

Configuration Manual

MSc Research Project Msc Cloud Computing

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MSc Project Submission Sheet

School of Computing

Student Name:	Rohit Rajesh Salvi		
Student ID:	21127336		
Programme:	Msc Cloud Computing	fear:	Jan 2022
Module:	Msc Research Project		
Lecturer:	Rashid Mijumbi		
Date:	15/12/2022		
Project Title:	Optimizing the load balancing efficiency using e algorithm in cloud computing	enhanc	ed genetic

Word Count: 1126..... Page Count: 11.....

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Configuration Manual

Rohit Salvi 21127336

1 Introduction

Using an enhanced genetic algorithm, load balancing is implemented as shown in this Configuration Manual.

2 Prerequisites

- 1. Java JDK 17
- 2. Eclipse IDE
- 3. CloudSim 3.0.3 Framework

Note: Please follow the specific instruction for your OS to install the prerequisites as these prerequisites were installed and ran on MacOS (M1 edition).

3 Prerequisite Installation

3.1 Java JDK 17

Step 1: Download Java JDK 17.0.5 for your appropriate OS. <u>https://www.oracle.com/java/technologies/javase/jdk17-archive-downloads.html</u>

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Java SE Development Kit 17.0.5 This software is licensed under the Oracle No-F	ee Terms and Conditions Licer	Se.
Product / File Description	File Size	Download
Linux Arm 64 Compressed Archive	171.95 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-aarch64_bin.tar.gz (sha256)
Linux Arm 64 RPM Package	153.93 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-aarch64_bin.rpm (sha256)
Linux xó4 Compressed Archive	173.15 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.tar.gz (sha256)
Linux x64 Debian Package	148.77 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.deb (sha256)
Linux x64 RPM Package	155.55 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.rpm (sha256)
macOS Arm 64 Compressed Archive	167.70 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-aarch64_bin.tar.gz (sha256)
macOS Arm 64 DMG Installer	167.11 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-aarch64_bin.dmg (sha256)
macOS x64 Compressed Archive	170.32 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-x64_bin.tar.gz (sha256)
macOS x64 DMG Installer	169.70 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-x64_bin.dmg (sha256)
Windows x64 Compressed Archive	171.88 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.zip (sha256)
Windows x64 Installer	152.85 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.exe (sha256)
Windows x64 MSI Installer	151.73 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.msi (sha256)

Step 2: Install JDK



Step 3: Click on "Install" to install JDK.



3.2 Eclipse IDE

Step 1: Download Eclipse IDE from the following link. <u>https://www.eclipse.org/downloads/</u>

The Eclipse Installer 2022-12 R now includes a JRE for macO8, Windows and Linux.	OpenJDK Runtimes
Get Eclipse IDE 2022-12 Install your favorite desktop IDE packages.	TENDEN The Eclipse Temury" project provides high-quality, TCK certified OpenJDK runtimes and associated technology for use across the Java" eccesystem.
Download x86,64 Download AArch64 Download Packages Need Help?	Download Now Learn More
Other Tools	Other Runtimes
Eclipse Che Sa developer workspace An open, flexible and extensible clou	ud & Eclipse Jetty provides a web server and Eclipse GlassFlah provides a complete

Step 2: Select "Eclipse IDE for Java Developers".

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type filter t	rext Q	
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C	Eclipse IDE for C/C++ Developers An IDE for C/C++ developers.	
C	Eclipse IDE for Embedded C/C++ Developers An IDE for Embedded C/C++ developers. It includes managed cross build plug-ins (Arm and RISC-V) and debug plug-ins	
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Step 3: Select the JDK path where you installed the Java JDK and the installation folder. Click on install to install.

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3.3 CloudSim v3.0.3

Step 1: Download CloudSim v3.0.3 from the following link. https://github.com/Cloudslab/cloudsim/releases/tag/cloudsim-3.0.3

Inklokagy greleased this Mar 19, 2015 · 55 commits to master since this release Cloudsim-3.0.3 ~ 46c4660 Changes from CloudSim 3.0.2 to CloudSim 3.0.3 WHAT'S NEW This is a bug fix and refactoring release. The following updates have been made: Removed the dependency on the flanagan library. It is now replaced with Apache Math. The implementation and interface of the MathUtil has been change accordingly. The minimal time between events is now configurable. Fixed Issue 43: UtilizationMode/PlanetLabinMemory: use a global constant to define the size of the data field: a new constructor for the classes, allowing definition of data size, was added. • Fixed Issue 49: Wrong calculation of debt during migrationL: all references to debt from Datacenter and its subclasses were removed. • Assets a Cloudsim-3.0.3.targz 9.9 MB Mar 19, 2 Ocloudsim-3.0.3.zip 13.1 MB Mar 19, 2 (plsource code (zip) (plsource code (uarag) Mar 2, 2 (plsource code (uarag) Mar 2, 2	cloudsim-3.0.3			Compare 👻
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4 Running the proposed code

Step 1: Create a new Java Project. Click on "File" → "New" → "Java Project".



Step 2: Give your project a name in the field **"Project Name"** and untick the option **"Use default location"**. Click on **"Browse"** to select the path where you have download CloudSim v3.0.3. Then click on **"Finish"**.

Project Discouraged module name. By convention, module names usually start with a lowercase letter Project name: LBConfig Use default location	Browse
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Create separate folders for sources and class files	Configure default
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Add project to working sets	New
Working aste	a Select
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Module	
Create module-info.java file	
Module name:	
Generate comments	

Step 3: Open the examples, right click on **"org.cloudbus.cloudsim.examples"** and select **"Import"**.

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Step 4: Select "General" → "File System" and click on Next.

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Step 5: Click on "Browse" and select the folder where the two files are located named "LBUsingEGA.java" and "LBUsingPSO.java". Tick the two files and click on "Finish".

	Import	
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Filter Types Select All	Deselect All	
Into folder: LBConfig/examples/org/cloudbus	:/cloudsim/examples	Browse
Options Overwrite existing resources without warn Create top-level folder Advanced >>	ing	
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Step 6: Double click on files to open them.



Step 7: For PSO, open the file and go to line 66. Here you define the number of cloudlets.



Step 8: Click on "**Run**" \rightarrow "**Run**" to run the code.

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Step 9: The results are obtained in "Console" tab.

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45	SUCCESS	2	5	1.31	1.99	3.3	org.cloudbus.cloudsim.Cloudlet@482f8f11		
44	SUCCESS	2	4	1.42	1.99	3.41	org.cloudbus.cloudsim.Cloudlet@51565ec2		
43	SUCCESS	2	3	1.51	2.1	3.61	org.cloudbus.cloudsim.Cloudlet@675d3402		
42	SUCCESS	2	2	1.64	2.32	3.96	org.cloudbus.cloudsim.Cloudlet@28feb3fa		
41	SUCCESS	2	1	1.8	2.55	4.35	org.cloudbus.cloudsim.Cloudlet@68be2bc2		
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Step 10: Similarly change the number of cloudlets to 75, 100, 125, and 150 respectively and run the simulation to obtain the results for it.

Step 11: Similarly run the code for 50, 75, 100, 125, 150 number of cloudlets for EGA and obtain the results. The below screenshot is the results obtained after simulating for 50 cloudlets.

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5 Results

After running 5 sets of simulations for both the algorithms for given number of cloudlets, the obtained results are compiled in a Line Graph.

5.1 Execution Time:

The results demonstrated that EGA executes more quickly than PSO.



5.2 Resource Utilization



The results show that PSO uses a lot more resources than EGA.

5.3 Energy Consumption

The results demonstrated that EGA consumes less energy than EGA.



References

- Cloudslab (no date) *Releases* · *Cloudslab/cloudsim*, *GitHub*. Available at: https://github.com/Cloudslab/cloudsim/releases (Accessed: December 10, 2022).
- *Eclipse installer 2022-12 R* (no date) *Eclipse Installer 2022-12 R* | *Eclipse Packages*. Available at: https://www.eclipse.org/downloads/packages/installer (Accessed: December 10, 2022).
- Installing the JDK software and setting JAVA_HOME (no date) Installing the JDK Software and Setting JAVA_HOME (Using the GlassFish ESB Installation CLI). Available at: https://docs.oracle.com/cd/E19182-01/820-7851/inst_cli_jdk_javahome_t/#:~:text=a%20Windows%20System-,Install%20the%20JDK%20software.,Program%20Files%5CJava%5Cjdk1. (Accessed: December 10, 2022).