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Cloud Compiler

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Abstract: Essentially, high-level programming languages highly relies on computer programs, called as compilers, to transform the source code of their programs into lower-level computer languages. To use these typesof compilers, programmers needs to install the required executable files on his local machines.The computers become limitation when it comes to local installation of compilers (i.e., devices, like tablets, cannot be used) and it resultsmostly in numerous portability and compatibility problems. For example, compilers (and their versions) are hugely dependent on the specifications of target computers (e.g., platform, architecture),resulting indifficulties toprogrammers in compilingsuch programs of a particular programming language on any other machine they use. On the other hand, conventional compilers are provided with no source code,restricting the programmers from extending their functionality or participating in fixing bugs. This paper provides a solution for problems, by providing open-source cloud-basedcompilers.The systempresentstherequiredprospective stakeholders, framework features, by taking into consideration potential challenges of deploying such kind of compilers.

Keywords: Cloud Compiler, Android Based, Web Based, Multi Language, etc.

I. INTRODUCTION

Regularly, programmers download and install the environment of their desired programming language into their own computers. This installation is actually platformdependent, which means that all prerequisite specifications of the operating system have to be satisfied. One of the major consequences of this is that all programming tasks should be accomplished through machines that already have the environment of that programming languages installed. Another concern is related to the frequent updates of the compilers (i.e., numerous version), which requires users to keep up-to-date with the refined releases as they might contain lots of useful fixes for bugs and vulnerabilities. In addition, most of the well-known programming languages are available as proprietary software, which means that they are closed for extension.

Cloud Compiler is a compiling tool which helps the programmers to compile their source code and run it online.Online compilers can perform the same task which locally stored compilers can do except for the fact that they require the project's source code to be stored online and facilitate the user to access it via a web browser. The programmers can begin development of project quickly on any platform or device if the hardware and software requirements are minimized. This facility is provided by online compilers as the user need not install each and every compiler locally. Modern online compilers have some limitations of capabilities when compared to conventional compilers, however today's online compilers are capable of compiling Java, C Sharp (programming languages), VB.net, etc.

Online compilers are an emerging technology and currently provides more functionalities than the conventional compilers. Few online compilers have integrated reliable version control systems which are necessary to store records of the previous iterations of projects. Online compilers have integrated a functionality of auto-save which solves this problem so that if the user's internet connection is lost, the project content is still notlost, however reliable version control has yet to be implemented. Team collaboration can sometimes be the main reason for the difficulties with online compilers, as for the security reason, some online-cloud based compilers do not allow users to share their source code with other user profiles. Online compilers have also provided the feature of importing sharing project with colleagues which is a temporary solution to the currently facing problem.Syntax highlighting is additional problem for some online compilers, which is still unresolved.

In general, cloud-based compilers provide a platformindependent environment to code, compile, debug and execute software programs. This means that cloud-based compilers are free of restriction, complication and compatibility issues related to platform. Thus, users do not have to worry about downloading and installing compilers on their machines, or even keep transporting their own programs from one machine to another.

The motivation behind this is the lack of availability of such compilers in the literature that provide the combination of both: cloud and open-source computing technologies. Basically, the program can be typed in two editors provided in the system:

a) An Android application interface, and
b) A Web Interface which can be accessed using an URL

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II. RELATED WORK

The paper presents a web and app-based compilation system. It helps any particular user to compile any code file on the go, based on computer languages like C, C++, Java & Python. A review was done on different topics which would be a hurdle while designing the cloud compiler. Some of the key ideas are described as follows:
The paper[1], provides different strategies and plans that have been experimented in order to enhance understanding of Prolog to Computer Science graduates in the Institute of Automatics at AGH University of Science and Technology is given. Of course the topic of difficulties with teaching Prolog is not new. The paper has records of different ways implemented in teaching Prolog to Computer Science students. These recorded experiences help build an interactive web portal for teaching support. Also different guidelines to be kept in mind are also given. A prototype implementation which is based on DokuWiki is also outlined by the respective paper.

The paper [2], focuses on solving the problem of storage and portability of compilers. The user need not to install any compiler, only needs to submit the program into the user interface provided. The controller ultimately decides which compiler server the program should be assigned to compile, depending on the design of backend compilers. Then,servers intended to compile the programs will compile and execute the programs. The output is then displayedto the user on his screen. The distribution of load on the controller is checked by comparing the total response time of the programs in both serial and parallel program allocation to compilation tier. The paper [3], provides a solution for various which makes it difficult for programmers to compile programs of a certain programming language on any machine they use, which offers open-source compilers which are cloudbased.Wepresenttherequiredframework, prospective stakeholders,anticipated features, and potential challenges of deploying such kind of compilers, taking into account the stateof-the-art efforts in this context. The paper [4], proposed a Meta-scheduler architecture to be used on Cloud Computing environments. The primary motive of the Meta-scheduler architecture is to manage the submission of services to the server in an efficient manner and also to manage the infrastructure concerning the Grid resources belonging to the Cloud. Furthermore, this Meta-scheduler also aims of building the best pool of available resources for the basic implementation of the requests which are issued by the users. For this, an economy model based in approach of supply/demand is adopted. Additionally, the paper presents a different approach for the communications between pairs of entities of the collaborative environment. This architecture extends the hierarchical model and implements the communication via hierarchical P2P shceme. The central idea on this model is to make use of the upper level Meta-scheduler (named Super-scheduler) to control partial overload and to impose performance under service demand.

The minimum requirements of the cloud compiler are:

- Software Requirements
  – Web-based requirements:
  - HTML5, CSS, Java Server Pages, JavaScript, Ajax Development Framework, Java Servlets
  - MySQL Database, JDBC-MySQL Connectivity, Java SE8 development kit

  – Android-based requirements:
  - XML, Java SE8 Development Kit, SQLite Local Database

• Hardware Requirements:
  – Client-side:
  - Minimum 512Mb RAM, Web Browser supporting AJAX(Chrome or Mozilla)
  - 50Mb minimum ROM memory for Android App, Android OS Ice-Cream-Sandwich onwards

  – Server-side:
  - Minimum 1GB RAM, Minimum 3GB Permanent Memory

III.PROPOSED ALGORITHM

The system is eventually intended for the software developers. Product will be deployed to web site and an android application. All users of this system will make use of the same via a website or an application. There will be cloud server where all the user data is kept and all the execution is done. Website and Android Application will only be the interface for the user data and the execution of provided functionalities.

Users are required to register through the interface provided on the website and android application. Whenever a new user is registered, all the required data will be created in the server-side database. The user can log in or logout of the system at instant of time he wishes to. Each operation that the user wishes to perform or performs will directly replicate on the database stored on the server. User will be able to compile programs on language specific compilers and debuggers (gcc, g++, javac, python, etc) available on the system.

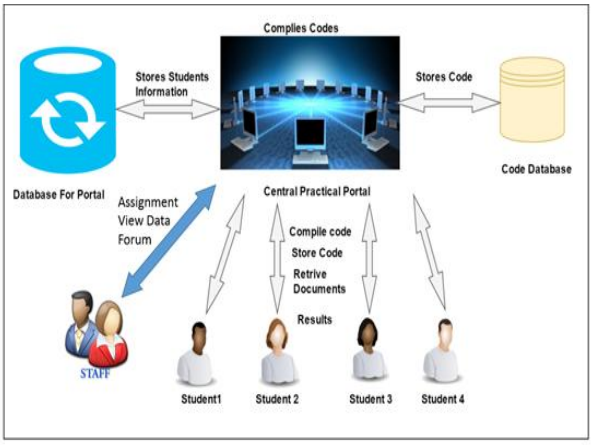

Fig. 1. Overall System Flow

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The compiling and running the programs will be executed on cloud server so that user will be able to access his own integrated development environment according his own convenience.

One assumption about the product is that it will always be used on mobile phones and Desktop/Laptop PCs that have enough performance. If the device does not have enough hardware resources or a proper internet connection available for the application, there may be scenarios where the application does not work as intended or even at all.

The programmer can also make use of the Cloud compiler service through an Android application. The system which is built, is not restricted only to Android users as it also provides a web interface, so that it can be accessed through a web browser using any internet-enabled device. In our system, cloud plays an important role of providing services of program compilation. And if successfully compiled it will also engender proper outputs. Different users from wide variety of backgrounds can benefit themselves by using this application. These users can create their account and can have their private workspace for files and project sharing.

IV. SIMULATION RESULTS

The simulation result presents the different interfaces for the proposed Cloud Compiler system which is as follows:

Fig. 2. List of Assignment for the student

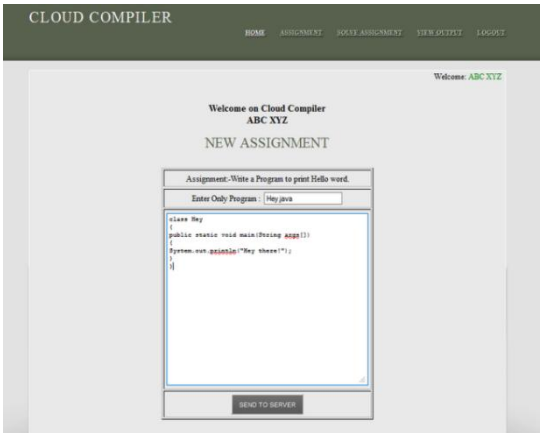

Fig. 3. Editor to type in the program

The Fig. 2 shows the list of assignments provided by the Teacher, which the student needs solve and submit the code in the system. An editor is provided for the student to type in the code. It is shown in Fig. 3.

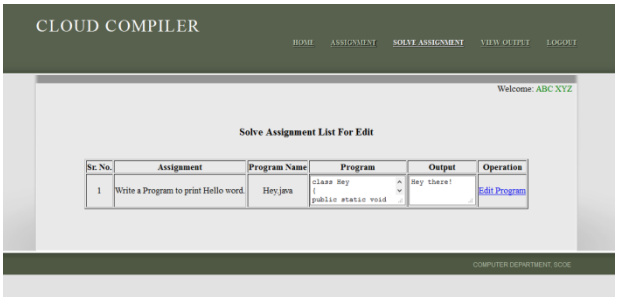

Fig. 4. Output after compiling the program

The Fig. 4 shows picture where output window is provided to the client after compiling the program.

V. CONCLUSION

Cloud Computing is a technology which enables the users to get utilize to services like computation, storage and data retrieval even if the end-user is not having and technical details of the system configuration and physical location of the system that provides the services. The main idea behind developing this system is that it eliminates the need of installation of compilers in each and every device as the cloud provide services for compilation of programs. Also, it will act as a centralized repository for multiple-language compilers in which user will have a facility of storing the programs and accessing their files through their registered credentials. It is centralized and on cloud so upgrade, update or installing compiler is not the issue for user and it can also be run on low end devices. Another advantage is it can also be used or access by non-android user through any web browser. The system also provides authentication and personalization by providing username and password.

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