

A Study of Cloud Based Compilers

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Abstract: Cloud computing is an Internet based environment for enabling an on-demand and convenient network access to a collection of computing resources that may be quickly utilized with minimal management. Compilers are used to convert source code (text format) into an executable file/program. Before use a compiler needs to be installed on each machine which leads to portability issues every computer provides different environments for the execution of programs, the setup of each environment may be tedious and space consuming. An online compiler would help to reduce the cross-system portability issues and optimize storage space by making allowing the user to select the fastest or the most convenient tool to compile the source code and carryout debugging and error removal. We have gone through various research papers and analyzed the different solutions and limitations of implementation of compilers on cloud published in the last few years.

Keywords: cloud computing, online compilers.

1. Introduction

Cloud computing revolutionizes the way data is stored and how it's processed. Instead of executing programs and information on a personal computer, it is conducted/run in the cloud, a network of computers and servers through the internet. Cloud computing allows you to access applications and documents from any computer connected to the internet which frees the user from the confined space of a desktop and makes it easier for group members in different locations to work together. The emergence of cloud computing has been compared to the advent of electric power supply [5] before which every house hold which required electricity had to produce it using its own generators. Similar to the analogy of the advent of electricity, cloud computing can be seen as a model for providing an easy, network access to a shared collection of computing resources that can be on-demand utilized with minimal management effort or interaction with the provider of said resource. The end-user does not need to know the physical location and configuration of the system that provides these services to the end-user. The main is the loss of control over the infrastructure used by the users, but many advantages of cloud computing such them are lower costs, better computing, location independence, better security (data sensitivity needs to be observed) offset the disadvantages. The term Cloud Computing refers computing resource services on cloud. In which reliable, cost effective and dynamic with guaranteed quality of services are provided. Many applications

can be executed dynamically to meet user requirements. The classification of cloud compilers is possible into Platform as a Service (PaaS), Infrastructure as a service (IaaS), and Software as a service (SaaS). IaaS involves using cloud computing for hardware related services. PaaS involves a development platform that can be accessed on the cloud. SaaS includes a complete software product which can be accessed on the cloud.

2. Literature survey

Mohammad and Hamada [1] (2016) has proposed to leverage the widespread availability of smart mobile devices, the convenient features of cloud computing and the then rapidly growing users of Android devices to provide a text editor interface which allows users to save create and modify Java programs on the server. A web-based version is also proposed for users to save and modify code through PC and other smart devices. The primary goal of their proposed system is integration into an existing online smart learning platform. An existing online cloud compiler called Sphere Engine which supports over 60 programming languages was selected used for this research purpose and the server was developed and deployed on the cloud as Software-as-a-Service (SaaS) to host the compiler. Their proposed system was operated using a server/client architecture. The client requests for services from the server, and the server in turn forwards the request to the cloud sphere engine API. The response returned and interpreted by the server it and sends the appropriate result back to the client. A directory structure was implemented to display the user folders and files in his root directory. The system is also comprised of an in-built editor with functionalities like save, load, find, and replace and some others. The Android SDK tools provided by Google was used to develop an android interface. The web browser interface was designed using HTML, CSS and JQUERY. The jsTree (an jQuery plugin distributed under MIT license) and Edit Area plugin were integrated to produce the interface for the system. A responsive HTML theme was used to provide non android users with an interactive reliable interface and to was used to access the system.

Ansari et al. [2] has proposed a system to describe an online compiler which helps to reduce the problems of storage space and portability. The authors propose that online compilers will allow a programmer to choose the fastest and most convenient tool to compile code. Through integrating and of current essential technologies, the authors have proposed an online

compiler to contribute to the examination system to be used as a platform for students of the university to give their programming examinations online. The server on the cloud would be able to compile the user code stored on another machine. Taher Ahmed Ghaleb [3] has proposed a solution for compilers which depend on the specifications of user computer and makes it difficult for programs to be compiled in a portable manner. They seek to provide an alternative to having compilers in executable releases (i.e., no source code available) which restricts the extension of functionality and participating in fixing bugs. They propose a possible solution, its features, prospective stakeholders, and possible challenges of deploying such kind of compilers. They have classified existing solutions into two groups, open-source and cloud based. They found that existing solutions are mainly focused on basic functionalities and don't provide GUI functionalities

Namrata Raut [4] et al. have created an IDE to allow coding in Java language which can be done simultaneously with other team members. The IDE was browser-based. They have successfully implemented an online compiler that allows users to write code on a browser IDE with all the functionalities of a basic compiler installed on a personal computer.

Pabhita et al. [5] have developed an online compiler based on a private cloud which makes the cloud infrastructure based on Ubuntu Enterprise Cloud (UEC) scalable as per the requirement. The online compiler showed relatively high performance compared to TurboC compiler and the cloud infrastructure uses the resources effectively. This cloud compiler was used to write C, C++, Python, Ruby, Perl, PHP programs through a web interface that gets the service from the GCC compiler installed in cloud.

Abdulla et al. [6] focuses on the importance of cloud compilers in daily life where using huge amounts of space isn't practically possible and how online cloud space can be utilized to accommodate and solve daily problems faced due to the lack of space and how every computer can use the online cloud compiler to resolve it. Not only a lot of problems can be solved but files can be shared by making groups that can select particular compilers.

Meshram et al. [7] has highlighted the need for cloud compilers and the way they can be executed in real life applications by creating a client side and a server side. The client end is for the people who want to use the compilers online and it has a login page where you enter id and password and the server end verifies it and lets us know whether details are correct or not and hence allow the user to enter into the site.

Ansari Mohammad et al. [8] detail the technologies used for cloud compilers and the three technologies that are used mostly. The three most used technologies are:

1. Net framework
2. My SQL
3. Virtual Machine

Manjula [9] brings in a new approach by combining the online cloud computing and the cloud compilers together as in

how they can be used dependently and advantages of both the systems can be clubbed to provide a better and efficient way of cloud compiling.

3. Discussion

Cloud compilers implement an interface and hardware to compile and execute code independent of any user operating environment related restriction or complication. The cloud compiler can be used by any user is authorized to use the service compiler and can exploit the resource for a period of time. The functionalities that are provided by the cloud are:

File Management: The source code can be accessed, modified and saved in a format that is relevant in the space that is allocated to each user. The storage space available to the user may be flexible.

Compile at any time: cloud compilers may have an IDE where code can be modified, saved and executed. This IDE will be available for use from any computer connected to the network. Can be used by anyone: Can be used by people who have access to poorly integrated GPU's to perform operations that can't be performed on their computers/systems.

4. Conclusion

Cloud computing has emerged as the leading way in shared resource sharing much more flexible and productive in using dynamically provisioned resources to create and to operate them. Cloud can now be seen as platform for the Internet based services and will continue to grow into its role. More and more companies and platforms have started to offer services on cloud and integration of such in increasing and becoming more convenient with time. Compilers may no longer be restraint by computing power and user environment, the same compiler will not be required to be installed on every machine. We have found that although several online compilers are available, the required hardware capability and the lack of Graphic user interface programs is common issue among them. The analysis of various solution for different available online cloud compilers was done and proposed the need of further research in the area.

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