

Web Based 'C' IDE: Approach

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Abstract- A Web based environment has been designed to execute C programs without explicitly installing any compilers on the machine, thus addressing the concerns of portability and accessibility. The environment runs on a Linux server, uses password authentication and provides each user with separate project directories to store all his programs. These can be accessed and modified by the respective user only. The entered code can be compiled and executed easily without using licensed software for the same. This saves installation time as well as memory of the client machine. The configuration of the machine need not be an issue as the system is web based and thus platform independent.

Keywords- programming environment, web based, C compiler, online IDE

I. INTRODUCTION

A number of compilers are available in the market but they are all platform dependent. Moreover, the installation of compilers and other software incurs high licensing cost on each terminal. There is lack of collaboration for a team working on a C project as each member works individually on his local computer. Therefore there is a need of web based programming environment. These web based environments are centralized and have a consistent environment. The exponential rapid growth in the infrastructure and use of high speed internet especially in the urban areas lead us to the concept of building a development environment on the web, where coders could not only edit, compile and execute their code, but also allow team coordination and project management. [1]

The Web Based 'C' IDE has been designed to help a user to log into the internet and run any C code without specially installing a C compiler on his machine. This makes it easy to execute programs from anywhere, anytime without having to carry out the pre-requisites of installing the necessary compilers on the terminal.

The Web IDE is platform-independent and needs only internet connection to execute programs. This is highly beneficial for students and professionals to immediately execute programs online without having to worry about installing the necessary compilers on their terminal. The goal of the system is to make it convenient for the users to execute programs without bothering about the licensed copies of the required software.

Online IDE is based on the Browser/Server structure, and allows the programmers to write the program through the browser. [2] There are a number of online IDEs, e.g., CodeRun [3], JavaWIDE [4]. CodeRun is a commercial product, which supports multiple of programming languages with the exclusion of Java. JavaWIDE is an application which needs to be downloaded and will perform the necessary execution enacting like a desktop application, proving to be a user-friendly application.

II. LITERATURE SURVEY

1. Need for the project:

Many compilers are available but they all are platform dependent. Moreover, the installation of compilers and other software incurs high licensing cost on each terminal. There is lack of collaboration for a team working on a C project as each member works individually on his local computer. Therefore there is a need of web based programming environment. These web based environments are centralized and have a consistent environment.

2. Products currently available in the market:

There are many compilers present in the market like Turbo C, GCC GNAT and Visual basic for C and C++ programming. These compilers are platform dependent and they incur licensing cost.

3. Non Technical shortfalls of current systems:

Apart from the problem of having high licensing cost, these compilers also occupy lot of memory space of machines and therefore less amount of memory is available to the user for programming on machines. Moreover, the major problem with these compilers is that they don't support all the operating systems thus making the task of users more difficult and administrators who have to install additional software on non – standard machines or for students who must purchase and install the software on their own machines.

4. Need for change

The Web Based 'C' IDE is being designed to help a user to log into the internet and run any C code without specially installing a C compiler on his machine. This makes it easy to execute programs from anywhere, anytime without having to carry out the pre-requisites of installing the necessary compilers on the terminal.

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III. FEATURES

Various features of the System are as follows:-

1. *Web Based:* Centralized location is more powerful. All programs can be stored at a centralized location i.e. Server and retrieved efficiently. The necessary software need not be installed on the machine, thus saving client memory. Platform independent nature of the application ensures the ease of use irrespective of the client machine configuration.
2. *Login Facility:* A directory is maintained consisting of each and every user's programs which are stored on the server side. This ensures access to the entire team as well as safeguarding of the program codes of the user.
3. *Syntax checking:* Allows checking of syntax before submitting the code to the compiler. This helps in reducing the load on the server since the checking of syntactical errors are handled on the client side itself. It also helps the user in skipping minor errors which might save a lot of time.
4. *Syntax Highlighting:* Highlighting the code makes it easy for the users to understand the code and to carry out modifications easily. It helps differentiate between system keywords and user defined code making the code more legible.
5. *Standard Tools and Options:* It allows users to compile 'C' programs and execute their programs. Also to save their programs in their respective directories and debug the code as well. Various standard options are provided to the users for frequently used options to enable user-friendliness.
6. *Help manual:* A manual will be available on the web site for the developer to refer to in case of doubt. The keywords and their syntax will be provided.

IV. ARCHITECTURE

The Web IDE has been introduced for any user to simply connect to the internet, which is available widely nowadays and then execute the programs. An online help will be provided consisting of the syntax of the programming language and other constructs. The website will be easy for the user to understand and use with clear instructions and options. The purpose of the project allows students to get familiar with different compilers and compiler optimization techniques.

A database is used on the server machine which stores the login details of the various project teams. Mysql is used for the same. On the Linux kernel, the interface is made possible which will enable the execution of the commands directly onto the terminal. The corresponding output will be displayed on the browser. In case of programs with errors, the details of the error will be displayed to the user to help him correct the code accordingly.

The application will include the interface between the GCC compiler and the web browser. The code entered on the browser will be directed to the compiler and the corresponding result of the code execution will be shown on the browser.

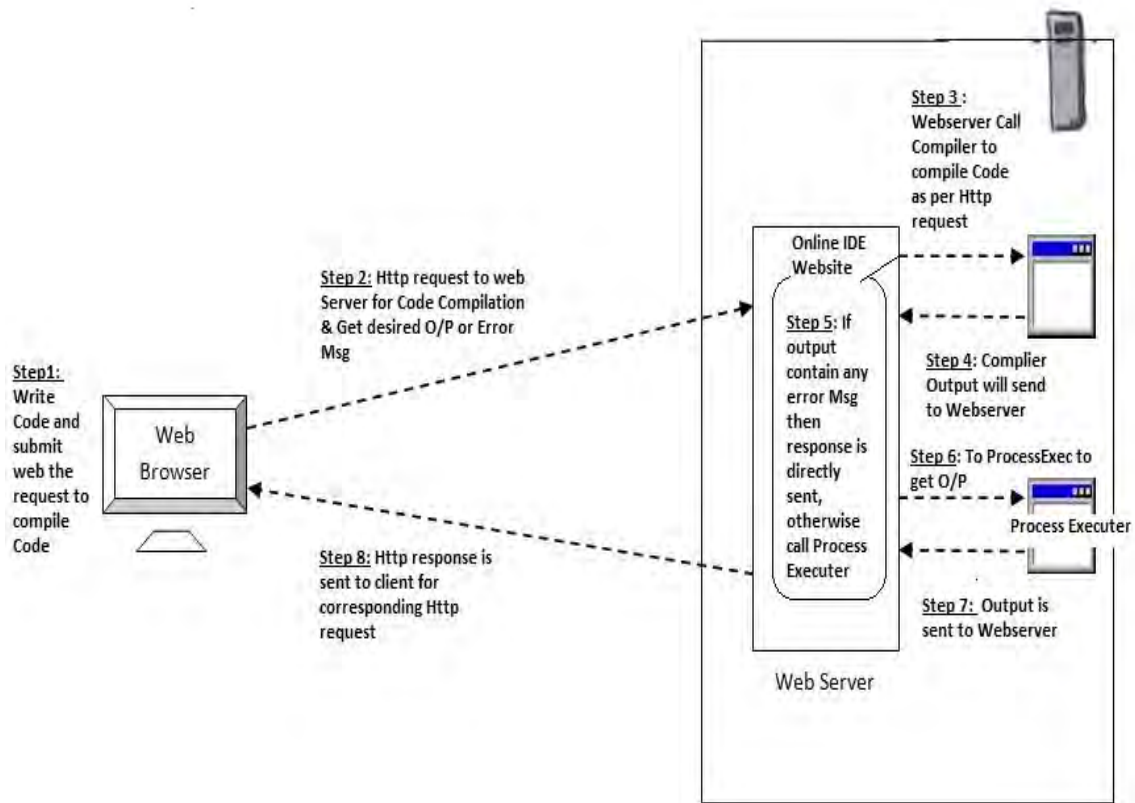


Figure 1 Architecture of Web-Based 'C' IDE

Architecture is explained as follows:

- Types the program code on the text area provided on the web page and then submits the code.
- The Client side program is transferred to web server and the web server will call appropriate Servlet/Perl Script to compile the program through C Compiler (E.g. GCC).
- After the compilation of the program if there are any errors present in the program then those error messages are transferred back to the client side.
- If there are no errors then the output of the program is transferred back to client side using Servlets so that the user can view the output of the program.

The user interface is programmed using Java Server Pages. The server side part of the application is implemented using CGI scripts written in PERL that handles communication between a user and the compiler. This allows for sharing the computational cost between the server and client.

The data flow of the complete application is shown in Fig. 1. The CGI/Servlet script does the file managing, runs compiler and processes the compilation results.

V. CHALLENGES

Dynamic Input to the program code is still an issue we need to address. The user should be able to provide input as per his wish when the program is in execution. Also when multiple requests arrive, the server needs to handle all of them efficiently and not go down. The load on server needs to be monitored. A backup of all the programs and login details needs to be regularly maintained of the server in case such a crash does occur. The updating of the backup of programs on server machine needs to be done repeatedly.

Faster access is to be achieved for the user. Our aim is to provide the user with complete satisfaction in using the application and thus will continually come up with more and more amendments to make the experience more effortless and enjoyable.

VI. FUTURE SCOPE

IDEs are the need of the day. They provide an integrated environment where a user can run his programs easily and obtain the necessary results. It helps by providing a single platform with the use of which we can combine all resources and thus implement programs at a single stage. Plug-ins of various functionalities help us achieve the desired goals. Due to its increasing popularity, the future lies in the use of IDEs using web browser.

The future lies in using these IDEs through portable and mobile devices without the need to install heavy software on the devices. A strong browser is enough to support such apps which will run satisfactorily on Tablet PCs and mobile phones. Thus, there would be no need of labs and other infrastructure in the future, a Tablet PC is all that is needed for the students to execute their programs.

VII. CONCLUSIONS

Thus we can conclude that the **Web Based 'C' IDE** is powerful and highly advantageous. Developing this system will prove to be beneficial to the users.

This system ensures the execution of the programs on any platform and thus the configuration of the system would not pose an issue in running programs. Also the user need not install the necessary software on every machine he uses. This saves a lot of time and improves efficiency.

The system is easy to access from anywhere. It is easy to understand and use without any complicated commands. Also the memory space in the machine is saved as the programs and the included components do not occupy any space on the client's machine.

The scope of the project is scalable. With work and proper guidance the project can be built commercially. Thus, this system is of great assistance to users from various fields to execute programs easily and would surely be preferred over the existing systems.

VIII. REFERENCES

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