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Cloud-based Compiler Web Application

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Abstract: *In this paper, we are presenting a development environment for programming languages like C, C++ and Python. The scope of cloud computing has increased in society. Sometimes a learner or beginner had to face some problem related to configuring the internal environment of the compiler. Because of such issues, they can't able to figure out how to execute the program successfully.*

Another problem is that if the users or beginners want to compile the program on any other system, they require they again need to do all processing to install and to configure the compiler.

To solve these Whole problems, we thought of designing an online compiler to execute the program on a different type of source code by one editor. And also, a configured compiler providing services by cloud. Simply it is by creating a common server for different programming languages and to access under one roof.

Keywords: Cloud Computing, AWS, Compiler, Programming, PAAS, Integrated Development Environment, PHP, EC2, RDS

I. INTRODUCTION

When we sit to code or to learn languages like C, C++, Python, etc. The beginners had a number of problems like How to install compilers on desktop or laptop and how I configure it. Sometimes a learner or beginner had to face some problem related to configuring the internal environment of the compiler. Because of such issues, they can't able to figure out how to execute the program successfully.

And another problem is that if the users or beginners want to compile the program on any other system, they require they again need to do all processing to install and to configure the compiler. To solve these Whole problems, we thought of designing an online compiler to execute the program on a different type of source code by one editor. And also, a pre-configured compiler providing services by cloud. Simply create a common server for different programming languages. In Today's world, any online compiler has similar functionality as a regular compiler, with a serious difference that is all of a project or application's source code is executed online through a web browser.

Executing source code online significantly reduces both the hardware and the software requirement of programmers or learner when working on any project. Today's online compilers are able for compiling python, C, C++, etc. programming languages. It gives benefits in portability that is the primary purpose behind the development of online compilers is the portability that they provide to programmers. This is only because it requires only a web browser and internet connection to access and implement code. It can be accessed from anywhere using any device like desktop, mobile which has an internet connection. It can also give the benefits to share our logic or program and do not have an installation procedure that is, you can spend more time on programming rather than investing a lot of time on configuring the environment.

II. LITERATURE SURVEY

Nowadays Cloud Computing is the vastly used in all of the world. Technology giants are the major cloud tenants in the world. The cloud provides more flexibility and low cost to make account and maintenance. SaaS (Software as a Service) is the widely used feature of cloud computing. The public cloud providers provide many software services via internet. Online programming language Compiler Using Cloud Computing is a SaaS application. As of this is the ending of 2020, there are a few researchers that have implemented the similar system of cloud-based coding application whether they may be web application or android application. Most of these people had an approach of compiling and executing the codes in the programming language's like C, C++, python, java and so on which was a very good alternative back in the day but as for now technology is rapidly evolving that we need to pull our sleeves to cope up with this evolving world in order to get most of advantages from this technology.

The main drawbacks of these previous systems is they have interface and functionalities for only one technologies at a time to execute so, we are planning to counter this need in our project and develop a platform where we can integrate different technologies for a project to build a more feature enriched project.

- 1) Online compiler as a cloud service by Arjun data - The application was a great advantage in the world of using cloud computing reduces the price of storage. 2014 IEEE International Conference on Advanced Communications, Control and Computing Technologies
- 2) A cloud-based Java compiler for smart devices by Tanko Y. Mohammed - This research aims to leverage cloud computing, the availability, prevalence the ever-growing market of Android devices to provide users with text editors. 2016 15th International Conference on Information Technology Based Higher Education and Training (ITHET)
- 3) Online C/C++ compiler using cloud computing by Aamir Nizam Ansari, Siddharth Patil - The paper aims to describe an online compiler which helps to reduce the problems of portability and storage space by making use of the concept of cloud computing. 2011 International Conference on Multimedia Technology 2011 International Conference on Multimedia Technology

III. PROPOSED SYSTEM

The traditional method of coding has its own merits and demerits, it up to user's choice what should they prefer but countering the demerits and proposing a much smarter and efficient solution to the traditional coding methodologies is what we are focusing on. The proposed system to encounter the limitations of the traditional methods is the cloud based Integrated Development Environment web application that will handle the requirements of downloading, configuring various compilers and IDEs for various programming languages and code, execute different technologies in the same environment. Mostly when anyone uses cloud services, they deliver a SAAS (Software as a Service) to the users, but here we are planning to deliver a PAAS (Platform as a Service which will let the user to develop their projects on the top of our web application. The new approach towards coding will result in more reliable and efficient system that we can rely on during these circumstances when nowadays all types of fields are preferring online approach towards the services they want and can be done without any hustle to manually manage the resources and then work on them. In today's world not many people are going to stick with the traditional coding as it is unreliable and will move towards the cloud based solution.

IV. SYSTEM DESCRIPTION

The cloud based Integrated development environment is a Cloud dependent system where we are using the cloud services such as AWS EC2, AWS RDS To develop an environment which will acquire all the necessity prerequisites that we will use to execute the programs in different programming languages and functionalities in different technologies.

Most developers which uses cloud services to develop a project delivers a SAAS to the users, so they can directly use the system to fulfil their needs. But here we are using cloud services to deliver a PAAS (Platform As a Service) to the users where they can develop a full-fledged project on top of our system.

A. Interface

The User Interface is most important aspect in terms of frequent use from the users, the interface must be clean and easy to handle. We are planning to have a Set of modules as follows:

- 1) *Login and Registration Module*: Here users can register and login to the main page of IDE to execute the work.
- 2) *Learn Module*: Learn module will contain the information about the technologies, guides for integration of different technologies, latest trends and innovations in development world
- 3) *Compiler Module*: The main module which will enable developers to integrate different programming languages and technologies to gain maximum functionalities from all the technologies and merge in a single application. Code written in the compiler will be sent to the internal functions and the output will be displayed on the application screen.
- 4) *User Profile*: User profile is where we can create our personal profile after registering in the project. User can add information like contact number, education, position, email, date of birth, and social media profile links like twitter, Facebook, Instagram and LinkedIn. Also automated generated ID will be assigned to the every user. This will display the information given by the particular user which is logged in into the system.

B. Functional Work Flow

The main advantage of using cloud computing for this project is for many new technologies user will need to have a high configuration machine as a resource for executing the projects like Android studio, Unity game development but it is a very much happening possibility that many users will not have this type of configurations so in order to efficiently use new technologies the approach of using cloud computing is the best way to maximize the advantages as well as minimizing the time and resources needed to complete the required tasks.

As cloud computing is highly scalable, have rapidly elasticity and on-demand resource allocation it is the best solution to use for the development of a system where we need resources with high scalability properties.

- 1) We are launching an EC2 instance on the AWS cloud services, an EC2 instance will allow us to launch a virtual machine with the configuration of OS, CPU, memory, storage and networking as per our need. We are using free tier services of the AWS, so we have launched t2.micro instance by configuring it with Ubuntu OS, 1 CPU, 1GB memory and 10 GB of storage which we can expand till 30 GB.
- 2) We have deployed our application on the instance and the files are stored ‘/var/www/html’ location which is the path of apache web server. As we have launched ubuntu operating system, we have installed all the compilers, and packages manually on the ubuntu instance for the C, C++, and Python.
- 3) After configuring the compilers and packages we configured the environment and gave path to all compilers in our project files.
- 4) For the gcc, g++, python binary packages, we have used apt package manager of the Ubuntu. It will fetch the packages required from the official repositories and will install on our instance.
- 5) For the database, we have used AWS RDS service, we have launched a database instance with MySQL. We have imported our local database backup to the AWS RDS. The endpoint of this instance has been integrated with the php connectivity file to access and fetch the data from the database.
- 6) AWS RDS don’t have a public IP so, no one can access the database directly. It will only be fetched through the front-end of the application.
- 7) Whenever user will input the code of a particular language, after hitting on run code, it will be sent to the particular language compiler file saved on the Ubuntu operating system, it will compile and execute the code and the output will be fetched by the application and be displayed on the screen.

V. SYSTEM ARCHITECTURE

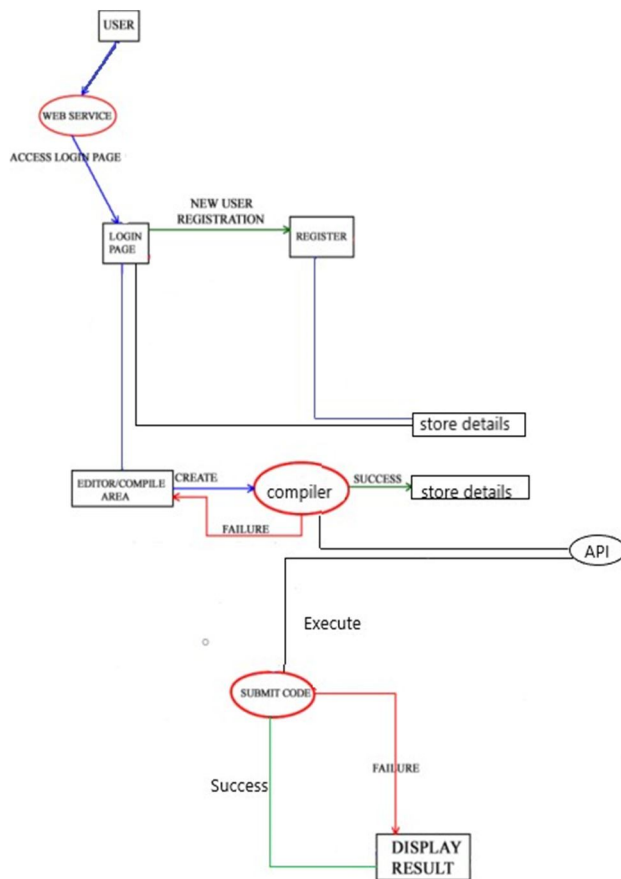


Fig. 1 Architecture diagram for the cloud-based integrated development environment.



VI. FUTURE SCOPE

Visual studio code is a very famous local environment IDE in all developers, it provides a great support and tools like terminal, commands, execution, emulators and debugging for every technologies in computer development, but this is when we use it on the local machine by installing and configuring the required technologies.

This project will give an edge to the future IDE that will be as reliable and efficient as of the visual studio code for development and deployment through a single Workspace.

The project is the web application but many people have worked on an android application, but as per our opinion not many people will use an android app for coding the projects, but in some cases, it may be a ease of use so, this could be next way to develop an android application.

One interesting solution that can be provided in the future that is to use this platform for the coding competitions and events where students can remotely perform coding and can participate in different events which may be held using this platform.

Many new technologies will be invented in the future, main concept of this project is to be able to integrate new technologies in this platform. So, coding in different languages and integrate those languages with each other.

VII. CONCLUSION

In conclusion, we can say that this system will make a great contribution towards the ease of programming as well as professional programmers where the integration of different technologies is efficient and reliable. Where beginners can learn basics of programming by implementation and professionals can use it on daily basis to reduce on premise resources as it available to public so any body can use it from mobile device as well as professionals can use it for onsite implementation and testing where the resources are not available.

The use of cloud computing makes it highly scalable and on- demand resource allocation will be useful where the high configuration resources will require to develop the new application to the user.

This platform will eliminate the drawbacks of traditional methodologies and will make it more advanced in terms of functionalities. Moreover, in today's world we require everything fast, efficient and accessible for all, this system encounters all of the problems and requirements that we face in this technology driven world. The Cloud-based IDE Embedded with the Cloud Computing assures the streamlined and continuous support and delivery of the content and the updated executing methods. By integrating and enhancing the capabilities of technologies, we are introducing the 'Cloud- based Integrated Development Environment Web Application'.

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