



Property Investment Optimiser

User Manual

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CLIENT

CSIR - Council for Scientific and Industrial Research

IMPAKD LINK

For further references see [gitHub](#). October 23, 2016

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1 Introduction

This document is a user manual for a Property Investment Optimizer web application. It was developed by team IMPAKD for CSIR at the University of Pretoria (2016). The code is available as open source on [gitHub](#). Below is a walk through of the installation and guidelines on how to use the application. Advanced users who are familiar with coding are more than welcome to use their own way of installation.

2 Vision

The Property Investment Optimizer application's objective is to evaluate whether a certain rental property is worth buying. It does this by calculating the Return of Investment (ROI) of a property, which can be compared with another property's ROI, to assist a user to optimize their investment strategy according to their portfolio.

The project will assist the user by helping to answer the following questions:

- Given a certain bond (interest rate, deposit as a percentage of property value), rental (occupancy rate, agent commission, rental amount) and environmental conditions (Interest rate, inflation) what is the ROI?
- When is it better to pay a higher or lower deposit for a bond?
- Between two rental scenarios which provides the greater ROI?
- Is it better to try and pay off the bond as fast as possible by paying in extra capital?
- How does purchasing another property influence a user's ROI and at which point would this be a good idea?
- At which point does it make sense to buy another property?
- How much tax will the user have to pay?

3 Background

The project was given to us by our client, CSIR, so that we can research how the ROI of different configurations of rental properties can answer the questions listed in the Vision section of this document. Answers to these questions can be used to help users of the system choose to buy the best property that fits their portfolio and requirements with the ease of not having to manually evaluate the property themselves. The project can also be used for property-related research.

4 System Overview

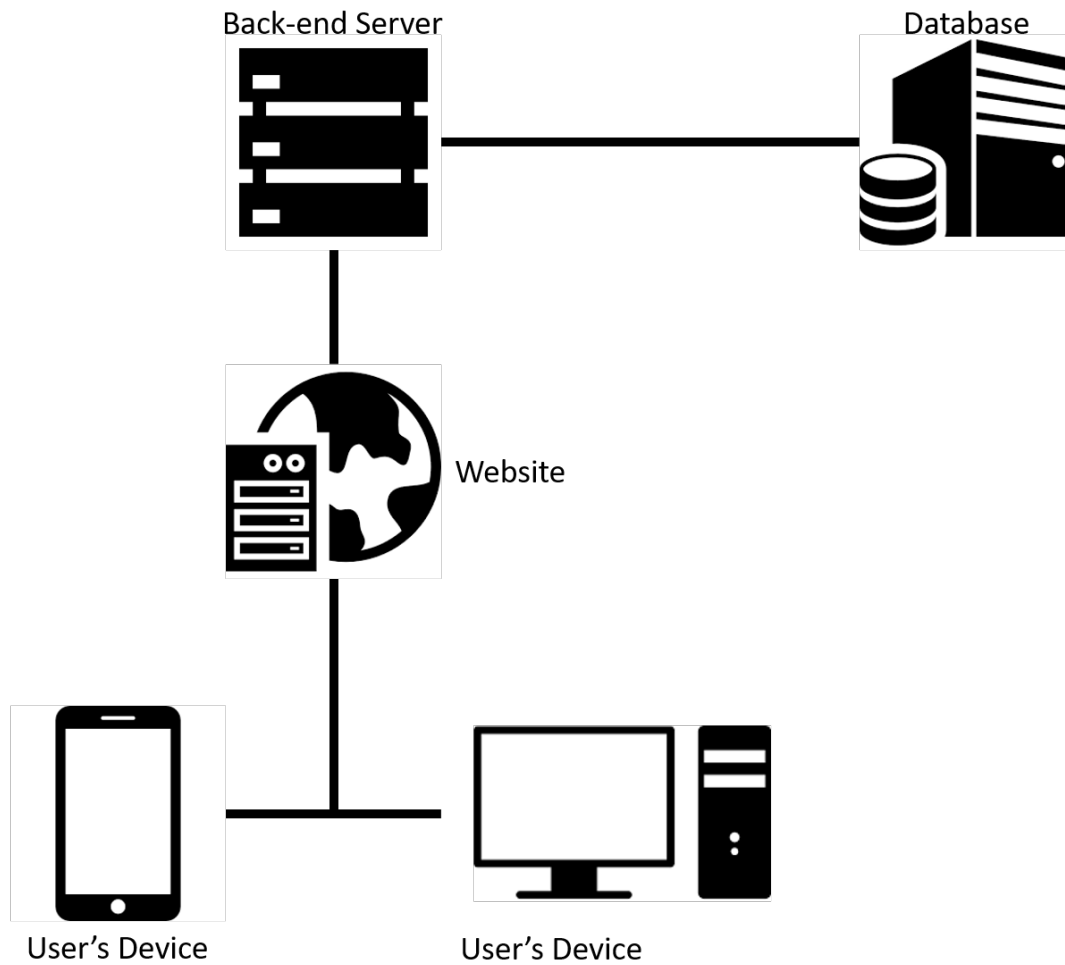
The Property Investment Optimizer application is designed to assist the user to know when is the right time to buy property and when is the right time to sell property. It also tells the user the best option to pay off a bond, which is either higher or lower. A user is allowed to add a property to calculate the property's ROI which is then added to the user's portfolio. Two properties can be compared to see which one has a better return of investment. Furthermore, the application will simulate the buying of properties. This application contains basic functionality, which is easy to use. The project is split into the back-end server and the front-end website.

5 System Configuration

A Windows/Unix based host is required to run the application's back end server. This host must have the associated technologies installed (the installation of these technologies is illustrated below). The host must have internet connectivity in order to allow any of the required dependencies to be installed and set up for the operating system environment. The back-end server runs on port 8080 and the website runs on port 8383.

The system uses REST web services to send data between the back-end server and the website. The data from the back-end server is sent in xml format and is translated to json objects on the website. From the website, the data is sent as `encodeURIComponent` and `application-form-urlencoded` media types using Ajax calls. The systems data is stored on a PostgreSQL database.

Users of the website will only be required to have a device that has a web browser and access to the internet.



6 Installation

6.1 Prerequisites

In order to use the Property Investment Optimizer system, you must install the following the technologies:

- AngularJS - [link](#)
- Apache Maven - [link](#)
- Glassfish Server - [link](#)
- Java JDK - [link](#)
- Netbeans - [link](#)
- Node.js - [link](#)

- PostgreSQL - [link](#)

You must first download the project from the following link: [Github](#). After you have downloaded the project, follow the instructions below to install the required technology.

6.1.1 Installing Apache Maven

1. Go to the following link: [apacheMaven link](http://apacheMaven.org)

The screenshot shows the Apache Maven Project website for downloading version 3.3.9. The page includes a navigation menu on the left with links like 'MAIN', 'Welcome', 'License', 'Download', 'Install', 'Configure', 'Run', 'IDE Integration', 'ABOUT MAVEN', 'What is Maven?', 'Features', 'FAQ', 'Support and Training', 'DOCUMENTATION', 'Maven Plugins', and 'Index (category)'. The main content area is titled 'Downloading Apache Maven 3.3.9' and states that it is the latest release. It provides a list of download mirrors, with the currently selected one being 'http://apache.is.co.za/'. There is a 'Change' button next to the mirror list. Below the mirrors, there is a 'System Requirements' section with a table listing requirements for Java Development Kit (JDK), Memory, Disk, and Operating system.

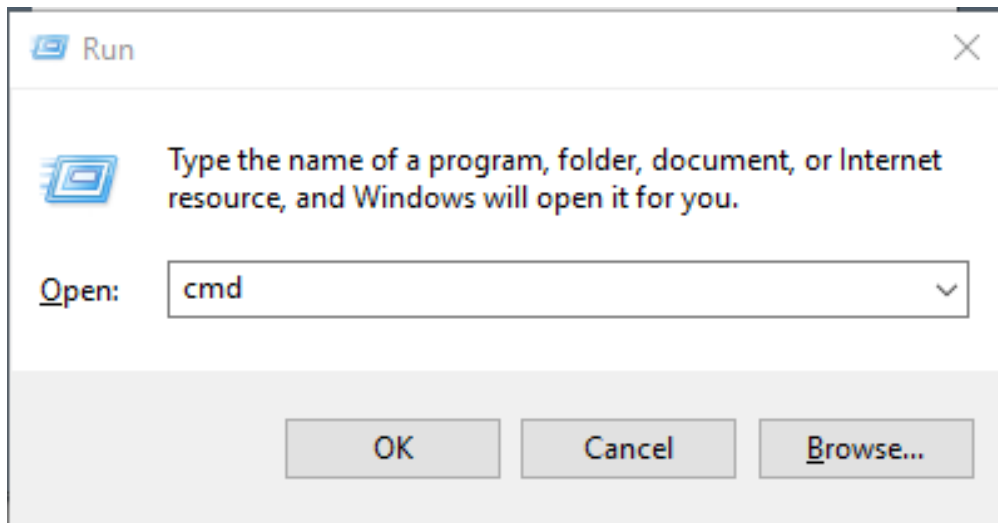
Requirement	Details
Java Development Kit (JDK)	Maven 3.3 requires JDK 1.7 or above to execute - it still allows you to build against 1.3 and other JDK versions by Using Toolchains
Memory	No minimum requirement
Disk	Approximately 10MB is required for the Maven installation itself. In addition to that, additional disk space will be used for your local Maven repository. The size of your local repository will vary depending on usage but expect at least 500MB.
Operating	No minimum requirement. Start up scripts are included as shell scripts and Windows batch files.

2. Click your preferred download link under the 'Files' Section of the page

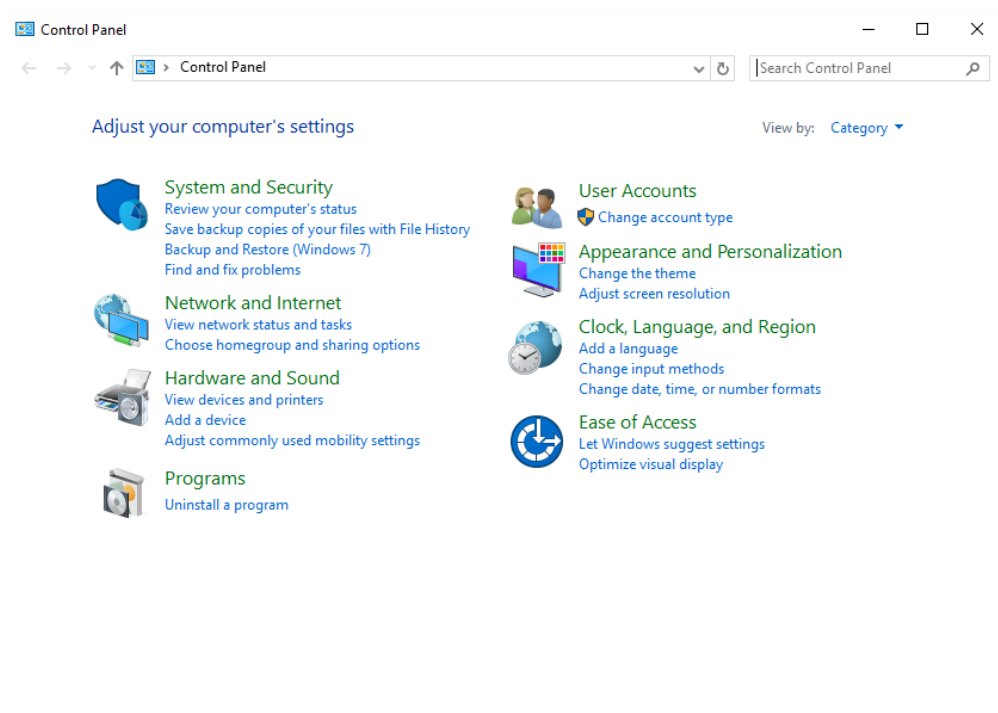
The screenshot shows the 'Files' section of the Apache Maven Project website. It provides information on how to download Maven, including instructions on verifying the signature of the release bundles against the public KEYS used by the Apache Maven developers. Below this, there is a table with four columns: 'Link', 'Checksum', and 'Signature'. The table lists four download options: Binary tar.gz archive, Binary zip archive, Source tar.gz archive, and Source zip archive. Each option has a corresponding link, checksum, and signature. Below the table, there is a list of links for Release Notes, Reference Documentation, Apache Maven Website As Documentation Archive, and All sources (plugins, shared libraries, ...) available at https://www.apache.org/dist/maven/. There is also a section for 'Previous Releases' which states that it is strongly recommended to use the latest release version of Apache Maven to take advantage of newest features and bug fixes. If you still want to use an old version, you can find more information in the Maven Releases History and can download files from the archives for versions 3.0.4+ and legacy archives for earlier releases.

	Link	Checksum	Signature
Binary tar.gz archive	apache-maven-3.3.9-bin.tar.gz	apache-maven-3.3.9-bin.tar.gz.md5	apache-maven-3.3.9-bin.tar.gz.asc
Binary zip archive	apache-maven-3.3.9-bin.zip	apache-maven-3.3.9-bin.zip.md5	apache-maven-3.3.9-bin.zip.asc
Source tar.gz archive	apache-maven-3.3.9-src.tar.gz	apache-maven-3.3.9-src.tar.gz.md5	apache-maven-3.3.9-src.tar.gz.asc
Source zip archive	apache-maven-3.3.9-src.zip	apache-maven-3.3.9-src.zip.md5	apache-maven-3.3.9-src.zip.asc

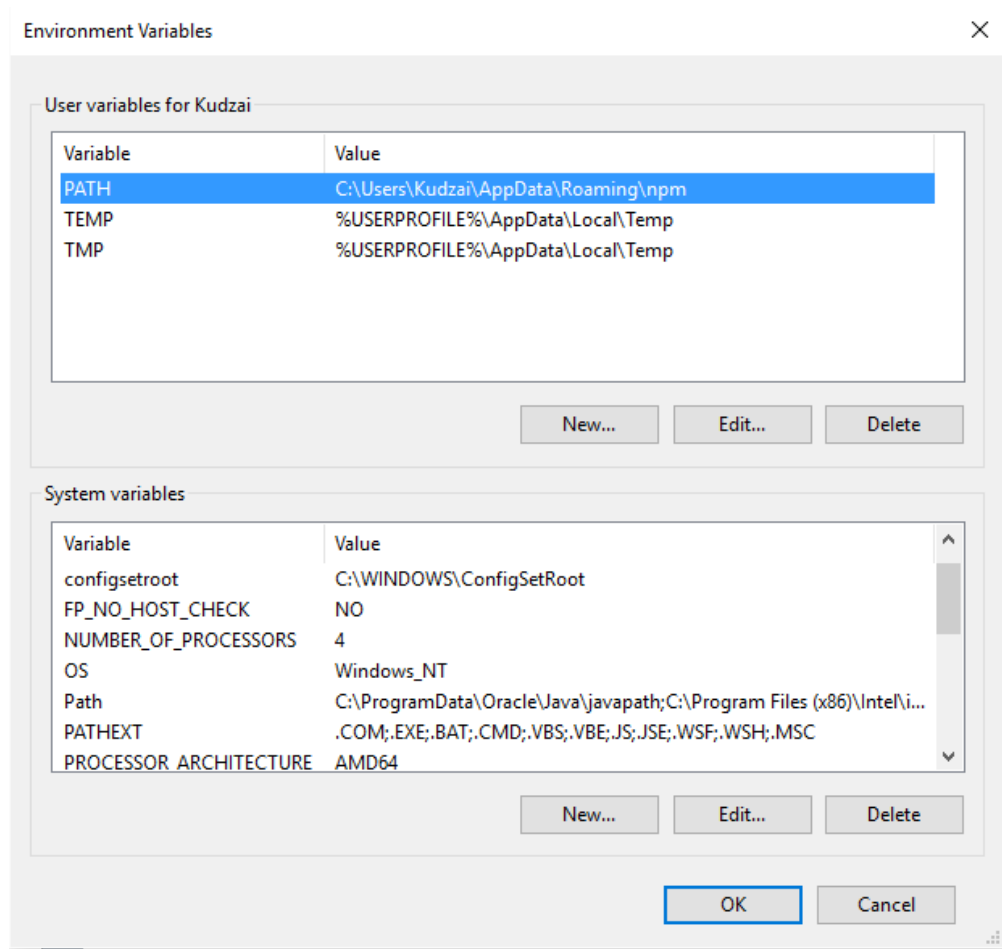
3. Open the command prompt by pressing the windows key together with the letter 'r', win+R, and type 'cmd'.



4. Once open, type the following command: `unzip Apache-maven-3.3.9-bin.zip`, in the folder that contains the download, to extract the data.
5. Open the Control Panel.



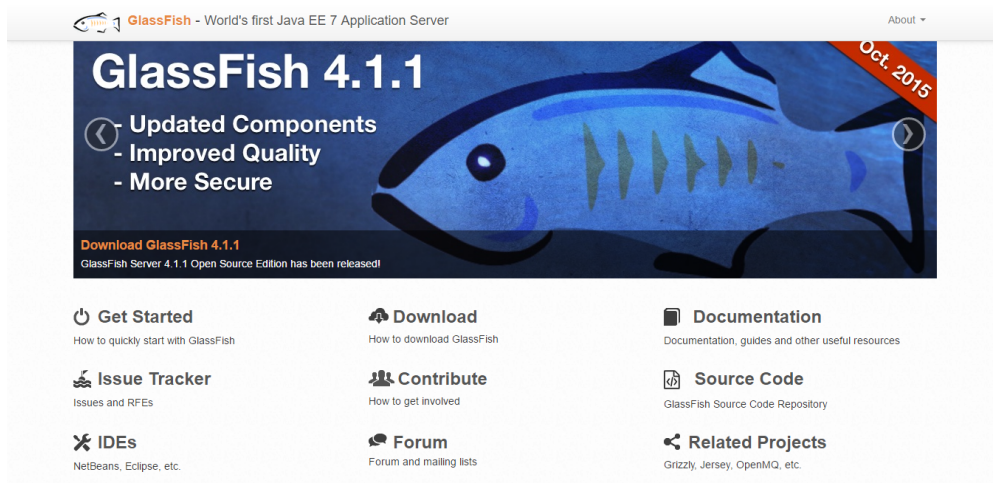
6. Select System and Security.
7. Select System.
8. Select Advanced System Settings
9. Click the Environment Variable.. button
10. Select the New button under User Variables



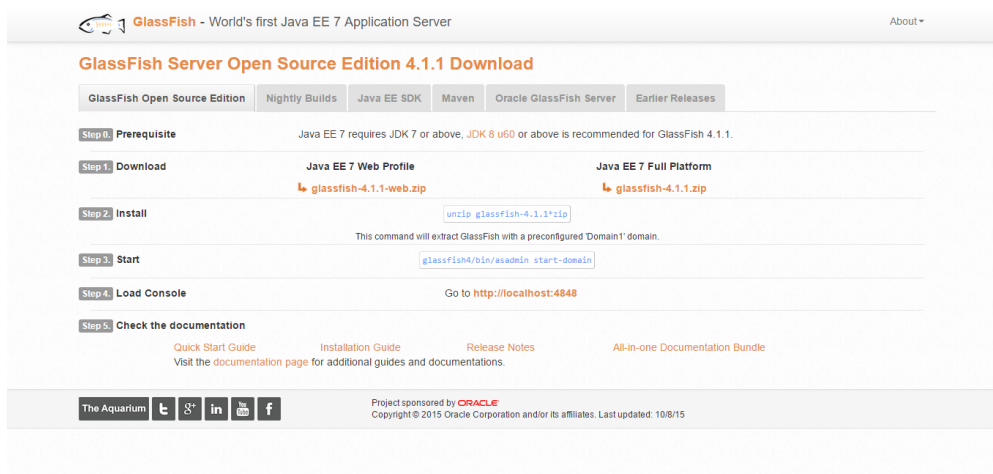
11. Add the file directory path of the 'bin' folder for Apache Maven and click OK.

6.1.2 Installing Glassfish Server

1. Go to the following link: [glassfishServer link](#)



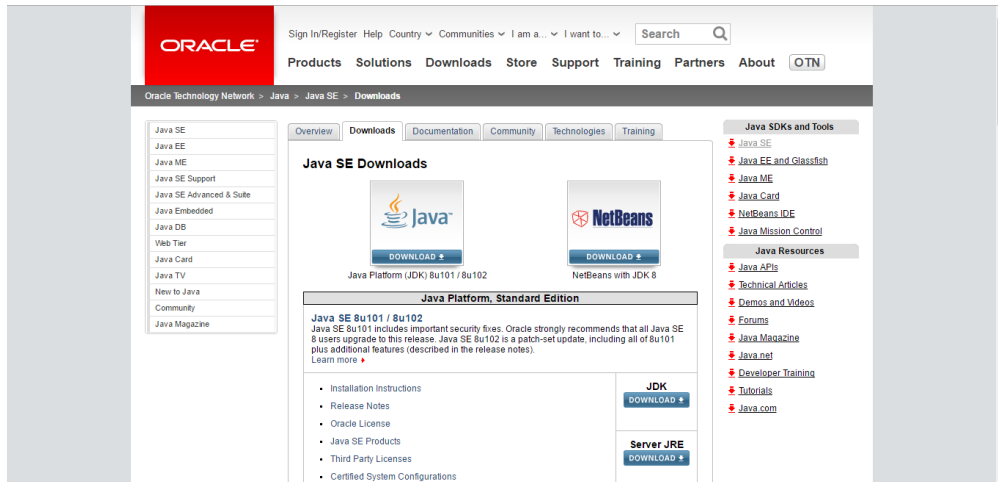
2. Click the Download link



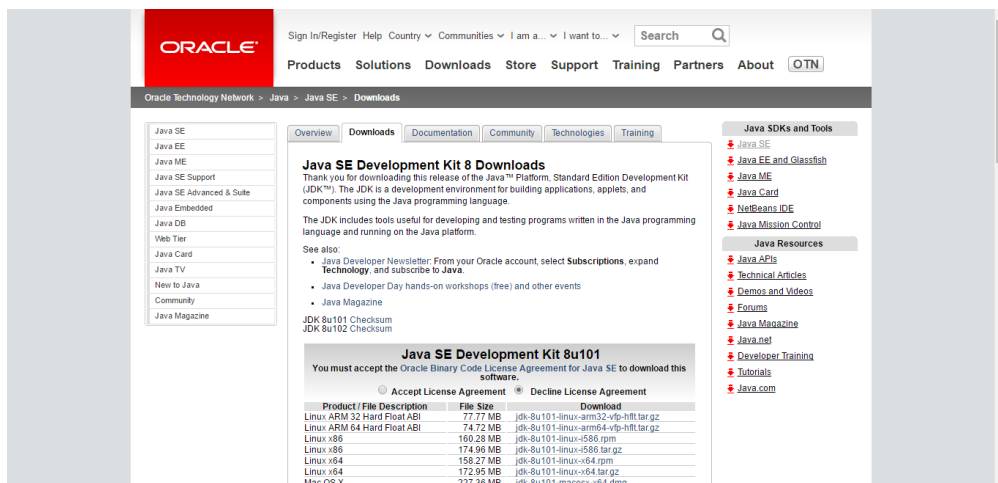
3. Download the 'Java EE 7 Full Platform' link and follow the instructions on the page.

6.1.3 Installing Java JDK

1. Go to the following link: [javaJDK link](#)



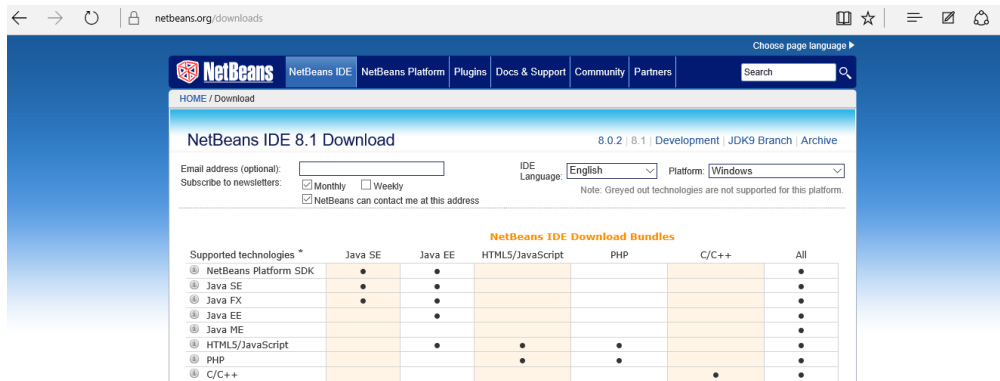
2. Click on the 'Java Platform (JDK) 8u101 / 8u102' link.



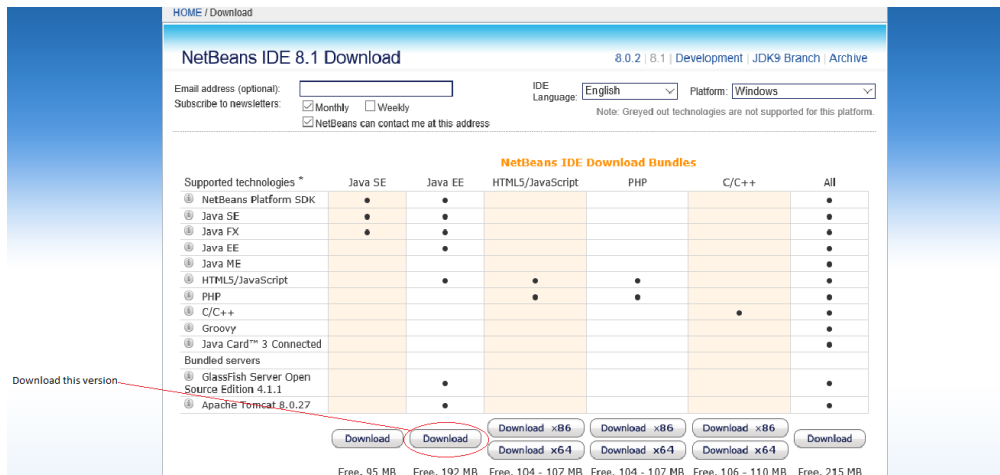
3. Select your required version and download it.
4. Once downloaded, open the installation file and follow the prompts to install it.

6.1.4 Installing Netbeans

1. Go to the following link: [Netbeans link](#)



2. download this version



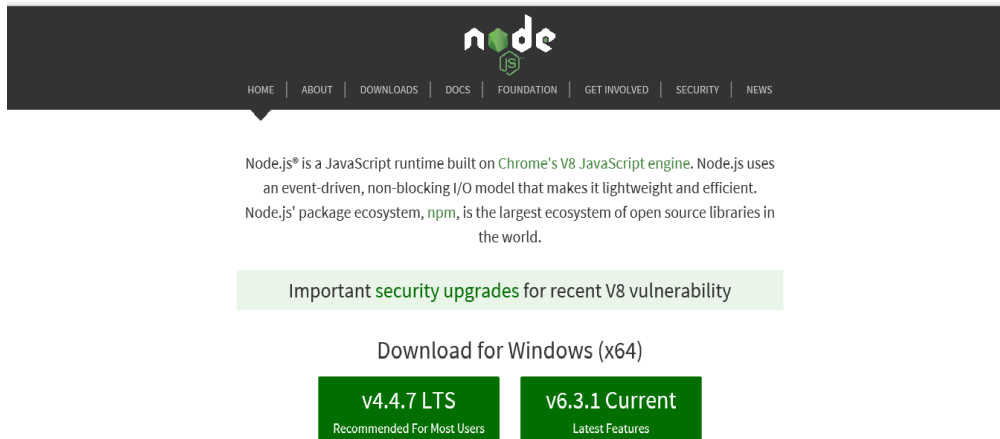
3. run the downloaded .exe file and follow the prompts to install it

6.1.5 Installing Node.js

1. Go to the following link: [Node.js link](#)



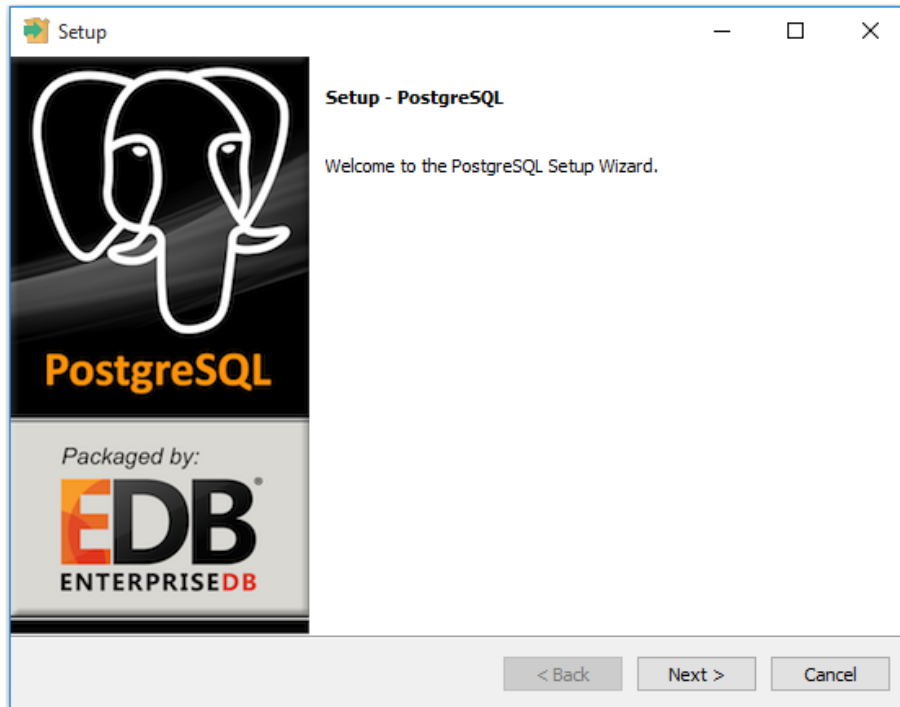
2. download the desired version preferably the recommended one. See picture below



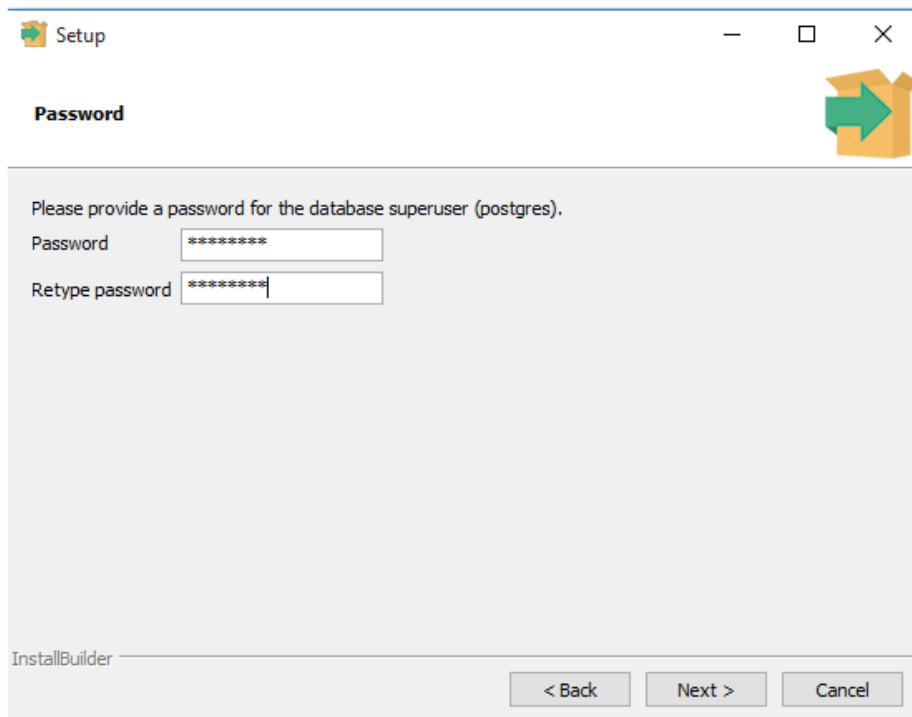
3. run the downloaded .exe file and follow the prompts to install it

6.1.6 Installing PostgreSQL

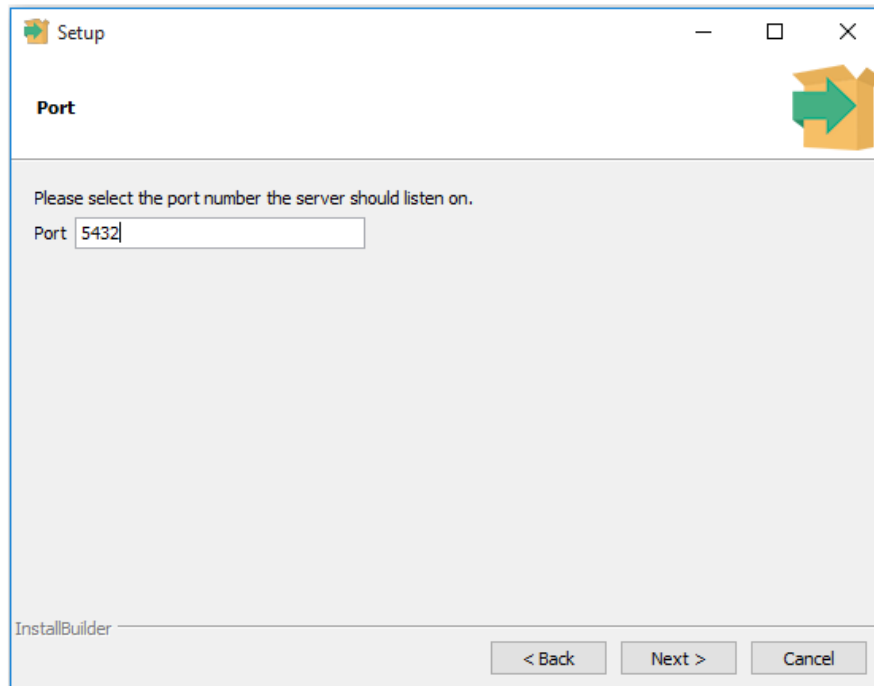
1. You need to download the installer from PostgreSQL Official website.
2. Go to the PostgreSQL official website, download section for Windows [PostgreSQL Link](#).
3. Click on the download installer from EnterpriseDB
4. Choose the latest version to download. It takes few minutes to complete the download.
5. Double click the installer



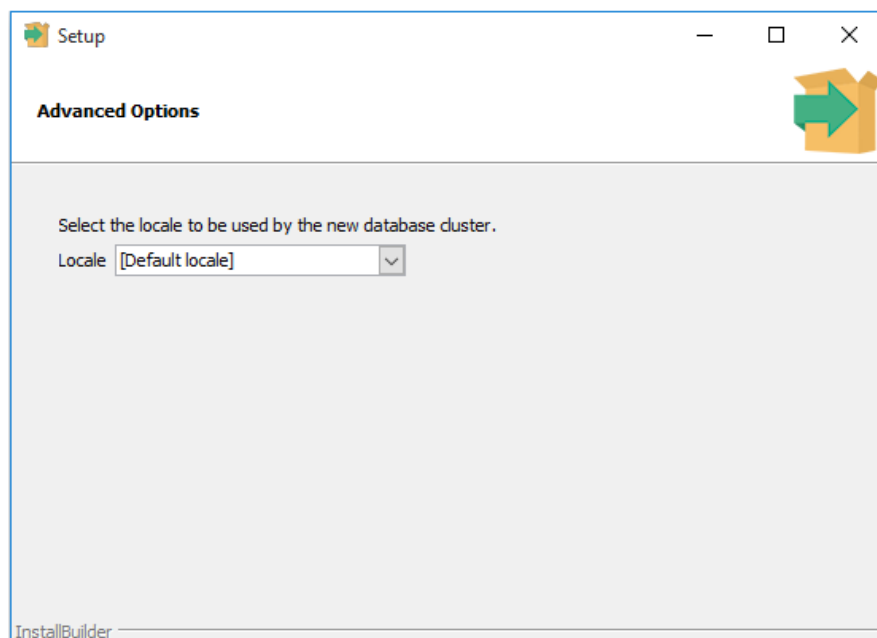
6. Enter the password for the database superuser and service account.



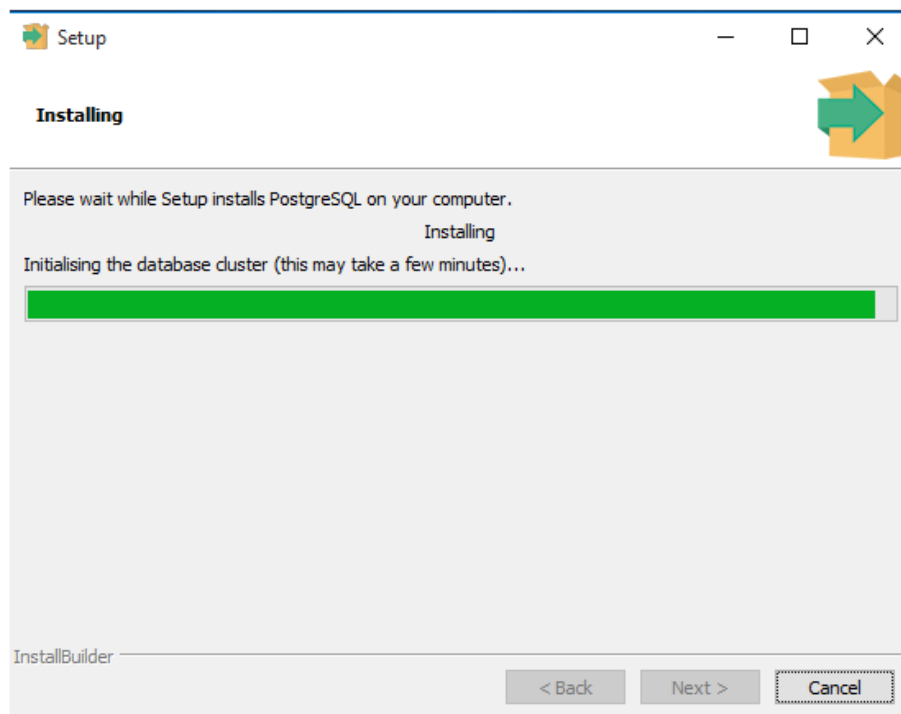
7. Enter the port for PostgreSQL. Make sure that no other applications are using this port. Leave it as default if you are unsure



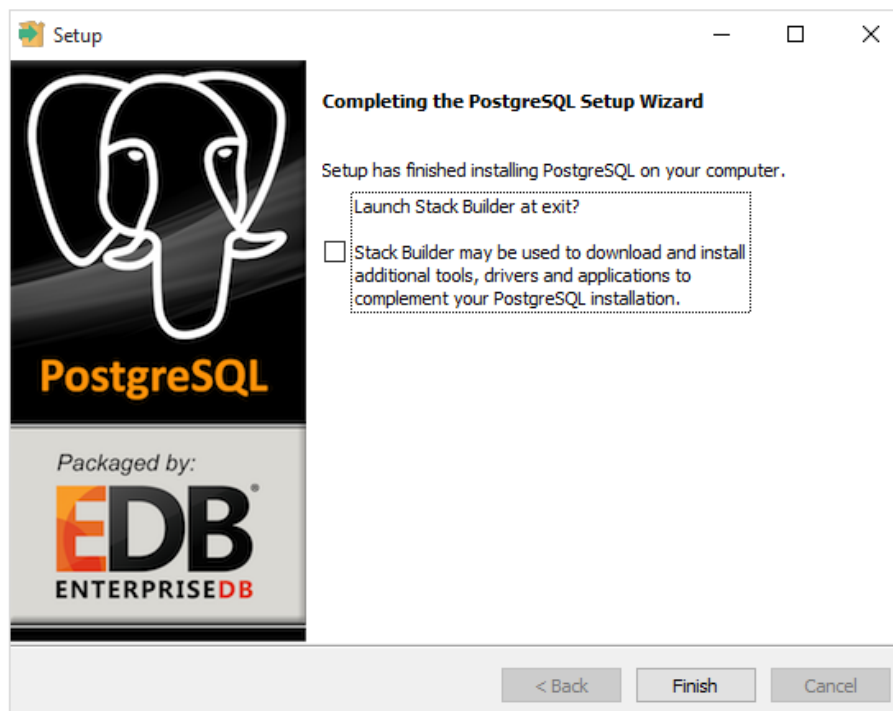
8. Choose the default locale used by the database.



9. Wait for it to finish installing



10. Click finish



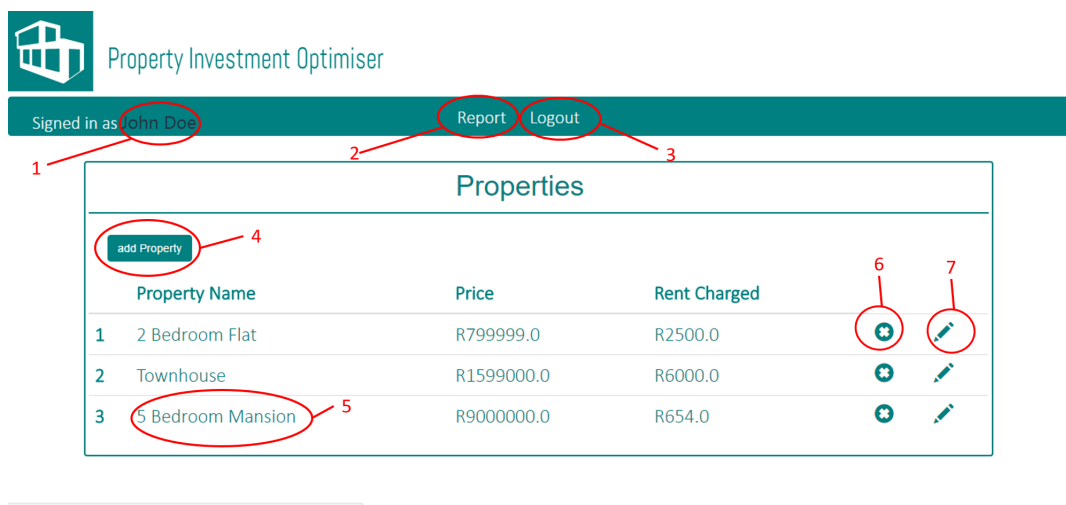
6.2 Setting up the System

Open Netbeans and open the 'BackEndPIO' netbeans project from the project folder. Once opened, run the project in order to start the Glassfish serve. BackEndPIO runs on port 8080.

Once 'BackEndPIO' is running, open the 'FrontEnd' netbeans project from the project folder. Once opened, run the project. 'FrontEnd' runs on port 8383.

7 Using The System

7.1 Home Page



Once the user has successfully logged into the system, the user will see this page. This page facilitates the following functionalities:

1. Profile

When the user clicks their name, the system will navigate to the profile page that will display their personal details. The user can change his/her details accordingly. They will also be able to see the number of properties associated with their profile.

2. Report

This functionality will enable the user to generate a report about certain properties in a pdf file. Based on several calculations configured for certain properties, the report will contain the calculation results and display the Return of Interest based on the calculations.

3. Logout

This button will log the user out of the system. Once this option has been selected, the user will not be able to use the system. They will be redirected to the "main

page” where they will need to log in again should they want to use the system again.

4. Add Property

This button will enable the user to add more details about a certain property. This information will be persisted and certain values will be calculated by the system dynamically as the user adds a certain property.

5. View Property Details

When the user clicks on one of the entries on the table, he/she will be redirected to a page that shows more information about the property they have selected.


6. Delete Property

This button will delete the relevant property from the database. The page will reload and show the updated list.

7. Update Property Details

This button will allow the user to change the details for a property that has already been added to the list.

7.2 Add Property

 Property Investor Optimiser

Add Property

Property Details

Bond Details

*Note: Scrolling will reveal more details

Add Property As previously mentioned on the fifth point under the ”home page” section, this page will enable the user to add a property to the system. Once validated, the details will then be added onto the system. The user needs to add a certain property once. Certain property details can be edited.

7.3 Property Details




Property Details As previously mentioned on the fifth point under the "home page" section, this page will enable the user see more details about the property they have selected on the "home page". The "ROI In Years" graph will be generated and more information pertaining to the property will be displayed.

1. This button will enable the user to get back to the "home page".

7.4 Profile

Property Investment Optimiser

Edit Profile



Upload a different photo...

Choose File No file chosen

Personal info

First name:

Last name:

Email:

Username:

Password:

Confirm password:

Save Changes Cancel

Profile This page will allow the user to change their login details and also to add extra details if they wish, like their full names and a profile picture.