

Cloud Based Web IDE for Collaborating Programmers

¹Rohini C. Ekghare, ²Manish Hadap

¹ Department of Information Technology, Yeshwantrao Chavan College of Engineering,
Nagpur, Maharashtra, India

² Department of Computer Technology, Yeshwantrao Chavan College of Engineering,
Nagpur, Maharashtra, India

Abstract- Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. It is a technology that uses the internet and central remote servers to maintain data and applications. It allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. Developers often have applications locally installed on their computers to run and edit programming code. But an online IDE is more accessible and lets you work in the same application you surf the Internet on – your web browser. This paper introduces an implementation of web-based IDE for writing and executing code online. It also supports the feature of real time collaboration where multiple users can work online on same document. This IDE also integrates chat forums in which users that require instant help related to coding can make use of chat system to post their queries. It can handle multiple projects and it helps developers to save data in a remote server. This IDE supports online execution of multiple programming languages where the compiler will use the processing and memory resources of cloud. The IDE can handle multiple projects and it helps developers to save data and development processes in a remote server.

Keywords- *Cloud computing, collaborative tools, web based IDE, compilers.*

1. Introduction

Many desktop applications have been migrated into the cloud. Cloud computing, where applications and files are hosted on a cloud consisting of thousands of computers and servers, all linked together and accessible via the internet. With cloud computing everything you do is now web based instead of being desktop based[1]. user can access all files or documents from any computer and from any location with an internet connection. In addition, group collaboration is provided by cloud computing. As all users in one group can work on the same document and can access it from any location. Many online IDEs appear at recent years, to program in cloud. It allows the

programmers to write the program over the browser as online IDE is based on the server or browser structure. Online IDE provides the same basic features as the local IDE provides such as code compiling which can compile the source code to byte code. Online IDE also holds some special compensation over local IDE. Firstly, using online IDE there is no need to set up their own development environment. Users can do programming work at any time, from any place and from any platform with an internet connection. Secondly, online IDE is suitable for collaborative development.

For coding in different languages like HTML, CSS, C#.net, JavaScript, etc. there are a few browser based IDEs. Cloude9 IDE, ideone, CodeRun Studio, Eclipse , Orion, eXo Cloud IDE, etc. are few existing browser based coding environments. Cloud9 IDE supports CSS, HTML, JavaScript etc. [3]. It is for web development and support real time collaboration. Code Run Studio[4] supports C#, ASP.net , JavaScript, HTML and CSS. It allows users to share code via URLs. Primary use of Eclipse Orion[3] is for front-end web development and it supports JavaScript and HTML only. All these above IDEs do not support Java and Lua language. Ideone[3] is not an IDE. It supports compilation and debugging of code in various languages but it does not support creation of projects. There is only one IDE that supports Programming in Java language which is eXo Cloud IDE. But it does not support real time collaboration [3]. Also they do not have compilation feature in them i.e no cloud collaboration tool have compiler yet.

To overcome this problem we are developing an application which will support an execution of programs in various languages like C, C++, Perl, Python, Ruby and Lua without installing any compilers on personal computer. The special feature of this application is that it support real time collaboration. For working on a same project users need to gathered at same place but using this

application users in the same group can work on a same document from any location. So, multiple users will have their own copies of the actual contents of a same file working at the same time.

2. Proposed System

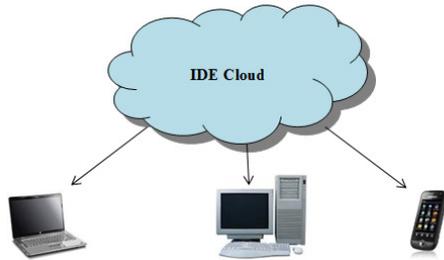


Fig 1. IDE present on the cloud

Integrated Development Environment is accessible from various devices like desktops, laptops, and smart phones with an internet connection. This paper explains the implementation details of the web based IDE which is present on the cloud and which support execution of programs in various languages. Also users can work on a same file together at the same time. As the application is deployed on the cloud there is no need to install and download it and because of this most of the operating system issues or hardware compatibility issues are eliminated [3]. For coding in different languages there are few browser based IDEs that supports real time collaboration and there is no such IDE which can handle multiple projects and helps developers to save data and development processes in a remote server. Also no cloud collaboration tool have compiler yet.

In the proposed work, users can do programming in various languages like C, C++, Perl, Python, Lua , Ruby. This IDE also integrates chat forums. The users who require instant help related to coding can make use of chat system to post their queries. It also supports the feature of real time collaboration where multiple users can work online on same document. It eliminates the need to download any software or desktop IDE because this application is present on the cloud and it also permits people working under various heterogeneous environments to code and collaborate and share knowledge with ease. It can be accessed from anywhere, at any time and from various devices likes desktops, laptops and even from smart phones with an internet connection. For the development of this IDE Filezilla FTP client software is used for file transfer. Cloud based compilers has been used for coding in cloud as this

application is deployed on cloud. Users can directly execute programs using this application without installing any compilers on their personal Computers. User can write code using application and after execution of code output will be display on same window. The files or data can be saved on cloud so that the users can easily get their data from anywhere using this application.

3. System Architecture

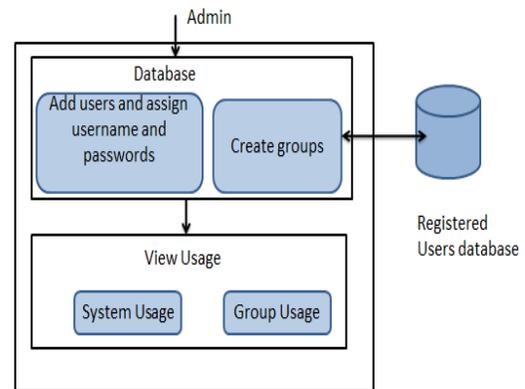


Fig. 2 System architecture of Admin

Administrator has an authority to create new group or a group of users and he will allocate username and password to each user. Fig.2 shows the system architecture of administrator. After creating new account user can login from application link. Admin can also view the disk usage of each group and System usage i.e. total space used by all groups. Admin has the database of all users. At the time of login, admin validates the username and password of each user in his consisting database. Authorized users only get login into the application. Registered users can login into the application by using their username and password. Fig.3 shows the system architecture of client.

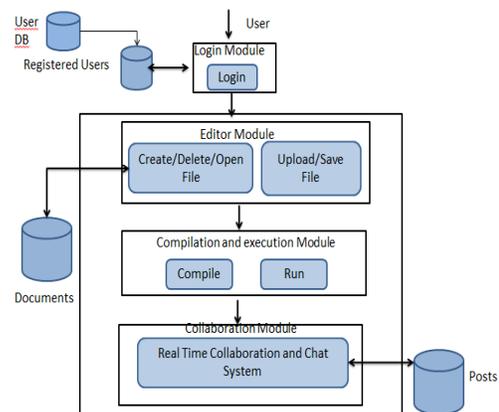


Fig.3 System architecture of Client

The various modules involved in Web Based IDE to Code in the Cloud are as follows:

3.1 Login Module

Users can login with user name and password to access the cloud IDE. User must be registered before login.

3.2 Editor Module

There are sub modules of this module.

3.2.1 Create, Save, Delete, Open Files and Folders

Create and save module allows the users to create new files and save them. File can be created from URL also. This system will download that particular file from the URL and save it in our working directory which is configured in the configuration file of the project. Users can also delete the files created by them. Users who have already created files or have common access to the files created by other users in a same group can open those files.

3.2.2 Search Files and Folders

Search module permits users to search files and folders which are present in the working directory. Files/Folders are searched in working directory using breadth first algorithm.

3.2.3 Upload Module

This module permits user to upload any file like text file, image file, doc file etc.

3.3 Execution Module

IDE is used to execute the multiple language programs. By hitting execute the file button source code of multiple language programs get executed and output will be reflected to the user. At the time of execution, compiler will check for errors. If there are errors then they will be displayed to the user.

3.4 Real Time Collaboration

An important feature of this application is a real time collaboration. Using this application users in the same group can work on a same project from any location. This feature provides various users with the ability to modify the same file at the same time and also view the changes made by others in real time [3]. But for privacy they can

not share the data with the users of other group. If other user in a same group who has access to the same file opens it, then the contents of the file are displayed to him also.

3.5 Chat System

Sometimes users in one group faced various problems during implementation of their programs or they may have queries related to various technical topics. So any user is allowed to ask queries or can answer to others.

3.6 Indication of Online Users

While solving queries using chat system, users need to know that other users are available or not. So, users in same group will get the indication of other online users and users can also see the last seen of each user.

4. Experimental Results

To use this collaboration tool or IDE, users need to have internet connection. The users have to type the correct URL and the login page will be displayed to the users.

4.1 Administrator Console

Administrator can create new group or group of users. This page also shows the disk usage of each group and system usage i.e. the total space used by all groups.

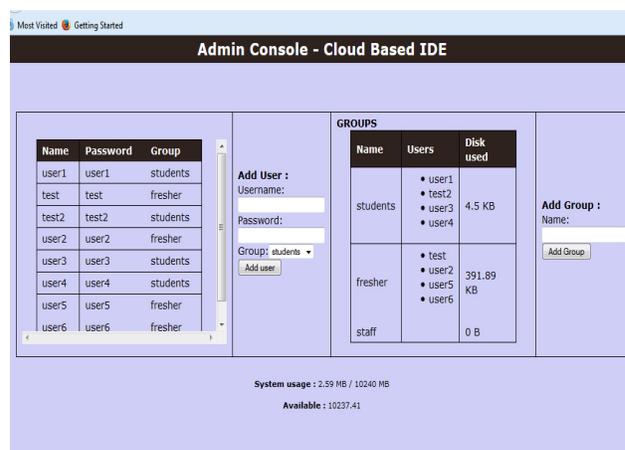


Fig.4 Administrator console

4.2 Login Module

To use this application registered user can login with his username and password.

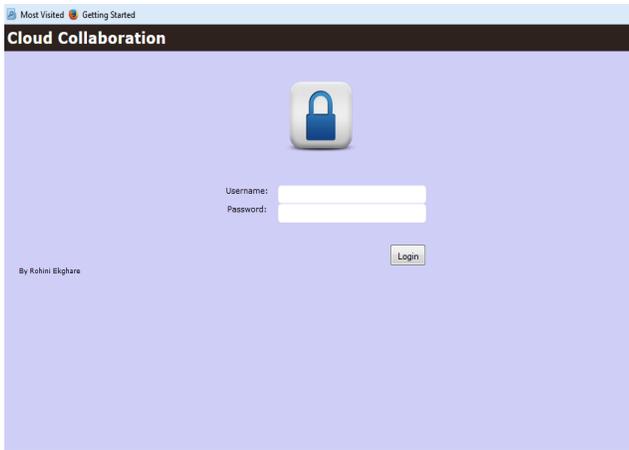


Fig.5 Login Page

4.3 Create, Search Files and Folders

Files and folders can be created or searched using file or folder name present in a directory. Also users can upload any file like text file, image file, doc file etc. File will be saved in working directory which is configured in configuration file of the project.

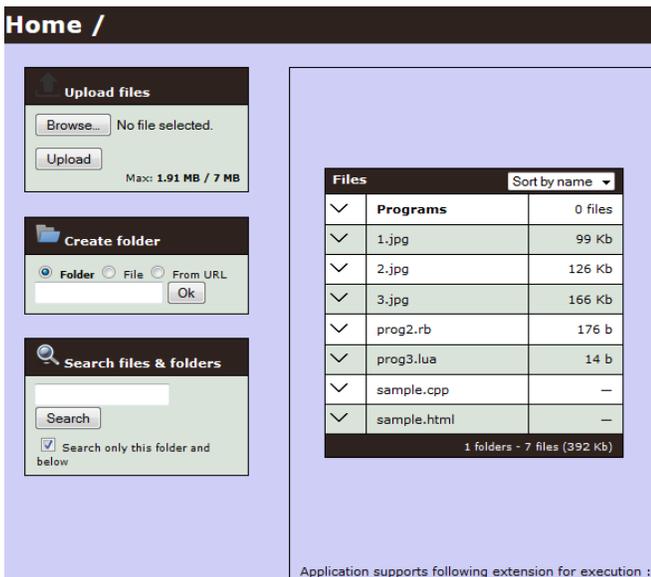


Fig.6 Create, search files and folders

4.4 Editor Module

Files can be edited in two ways in this module Text based editor and WYSIWYG Editor. Rich content files like HTML (.html, .htm) files can be edited in WYSIWYG editor.

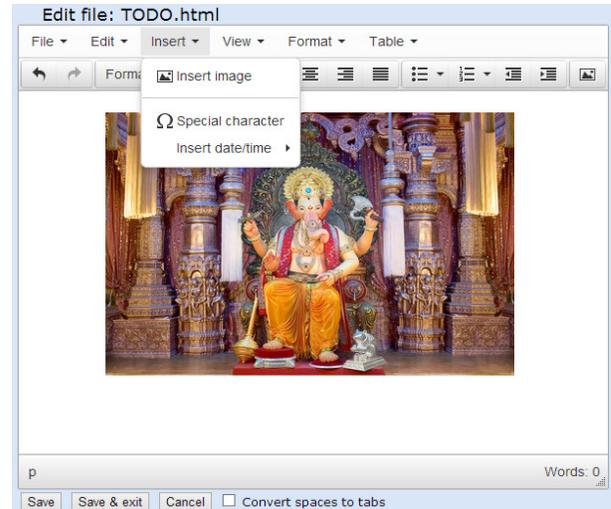


Fig.7 WYSIWYG editor

4.5 Execute Source Code Using Cloud Based Compilers

User can execute the programs in C, C++, Perl, Python, Lua, Ruby languages. When the user hits the Execute the file button, the source file is execute using the compilers. If errors are present, they are displayed to the user. Also user can save the output for future purpose.



Fig.8 Execution of C++ program

4.6 Real Time Collaboration

Users in same group can modify the same file at the same time and also view the changes made

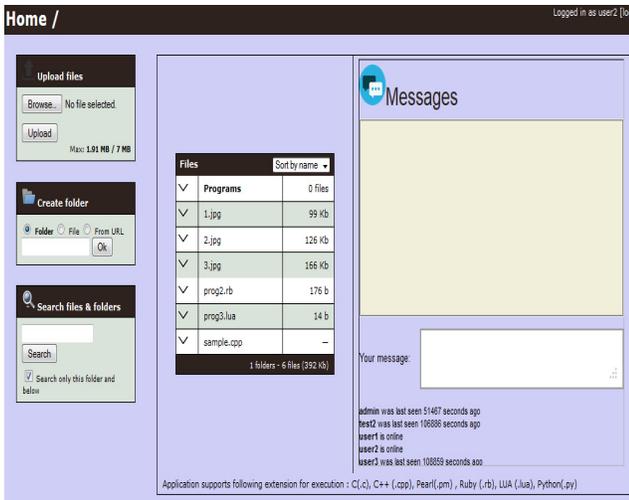


Fig.9 Profile of first user in group

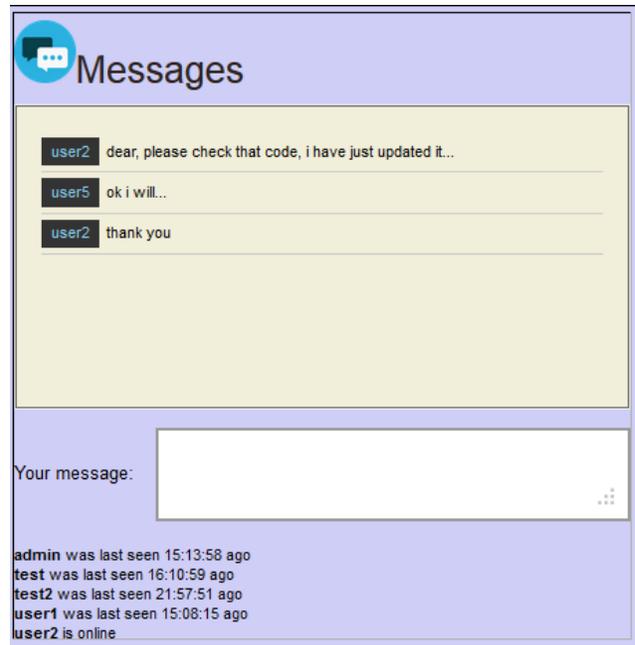


Fig.11 Chat system

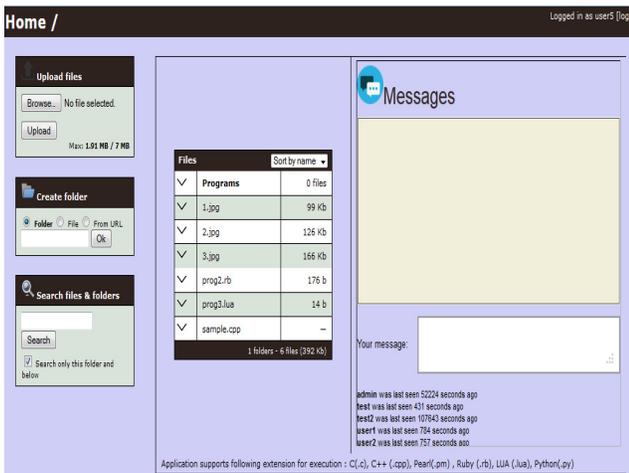


Fig.10 Profile of second user in group

4.7 Chat System

User can solve their problems by using chat system. Any user in a same group is allowed to ask queries or can answer to others. Users in same group will get the indication of other online users and can also see the last seen of each users.

4.8 IDE Accessible through A Mobile Phone

This IDE is accessible from all devices that have Internet access such as smart phones, laptops, desktops, etc. The following figures shows that this Web Based IDE can be accessed from a mobile phone with an internet connection.

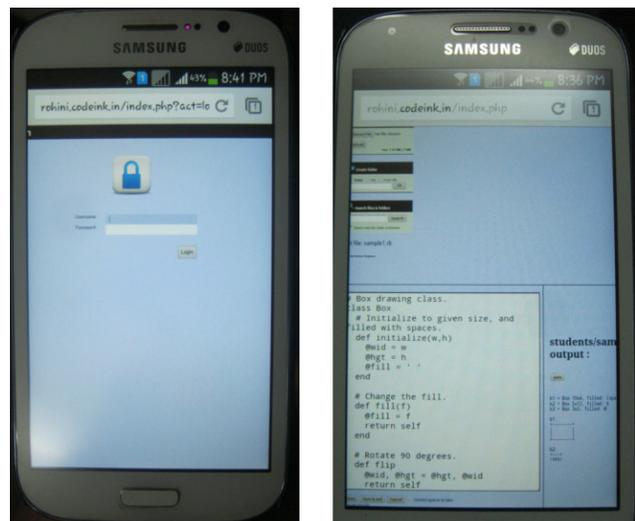


Fig.12 Execution of code through mobile phone

5. Conclusion

This paper describes the implementation of web based IDE to code in the cloud. This IDE eliminates the need to have compilers installed on the device that developers use for writing their programs in various languages. It also provides the special feature of real-time collaboration. This IDE also integrates chat forums. The users who require instant help related to coding can make use of chat system to post their queries. It can be accessed from anywhere, at any time and from various devices like desktops, laptops and even from smart phones with an internet connection.

References

- [1] Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and collaborate online.
- [2] Ashish Kumar, "World of Cloud Computing & Security", International Journal of Cloud Computing and Services Science (IJ-CLOSER) Vol.1, No.2, June 2012, pp.53~58 ISSN: 2089-3337
- [3] Laxmi M. Gadhihar, Deep Vincent, Lavanya Mohan, Megha V. Chudhari, "Implementation of browser based IDE to code in the Cloud", International Journal of Advances in Engineering & Technology, Nov. 2012, ISSN: 2231-1963
- [4] Gilad Khen, Dan-El Khen and Alon Weiss, <http://www.coderun.com>.
- [5] Ling Wu, Guangtai Liang, Shi Kui, Qianxiang Wang, "CEclipse: An Online IDE for Programing in the Cloud", pp.45-52, 2011 IEEE World Congress on Services, 2011.
- [6] A.Rabiyathul Basariya and K.Tamil Selvi, Computer Science and Engineering, Sudharsan Engineering College-centralized C# compiler using cloud computing, 2nd march 2012 .
- [7] NamrataRaut, Darshana Parab, Shephali Sontakke, Sukanya, Cloud Documentation and Centralized Compiler for Java &Php, International Journal Of Computational Engineering Research (ijceronline.com) Vol. 3 Issue. 3.
- [8] Rafael A. Calvo, Senior Member, IEEE, Stephen T. O'Rourke, Janet Jones, Kalina Yacef, and Peter Reimann-Collaborative writing support tools on the cloud, Jan-March 2011.
- [9] Peter Reimanna, Rafael Calvob, Comprehensive Computational Support for Collaborative Learning from Writing, International Conference on Computers in Education, 2010, S. L. Wong et al. (Eds.).
- [10] Max Goldman, Greg Little, and Robert C. Miller, "Collabode: collaborative coding in the browser", in Proceedings of the 4th International Workshop on Cooperative and Human Aspects of Software Engineering (CHASE '11), ACM, 2011, New York, NY, USA, 65-68.
- [11] Martin Nordio, H.-Christian Estler, Carlo A. Furia, and Bertrand Meyer, ETH Zurich, Switzerland, "Collaborative Software Development on the Web", arXiv:1105.0768v4 [cs.SE] 26 Jun 2012.
- [12] Van Deursen, Mesbah, Cornelissen, Zaidman, Pinzger and Guzzi, "Adinda: A knowledgeable, browser-based IDE", In Proceedings of the 32nd ACM/IEEE International Conference on Software Engineering (ICSE) (2010), vol. 2, ACM, pp. 203–206.

Bibliography

Rohini Ekghare completed BE in Computer Science in year 2011. And now pursuing M.Tech. in Information Technology from YCCE College, Nagpur.

Manish Hadap is an Assistant Professor in YCCE College, Nagpur. He has done M.Tech. in Computer Science from GSVTU college, Bhilai.