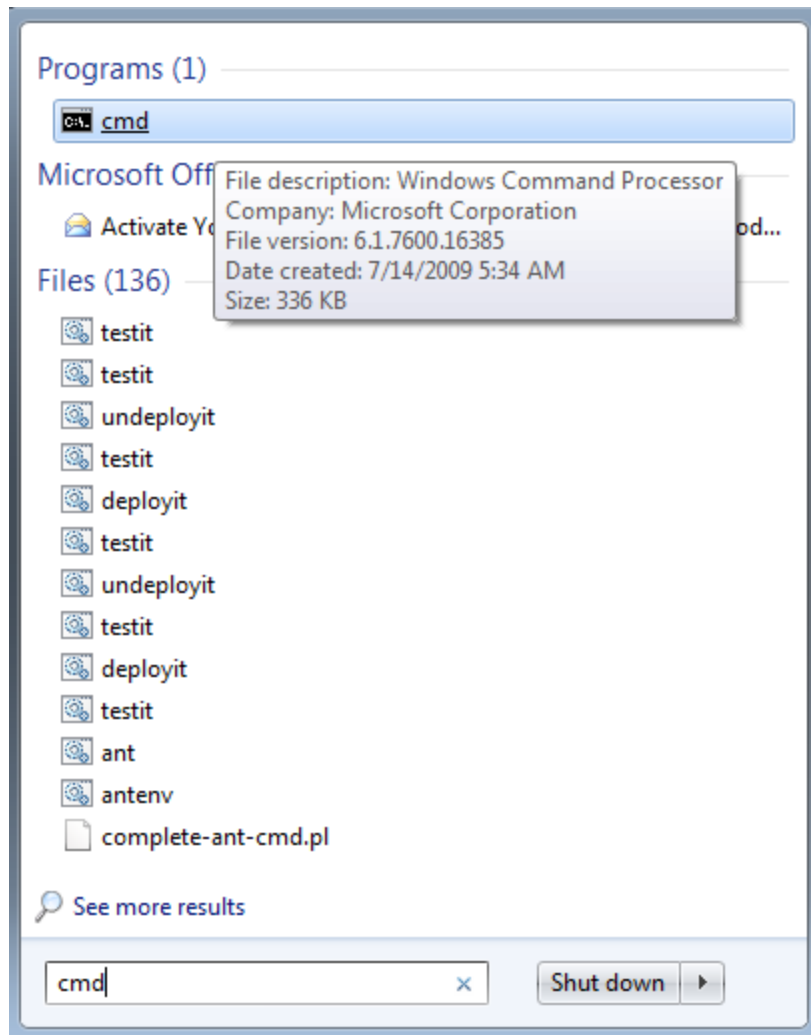
Press ok button.

The environment variable JAVA_HOME is now configured properly.

To test open a command prompt and type `echo %JAVA_HOME%`

See the following screenshot

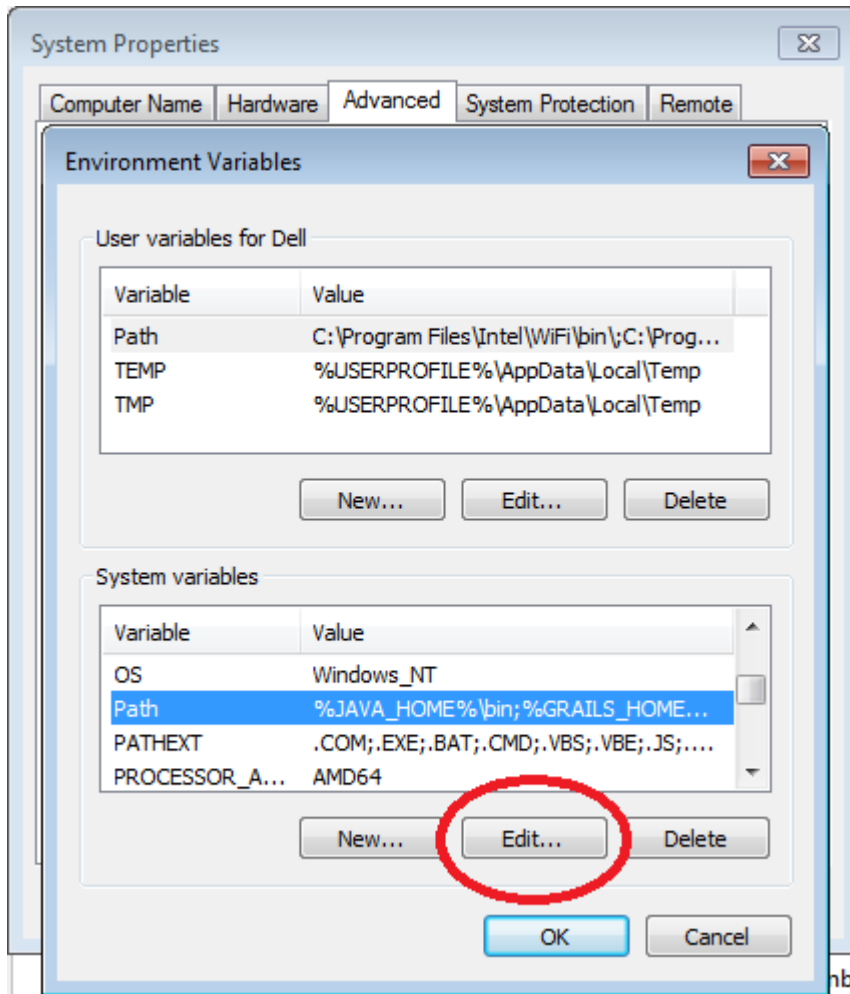
Technical Instruction Grails -Getting Started



Technical Instruction Grails -Getting Started

2.3.2 Configure/Edit path environment variable

To configure path environment variable select the path environment variable like the following screen.
Here the Blue colored like is the selected path environment variable on system variables.



Click on edit button

And add %JAVA_HOME%\bin; at the very beginning of the variable value field.

Follow the screen below:



follow the below screen shot for more help:



19 | Page

Technical Instruction Grails -Getting Started

Now JDK is installed properly. You may now download and install Grails for configuration.

3. Grails Basics

Grails is a web framework based on Groovy and Java which can be deployed into existing Java web servers, e.g. Tomcat or Jetty.

Grails allows to create quickly web applications; its scaffolding capabilities let you create a new project within a few minutes. Grails is based on the "convention over configuration" idea which allows the application to auto-wires itself based on naming schemes (instead of using configuration files, e.g. XML files).

The Grails framework allows instance development without requiring any configuration. Just download Grails and you are ready to start. Grails accomplish this by automatically providing the Tomcat webcontainer and the H2 database during development. If you deploy you Grails application later you can use another webcontainer or database.

Grails uses GORM (Grails Object Relational Mapping) for the persistence of the domain model. GORM is based on Hibernate. You can test with the H2 and run in production against another database simply by changing the configuration file (DataSource.groovy).

Grails uses JavaEE as the architectural basis and Spring for structuring the application via dependency injection.

Grails is plugin based and provides its own build system (Gant). The Grails homepage provides several pre-defined plugins which extend the Grails framework.

During the start of a new development with Grails you mainly use the command line to generated new user interfaces.

4. Install and Configure GRAILS

The first step to getting up and running with Grails is to install the distribution. To do so follow these basic steps:

Download a binary distribution of Grails and extract the resulting zip file to a location of your choice

Setup your GRAILS_HOME environment variable pointing to your installation directory of Grails. Add also the \$GRAILS_HOME/bin to the path variable.

Technical Instruction Grails -Getting Started

If Grails is working correctly you should now be able to type `grails -version` in the terminal window and see output similar to this:

```
Grails version: 2.0.3
```

Please follow the following steps for more detail on installation and configuration of grails on windows 7 machine.

4.1 Download Grails

To download grails please visit <http://grails.org/Download>

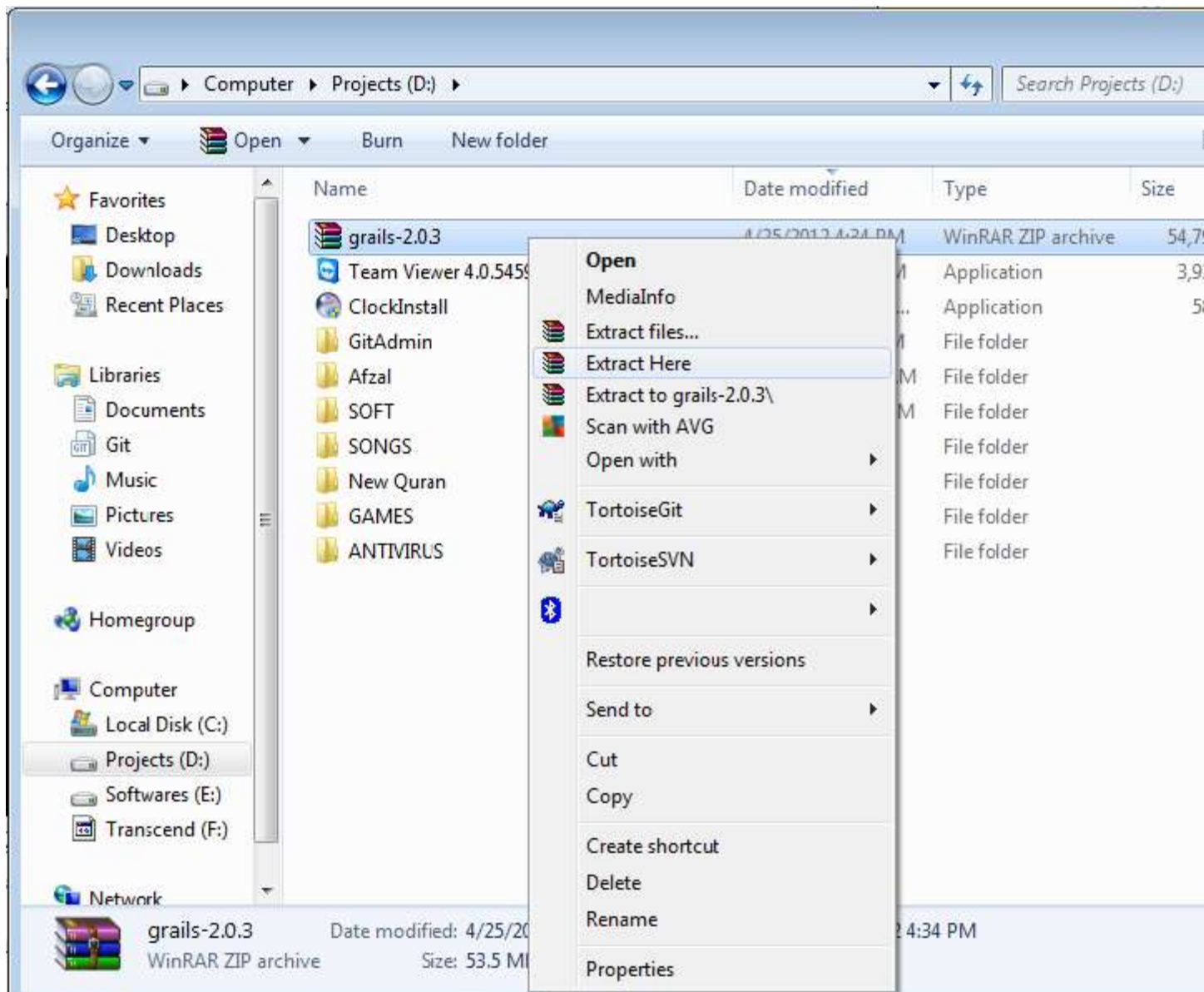


Click the download button of Binary zip. The Download will start. It will take around 20 minutes to download the 57.5 MB download with average internet speed.

4.2 Install Grails

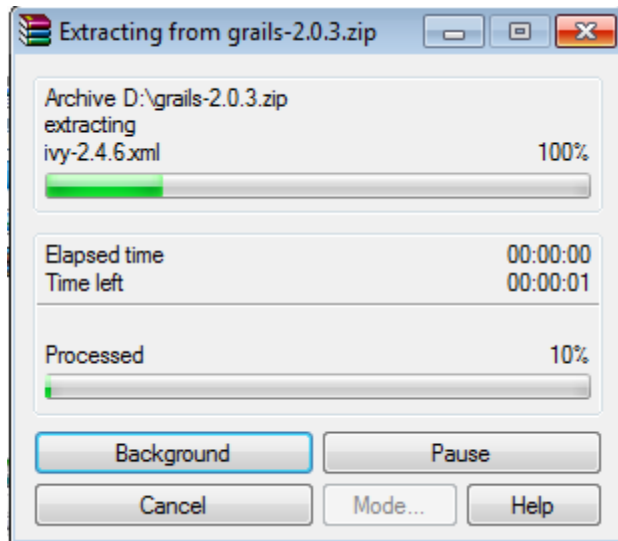
Copy the zip file to D:\\ drive or any directory of your choice. Right click on the file and choose extract here to extract the distribution to the folder where grails-2.0.3.zip folder resides.

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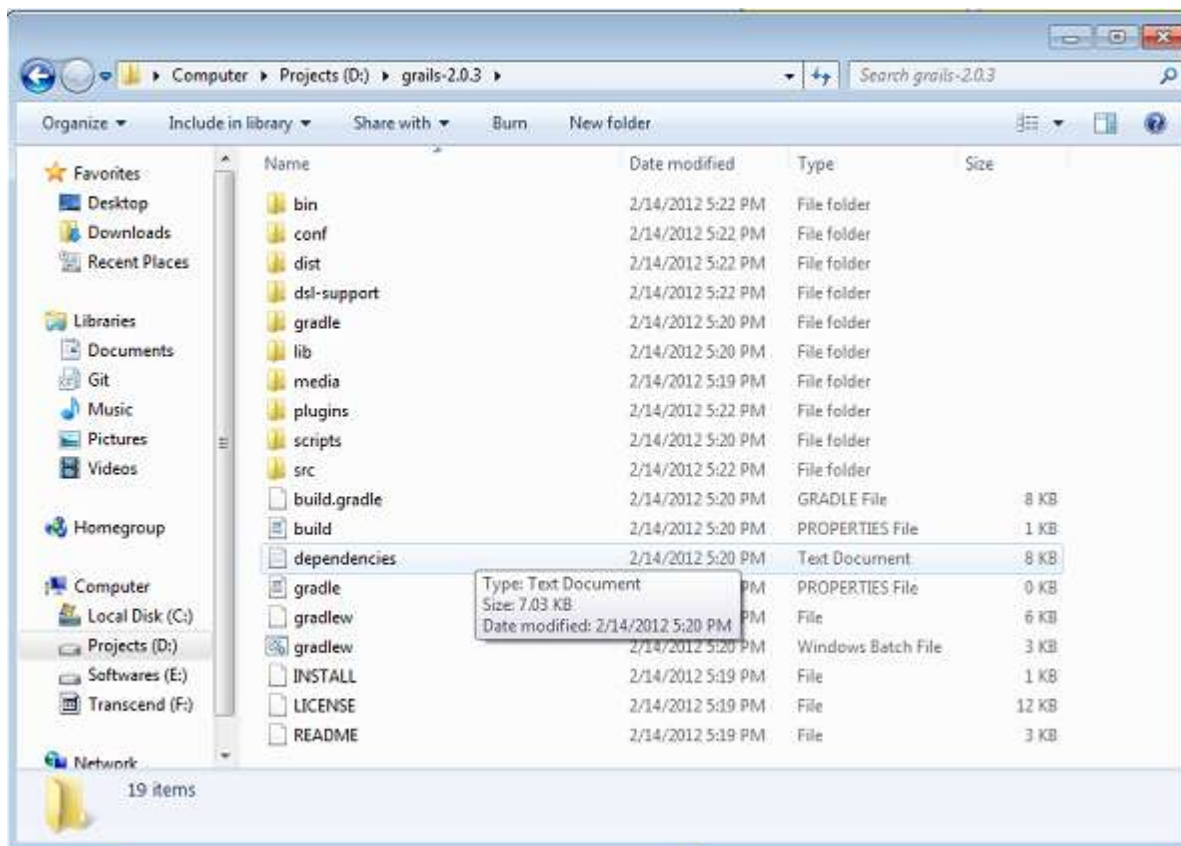


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In this example the grails-2.0.3.zip is extracted to d:\



Verify that the folder has bin, conf, dist etc folders. The following screen may help you to verify the distribution.

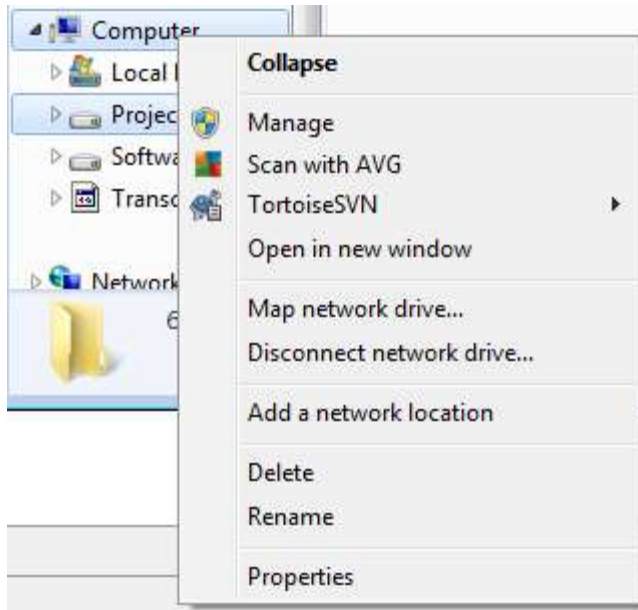


Technical Instruction Grails -Getting Started

4.3 Configure Environment Variable for grails

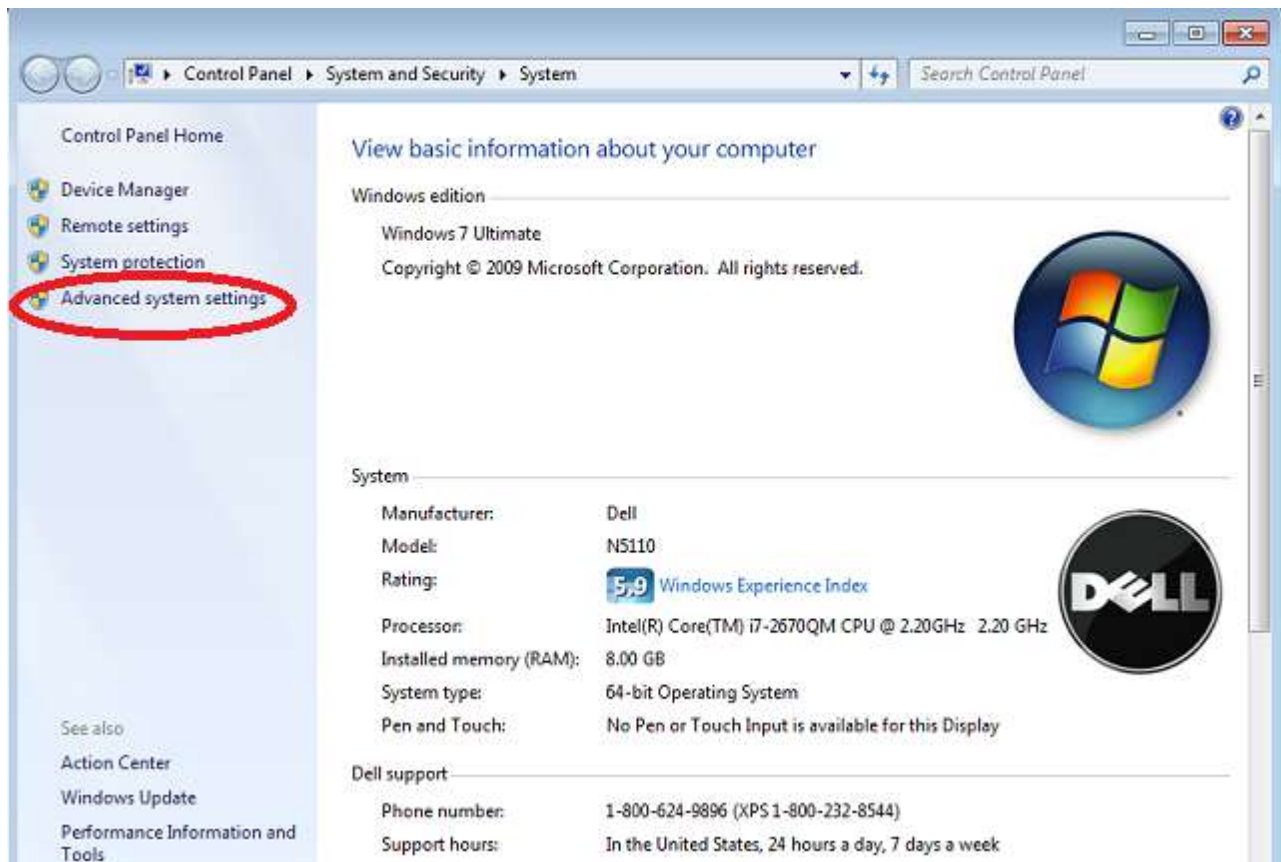
Now you have to configure environment variable JAVA_HOME and path to make sure any application looks JDK through these variables.

To configure environment variables right click on Computer from windows explorer and then chose properties



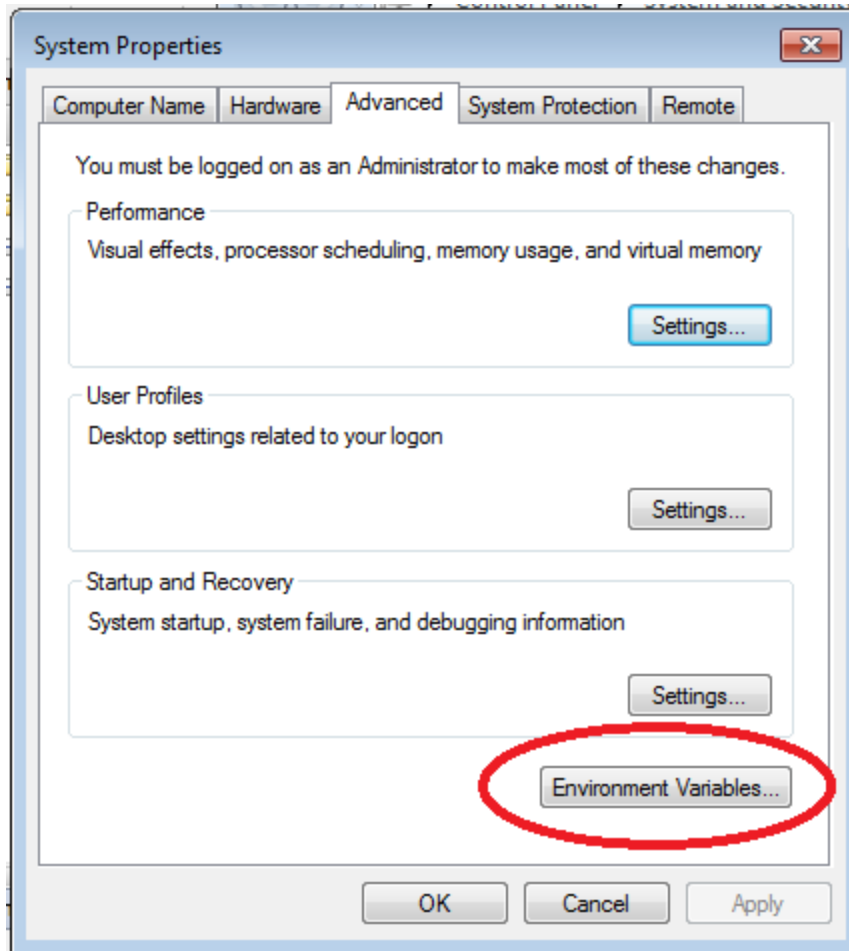
Once you click on properties on the previous screen the following screen will appear.

Technical Instruction Grails -Getting Started



Now click on Advanced System settings. The following screen will appear.

Technical Instruction Grails -Getting Started



Click on 'Environment variable' button to get the window to configure environment variables.

Technical Instruction Grails -Getting Started

The following System Properties window will appear

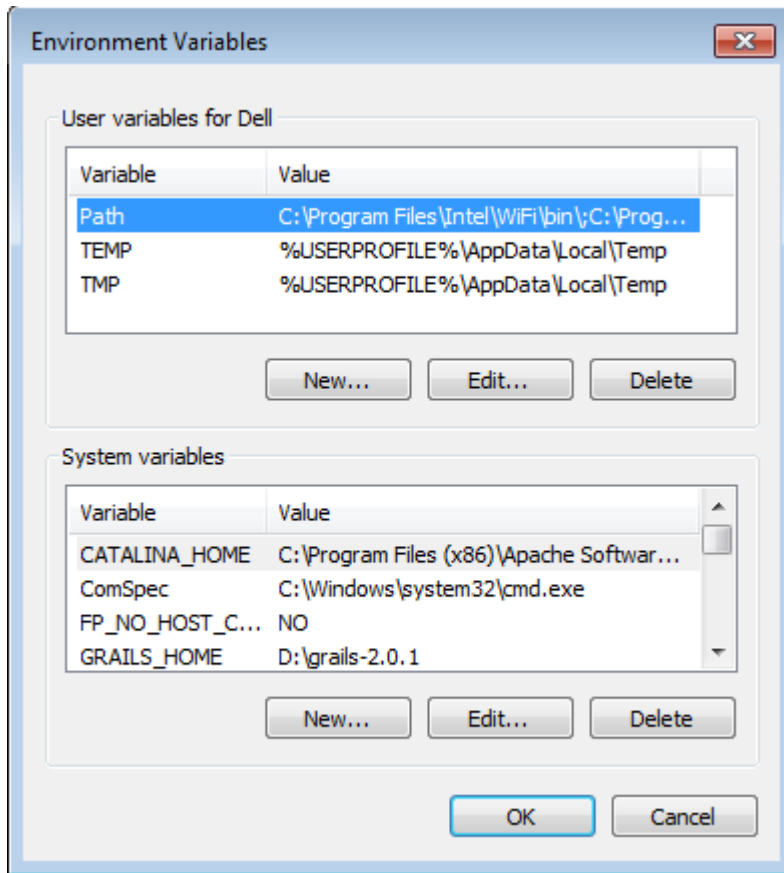


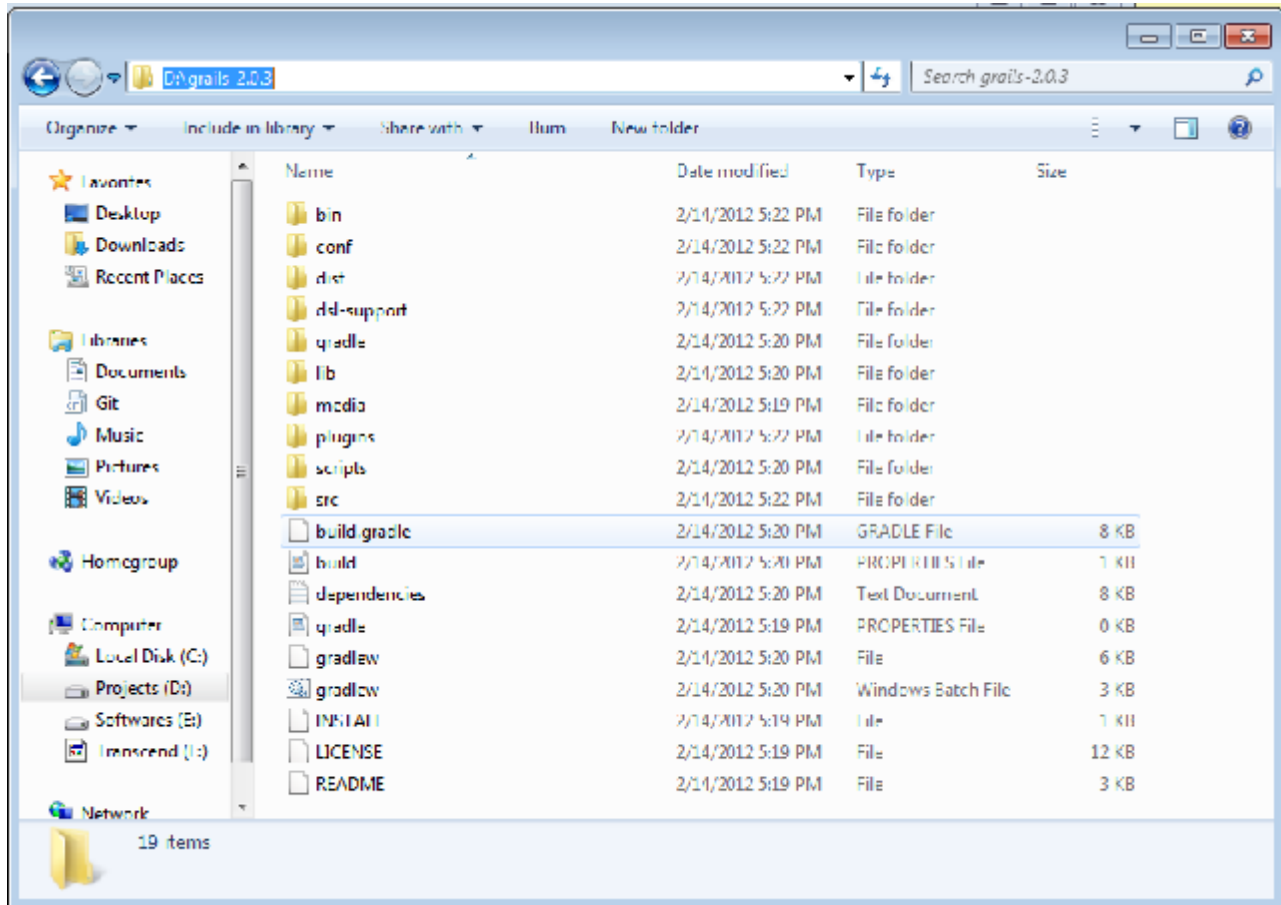
Figure - Grails Environment variables

Remember to setup system variables not user variables. If you setup user variables other users will not get this variables.

Technical Instruction Grails -Getting Started

4.3.1 Configure GRAILS_HOME environment variable

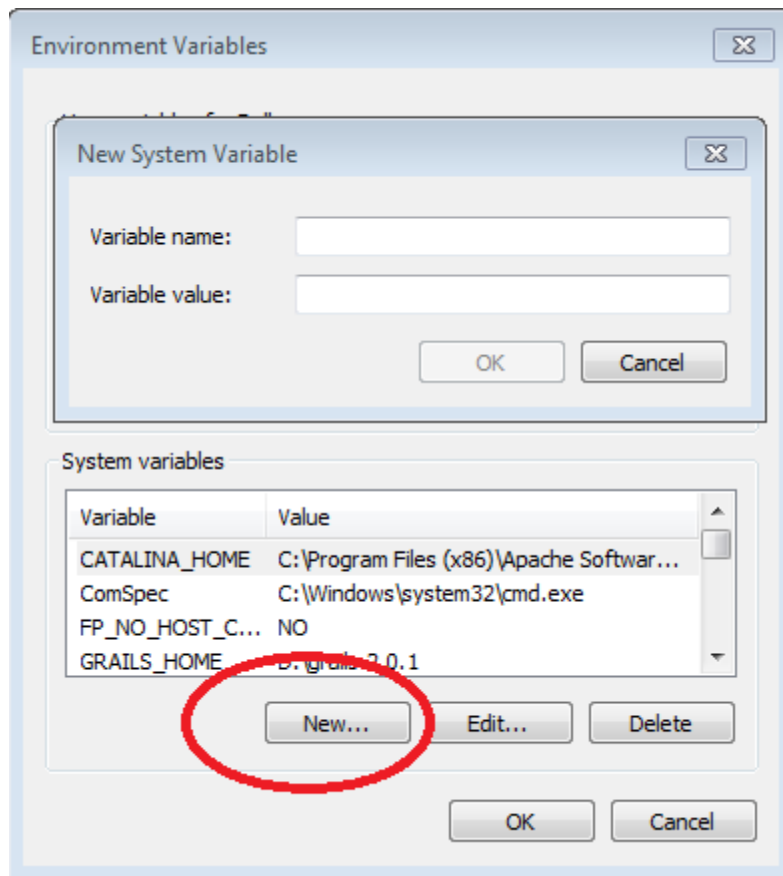
To configure GRAILS_HOME environment variable copy the location of grails installation (D:\grails-2.0.3). Make sure bin, conf, dist etc folders are available inside this folder



Now click on new in Figure - Environment variables screen

A small popup will appear like the following

Technical Instruction Grails -Getting Started

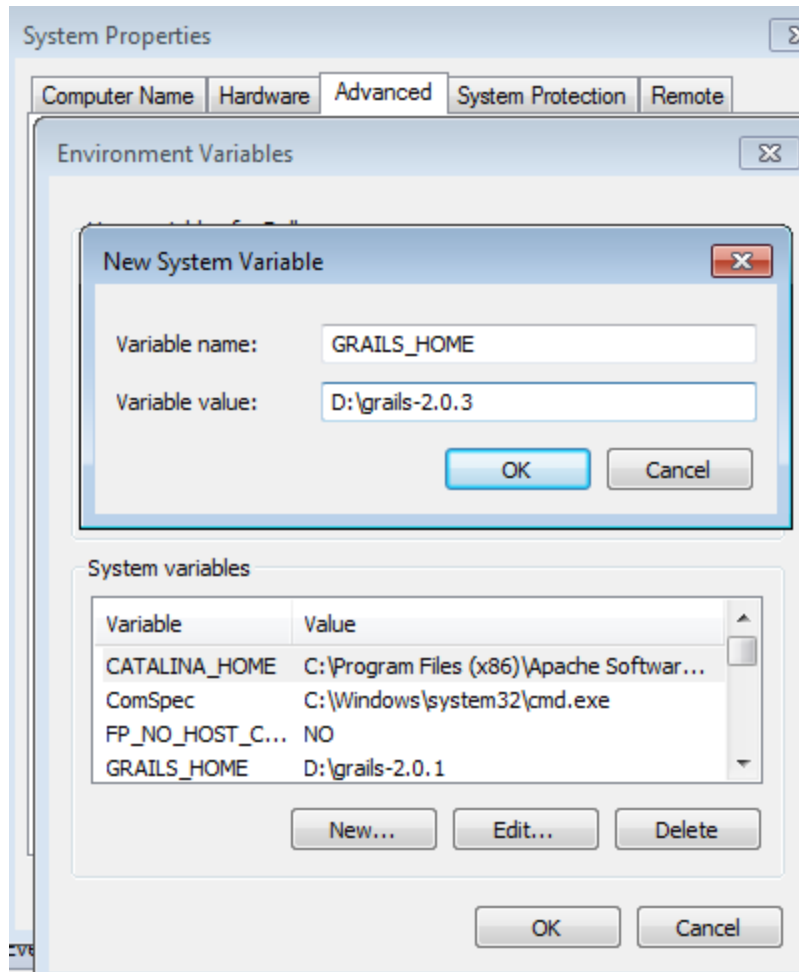


Type `GRAILS_HOME` in variable name text field

and paste the copied location of the grails installation in variable value field

help from the following screen

Technical Instruction Grails -Getting Started



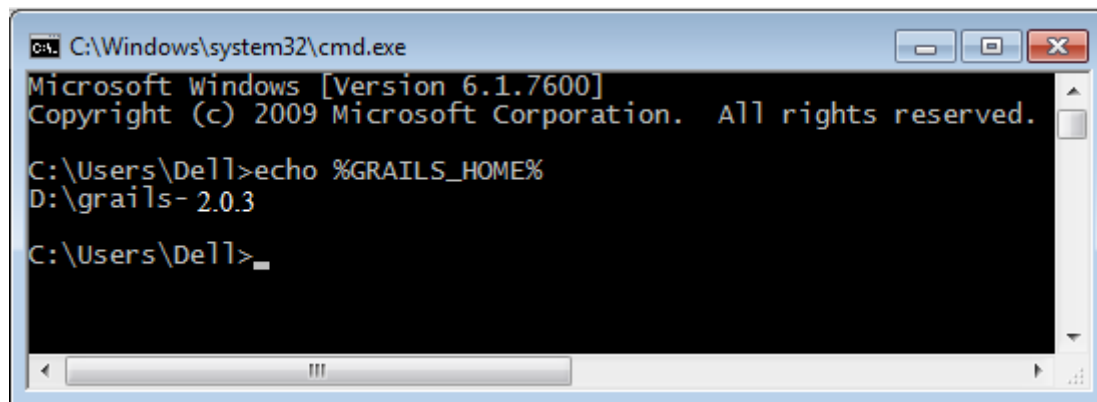
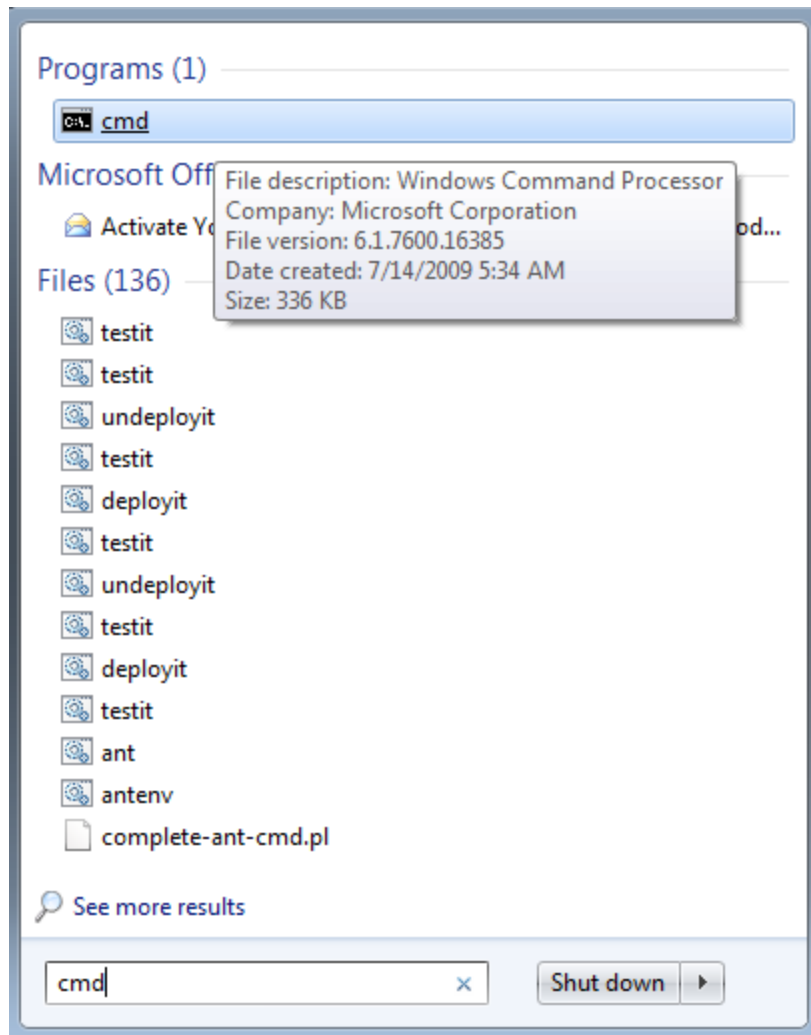
Press ok button.

The environment variable GRAILS_HOME is now configured properly.

To test open a command prompt and type `echo %GRAILS_HOME%`

See the following screenshoot

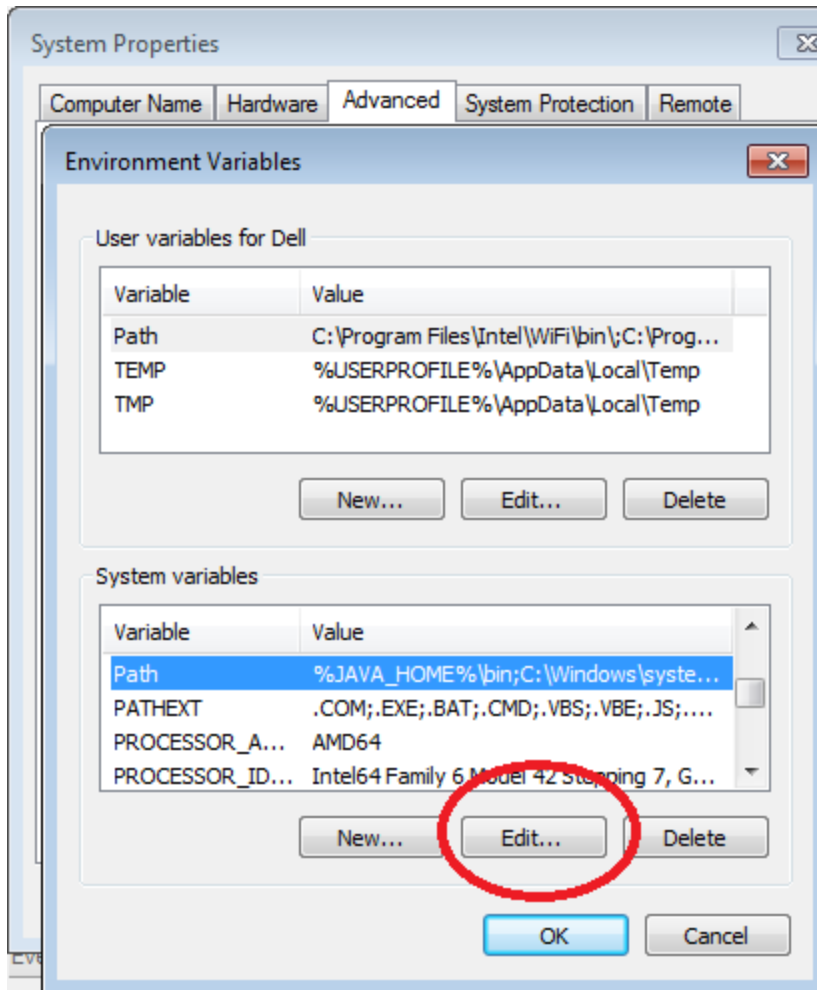
Technical Instruction Grails -Getting Started



Technical Instruction Grails -Getting Started

4.3.2 Configure/Edit path environment variable

To configure path environment variable select the path environment variable like the following screen. Here the Blue colored like is the selected path environment variable on system variables.

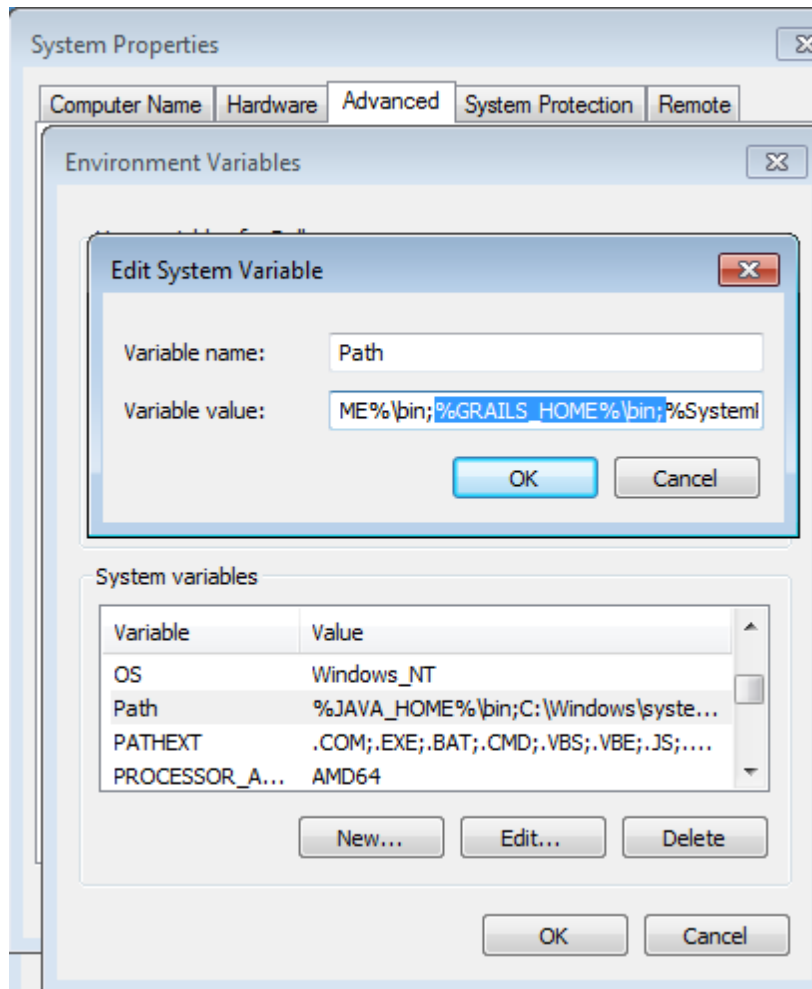


Click on edit button

And add %GRAILS_HOME%\bin; after %JAVA_HOME%\bin; of the variable value field.

Follow the screen below:

Technical Instruction Grails -Getting Started



Click on ok button to finish setting path variable

Now test configuration typing java -version on the command prompt.

follow the below screen shot for more help:

```
C:\Users\Dell>echo %GRAILS_HOME%
D:\grails-2.0.3

C:\Users\Dell>echo %path%
C:\Program Files\Java\jdk1.6.0_31\bin;D:\grails-2.0.3\bin;C:\Windows\system32;C:\Windows;C:\Windows\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0\;C:\Program Files (x86)\Common Files\Roxio Shared\DLLShared\;C:\Program Files (x86)\Common Files\Roxio Shared\10.0\DLLShared\;C:\Program Files\Intel\WiFi\bin\;C:\Program Files\Common Files\Intel\WirelessCommon\;C:\Program Files\TortoiseSVN\bin;D:\grails-2.0.3\bin;C:\Program Files\TortoiseGit\bin;C:\Program Files\Intel\WiFi\bin\;C:\Program Files\Common Files\Intel\WirelessCommon\;C:\Program Files (x86)\SSH Communications Security\SSH Secure Shell

C:\Users\Dell>grails -version
Grails version: 2.0.3
C:\Users\Dell>
```

If you can see the grails version properly as installed version of grails , you are done with grails installation.

4.3.3 Tip

Please make sure that the environment variable `JAVA_HOME` is set to the JDK and not the JRE. The JDK is required to develop with Grails.

5. Creating grails Application

To create a Grails application you first need to familiarize yourself with the usage of the `grails` command which is used in the following manner:

```
grails [command name]
```

Run [create-app](#) to create an application:

```
grails create-app helloworld
```

This will create a new directory inside the current one that contains the project. Navigate to this directory in your console:

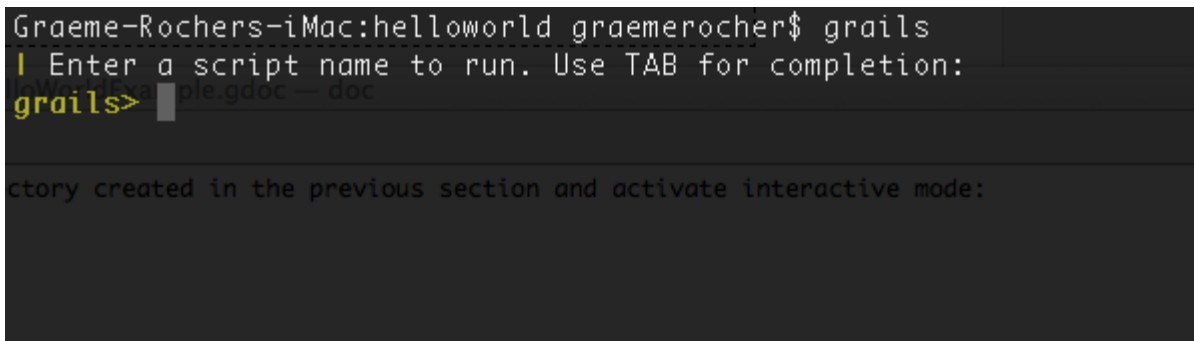
```
cd helloworld
```

5.1 A Hello World Example

Let's now take the new project and turn it into the classic "Hello world!" example. First, change into the "helloworld" directory you just created and start the Grails interactive console:

```
cd helloworld  
grails
```

You should see a prompt that looks like this:



```
Graeme-Rochers-iMac:helloworld graemerocher$ grails  
! Enter a script name to run. Use TAB for completion:  
grails> ple.gdoc -- doc  
  
actory created in the previous section and activate interactive mode:
```

What we want is a simple page that just prints the message "Hello World!" to the browser. In Grails, whenever you want a new page you just create a new controller action for it. Since we don't yet have a controller, let's create one now with the [create-controller](#) command:

Technical Instruction Grails -Getting Started

```
grails> create-controller hello
```

Don't forget that in the interactive console, we have auto-completion on command names. So you can type "cre" and then press <tab> to get a list of all `create-*` commands. Type a few more letters of the command name and then <tab> again to finish.

The above command will create a new [controller](#) in the `grails-app/controllers/helloworld` directory called `HelloController.groovy`. Why the extra `helloworld` directory? Because in Java land, it's strongly recommended that all classes are placed into packages, so Grails defaults to the application name if you don't provide one. The reference page for [create-controller](#) of grails web site provides more detail on this.

We now have a controller so let's add an action to generate the "Hello World!" page. The code looks like this:

```
package helloworld

class HelloController {

    def index() {

        render "Hello World!"

    }

}
```

The action is simply a method. In this particular case, it calls a special method provided by Grails to render the page.

Job done. To see your application in action, you just need to start up a server with another command called `run-app`:

```
grails> run-app
```

This will start an embedded server on port 8080 that hosts your application. You should now be able to access your application at the URL <http://localhost:8080/helloworld/> - try it!

If you see the error "Server failed to start for port 8080: Address already in use", then it means another server is running on that port. You can easily work around this by running your server on a different port using `-Dserver.port=9090 run-app`. '9090' is just an example: you can pretty much choose anything within the range 1024 to 49151.

The result will look something like this:



This is the Grails intro page which is rendered by the `grails-app/view/index.gsp` file. It detects the presence of your controllers and provides links to them. You can click on the "HelloController" link to see our custom page containing the text "Hello World!". Great! You have your first working Grails application.

One final thing: a controller can contain many actions, each of which corresponds to a different page (ignoring AJAX at this point). Each page is accessible via a unique URL that is composed from the controller name and the action name: `/<appname>/<controller>/<action>`. This means you can access the Hello World page via [/helloworld/hello/index](#), where 'hello' is the controller name (remove the 'Controller' suffix from the class name and lower-case the first letter) and 'index' is the action name. But you can also access the page via the same URL without the action name: this is because 'index' is the *default action*.

6. Getting Set Up in an IDE

6.1 IntelliJ IDEA

[IntelliJ IDEA](#) and the [JetGroovy](#) plugin offer good support for Groovy and Grails developers. Refer to the section on [Groovy and Grails](#) support on the JetBrains website for a feature overview.

To integrate Grails with IntelliJ run the following command to generate appropriate project files:

```
grails integrate-with --intellij
```

6.2 Eclipse

We recommend that users of [Eclipse](#) looking to develop Grails application take a look at [SpringSource Tool Suite](#), which offers built in support for Grails including automatic classpath

Technical Instruction Grails -Getting Started

management, a GSP editor and quick access to Grails commands. See the [STS Integration](#) page for an overview.

6.3 NetBeans

NetBeans provides a Groovy/Grails plugin that automatically recognizes Grails projects and provides the ability to run Grails applications in the IDE, code completion and integration with the Glassfish server. For an overview of features see the [NetBeans Integration](#) guide on the Grails website which was written by the NetBeans team.

7. Convention over Configuration

Grails uses "convention over configuration" to configure itself. This typically means that the name and location of files is used instead of explicit configuration, hence you need to familiarize yourself with the directory structure provided by Grails.

Here is a breakdown and links to the relevant sections:

- `grails-app` - top level directory for Groovy sources
 - `conf` - [Configuration sources](#).
 - `controllers` - [Web controllers](#) - The C in MVC.
 - `domain` - The [application domain](#).
 - `i18n` - Support for [internationalization \(i18n\)](#).
 - `services` - The [service layer](#).
 - `taglib` - [Tag libraries](#).
 - `utils` - Grails specific utilities.
 - `views` - [Groovy Server Pages](#) - The V in MVC.
- `scripts` - [Gant scripts](#).
- `src` - Supporting sources
 - `groovy` - Other Groovy sources
 - `java` - Other Java sources
- `test` - [Unit and integration tests](#).

8. Running an Application

Grails applications can be run with the built in Tomcat server using the [run-app](#) command which will load a server on port 8080 by default:

```
grails run-app
```

You can specify a different port by using the `server.port` argument:

```
grails -Dserver.port=8090 run-app
```

Note that it is better to start up the application in interactive mode since a container restart is much quicker:

Technical Instruction Grails -Getting Started

```
$ grails
grails> run-app
| Server running. Browse to http://localhost:8080/helloworld
| Application loaded in interactive mode. Type 'exit' to shutdown.
| Downloading: plugins-list.xml
grails> exit
| Stopping Grails server
grails> run-app
| Server running. Browse to http://localhost:8080/helloworld
| Application loaded in interactive mode. Type 'exit' to shutdown.
| Downloading: plugins-list.xml
```

More information on the [run-app](#) command can be found in the reference guide of grails web site.

9. Testing an Application

The `create-*` commands in Grails automatically create unit or integration tests for you within the `test/unit` or `test/integration` directory. It is of course up to you to populate these tests with valid test logic, information on which can be found in the section on [Testing](#).

To execute tests you run the [test-app](#) command as follows:

```
grails test-app
```

10. Deploying an Application

Grails applications are deployed as Web Application Archives (WAR files), and Grails includes the `war` command for performing this task:

```
grails war
```

This will produce a WAR file under the `target` directory which can then be deployed as per your container's instructions.

Unlike most scripts which default to the `development` environment unless overridden, the `war` command runs in the `production` environment by default. You can override this like any script by specifying the environment name, for example:

```
grails dev war
```

NEVER deploy Grails using the [run-app](#) command as this command sets Grails up for auto-reloading at runtime which has a severe performance and scalability implications

When deploying Grails you should always run your containers JVM with the `-server` option and with sufficient memory allocation. A good set of VM flags would be:

```
-server -Xmx512M -XX:MaxPermSize=256m
```

Hope you will enjoy working with grails.

I will write more documents for working with grails. Keep your eyes open for new docs.

11. More detail domain based project creation

11.1 Create application

11.1.1 Create new project

Create application using the following commands

```
grails create-app FinanceManagementSystem
```

11.1.2 Create domain class

Create domain class by using the following command

```
grails create-domain-class com.progoti.User
```

11.2 Create project in IntelliJ Idea

11.2.1 Open IntelliJ Idea

Choose File->New Project

Choose Create project from existing source

Click next

Browse and show the newly created project

Click Next

Click Next without changing anything

Add a JSDK by clicking on + button

Press next

Create a grails SDK or choose from existing

Press Next

Finish

11.2.2 Add Attributes and constraints on the domain User

package com.progoti

```
class User {  
  
    Integer id;  
  
    String name;  
  
    String userName;  
  
    String password;  
  
    boolean active;  
  
  
    static mapping = {  
  
        table("security_user")  
  
    }  
  
  
    static constraints = {  
  
        userName(blank:false, size:3..100,unique:true)  
  
        password(blank:false, size:4..100)  
  
    }  
  
  
  
  
  
  
  
    public static void initialize(){  
  
  
  
  
  
  
  
    }  
  
}
```


11.2.3 Configure database

Add the following to your grails-app\conf\ DataSource.groovy file with the following content make sure to create the dataset in your database server:

```
dataSource {  
    pooled = true  
  
    url = "jdbc:mysql://localhost/fms?useUnicode=true&characterEncoding=utf8"  
  
    driverClassName = "com.mysql.jdbc.Driver"  
  
    username = "root"  
  
    password = ""  
  
    dialect = org.hibernate.dialect.MySQL5UTF8InnoDBDialect  
}  
  
hibernate {  
  
    cache.use_second_level_cache = false  
  
    cache.use_query_cache = true  
  
    cache.provider_class = 'net.sf.ehcache.hibernate.EhCacheProvider'  
}  
  
// environment specific settings  
  
environments {  
    development {  
        dataSource {  
            dbCreate = "update"  
  
            url = "jdbc:mysql://localhost/fms?useUnicode=true&characterEncoding=utf8"  
  
            pooled = true  
  
            properties {  
                maxActive = -1  
            }  
        }  
    }  
}
```

Technical Instruction Grails -Getting Started

```
minEvictableIdleTimeMillis=1800000

timeBetweenEvictionRunsMillis=1800000

numTestsPerEvictionRun=3

testOnBorrow=true

testWhileIdle=true

testOnReturn=true

validationQuery="SELECT 1"
}
}
}

test {

dataSource {

    dbCreate = "update"

    url = "jdbc:mysql://localhost/fms?useUnicode=true&characterEncoding=utf8"

    pooled = true

    properties {

        maxActive = -1

        minEvictableIdleTimeMillis=1800000

        timeBetweenEvictionRunsMillis=1800000

        numTestsPerEvictionRun=3

        testOnBorrow=true

        testWhileIdle=true

        testOnReturn=true

        validationQuery="SELECT 1"

    }

}
```

```
    }  
  }  
  production {  
    dataSource {  
      dbCreate = "update"  
      url = "jdbc:mysql://localhost/fms?useUnicode=true&characterEncoding=utf8"  
      properties {  
        maxActive = -1  
        minEvictableIdleTimeMillis=1800000  
        timeBetweenEvictionRunsMillis=1800000  
        numTestsPerEvictionRun=3  
        testOnBorrow=true  
        testWhileIdle=true  
        testOnReturn=true  
        validationQuery="SELECT 1"  
      }  
    }  
  }  
}
```

11.2.4 Configure database driver dependency

Uncomment `// runtime 'mysql:mysql-connector-java:5.1.20'` line from `grails-app\conf\buildConfig.groovy`

You may copy paste the following content to your `buildConfig.groovy`

```
grails.servlet.version = "2.5" // Change depending on target container compliance (2.5 or 3.0)
```

Technical Instruction Grails -Getting Started

```
grails.project.class.dir = "target/classes"

grails.project.test.class.dir = "target/test-classes"

grails.project.test.reports.dir = "target/test-reports"

grails.project.target.level = 1.6

grails.project.source.level = 1.6

//grails.project.war.file = "target/${appName}-${appVersion}.war"


grails.project.dependency.resolution = {

    // inherit Grails' default dependencies

    inherits("global") {

        // specify dependency exclusions here; for example, uncomment this to disable ehcache:

        // excludes 'ehcache'

    }

    log "error" // log level of Ivy resolver, either 'error', 'warn', 'info', 'debug' or 'verbose'

    checksums true // Whether to verify checksums on resolve


    repositories {

        inherits true // Whether to inherit repository definitions from plugins


        grailsPlugins()

        grailsHome()

        grailsCentral()


        mavenLocal()

        mavenCentral()
```

Technical Instruction Grails -Getting Started

```
// uncomment these (or add new ones) to enable remote dependency resolution from public
Maven repositories

//mavenRepo "http://snapshots.repository.codehaus.org"

//mavenRepo "http://repository.codehaus.org"

//mavenRepo "http://download.java.net/maven/2/"

//mavenRepo "http://repository.jboss.com/maven2/"
}

dependencies {

    // specify dependencies here under either 'build', 'compile', 'runtime', 'test' or 'provided' scopes eg.

    runtime 'mysql:mysql-connector-java:5.1.20'
}

plugins {

    runtime ":hibernate:$grailsVersion"

    runtime ":jquery:1.7.2"

    runtime ":resources:1.1.6"

    // Uncomment these (or add new ones) to enable additional resources capabilities

    //runtime ":zipped-resources:1.0"

    //runtime ":cached-resources:1.0"

    //runtime ":yui-minify-resources:0.1.4"

    build ":tomcat:$grailsVersion"
```

Technical Instruction Grails -Getting Started

```
runtime ":database-migration:1.1"
```

```
compile ':cache:1.0.0'
```

```
}
```

```
}
```

11.2.5 Generate all the related controller and gsp (view) pages for User Domain

Generate all the necessary controller and views by using the following command:

```
grails generate-all com.progoti.User
```

11.2.6 Run the application

Execute the development application by using the following command:

```
Grails -Dserver.port=8088 run-app
```