Grading Ecosystem – Development & Testing Environments



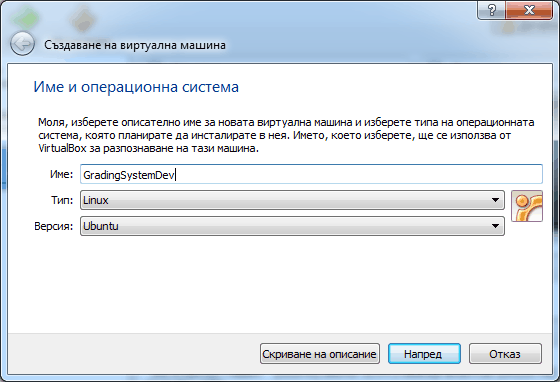
# Introduction

The following document provides a detailed overview of the steps required to setup a development environment for the grading ecosystem. Since we will be developing on top of different systems it is best to have a separate virtual machine for each separate component (ecosystem server, graders and third-party clients such as Eclipse) for testing the integration between them. However for the purpose of development all of the components can reside on single Linux VM (since spoj0, for example, is coupled strongly to a Linux environment in order to be able to run and test all of the components simultaneously the VM must be running Linux).

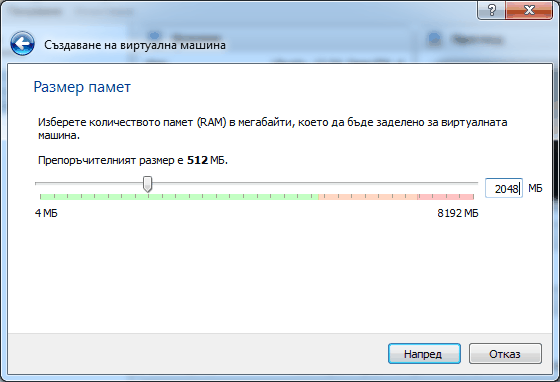
# Development Environment - Setup Guide

## Setting up the VM

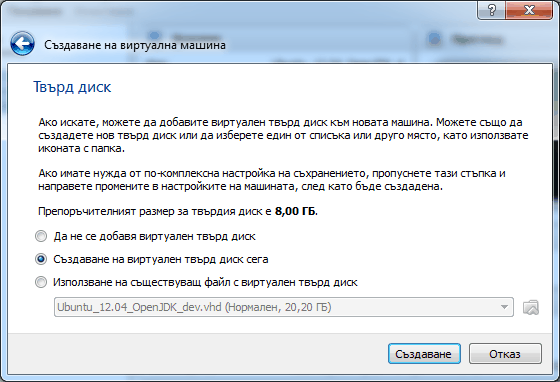
Download and install VirtualBox from [1] – this guide uses VirtualBox 4.2.18. This guide uses Ubuntu 12.04 64bit as the OS for the VirtualBox VM - download Ubuntu from [2]. Power up Virtual Box and click the **New** button. Specify **GradingSystemDev** as the name of the VM, for the OS type select **Linux** and for version – **Ubuntu**.



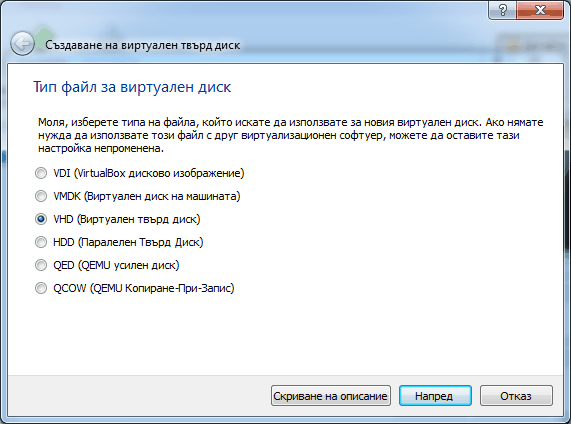
Specify a memory size of 2048 MB.



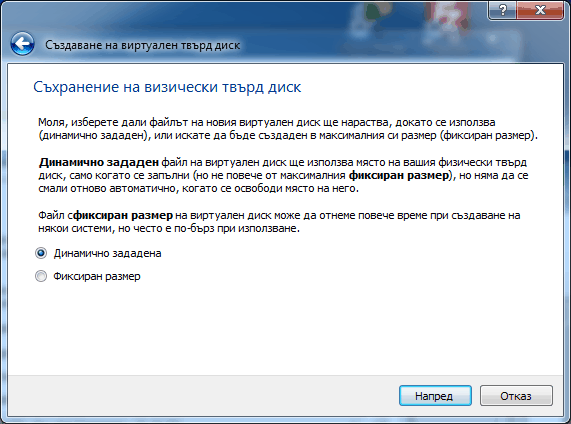
Specify the option for creating a new virtual disk.



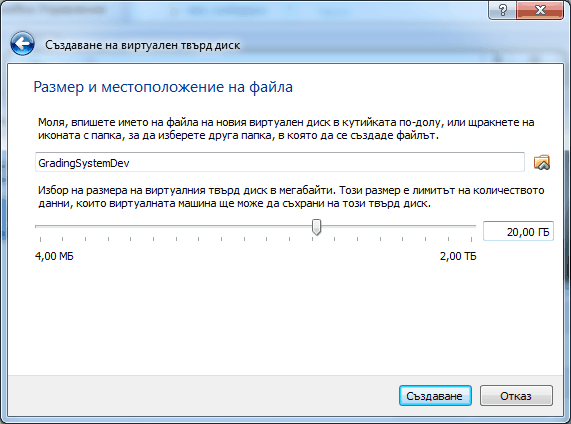
Specify **VHD** as the type of the virtual disk.



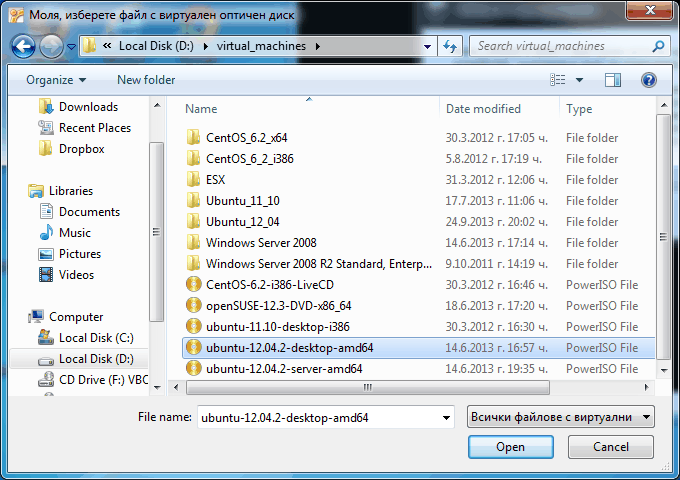
Specify dynamic size allocation for the new disk.

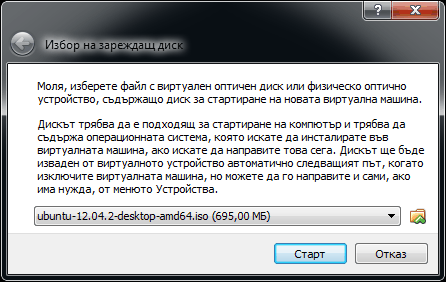


Specify a size of 20 GB for the virtual disk.



Now the virtual machine is created start it. Once started you have the option to specify a boot disk - select the Ubuntu ISO file.





During the Ubuntu installation process leave all settings to their defaults. For the name, computer’s name, username and password specify **system** and select the **Log in automatically** option (this step is optional – if you want you can change this settings at this step or later on). After Ubuntu is installed install the VirtualBox Virtual Add-ons for the VM from Devices -> Install Virtual Add-ons (if necessary mount the Virtual Add-ons iso file first – it is located in the Virtual Box directory) – it is purely optional but gives very handy tools such as copy-paste between the host OS and the VM as well as more screen modes for the VM.

All of the software packages are downloaded and installed from the VM directly. In case a custom installation process is required – the software is installed by convention in the **/opt** directory. Installation files for the applications are stored in **/home/system/Downloads**.

### GIT

GIT is the version control system of the application. To install the GIT issue:

sudo apt-get install git

To verify that GIT is installed type:

git

### JDK

JDK 7 is used to build the majority of the projects in the Grading Ecosystem. OpenJDK 7 is already installed in Ubuntu – there is no need to install Oracle JDK 7 at this time. To install OpenJDK7 (or later) if not already installed issue:

sudo apt-get install openjdk-7-jdk

To verify that the proper version of java is being used issue:

java -version

### Maven

Maven is used as the build system for most of the project in the Grading Ecosystem. To install Maven issue:

sudo apt-get install maven

To verify that Maven is installed issue:

mvn -v

### Eclipse

Eclipse is used as the IDE of choice for developing the various projects. Download and install the latest version of Eclipse Classic from [3] (this guide uses Eclipse 4.3 Kepler). Once downloaded issue the following from the download directory:

tar xzvf eclipse-standard-kepler-R-linux-gtk-x86\_64.tar.gz  
sudo mv eclipse /opt/  
sudo chown –R system:system /opt/eclipse/  
sudo chmod –R 777 /opt/eclipse

In order to be able to add an Eclipse shortcut to the desktop install gnome panel first:

sudo apt-get install --no-install-recommends gnome-panel

Add a desktop icon by issuing (/opt/eclipse/eclipse):

gnome-desktop-item-edit --create-new ~/Desktop

### MySQL

MySQL is the RDBMS used by Spoj0 and Arena Maycamp to store contest data. To install MySQL server (currently MySQL 5) issue:

sudo apt-get install mysql-server

Use the password **system** as the root password.

### MySQL Workbench

MySQL Workbench is a GUI client for use with MySQL server. Download the MySQL Workbench Ubuntu package from [4]. Add a desktop icon by issuing:

gnome-desktop-item-edit --create-new ~/Desktop

(MySQL Workbench executable /usr/bin/mysql-workbench)

### MongoDB

MongoDB is the NoSQL storage engine used by the Grading Ecosystem server instances. Download MongoDB from [5]. To install MongoDB issue:

tar xzvf mongodb-linux-x86\_64-2.4.6.tgz  
sudo mv mongodb-linux-x86\_64-2.4.6 /opt/  
sudo chown -R system:system /opt/mongodb-linux-x86\_64-2.4.6/  
sudo chmod -R 777 /opt/mongodb-linux-x86\_64-2.4.6/

In ~/.bashrc add the following line (in order to make Mongo executables visible on the path):

export PATH=$PATH:/opt/mongodb-linux-x86\_64-2.4.6/bin/

Then issue the following to make the changes visible in the shell:

source ~/.bashrc

Create the directory **mongo\_data** in **/home/system/dev**  as the directory where the test database files will be stored. To test that a MongoDB instance may be started on default port (27017) issue:

mongod --dbpath=/home/system/dev/mongo\_data/

### Curl

Curl is a command-line tool for sending HTTP requests. It can be used to test the various RESTful web services exposed by the components of the system. Install curl by typing:

sudo apt-get install curl

### RestClient

The WizTools RestClient is a convenient UI client for testing RESTful web services. Download the client from [6]. To install it perform the following:

sudo mkdir /opt/restclient  
sudo mv restclient-ui-3.2.1-jar-with-dependencies.jar /opt/restclient/  
sudo chown -R system:system /opt/restclient/  
sudo chmod -R 777 /opt/restclient/  
gnome-desktop-item-edit --create-new ~/Desktop

In the **Command** field of item dialog specify:

java –jar /opt/restclient/restclient-ui-3.2.1-jar-with-dependencies.jar

## Setting up the Development Environment

The following directory structure is used:

**/home/system/dev/repo** – Grading Ecosystem repository  
**/home/system/dev/workspace** – Grading Ecosystem Eclipse workspace

To clone the Grading Ecosystem repository type:

mkdir /home/system/dev  
cd /home/system/dev

// getting the sources

// setting up the IDE – CDT, PDE, perlIDE, rubyRailsIDE

// creating mysql schemas for spoj0 and maycamp

// test that the following are running successfully

// Grading Ecosystem Server

// Spoj0

// Arena Maycamp

// Eclipse Plug-in

## Testing the Setup

# Testing Environment – Setup Guide

// TODO

# References

[1] VirtualBox Downloads  
<https://www.virtualbox.org/wiki/Downloads>

[2] Ubuntu Desktop Edition Downloads  
<http://www.ubuntu.com/download/desktop>

[3] Eclipse Downloads  
<http://www.eclipse.org/downloads/>

[4] MySQL Workbench  
<http://dev.mysql.com/downloads/tools/workbench>

[5] MongoDB downloads  
<http://www.mongodb.org/downloads>

[6] WizTools RestClient Download  
<http://code.google.com/p/rest-client/downloads/list>