

# Analysis of Cloud IDEs for Software Development

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**ABSTRACT:** In today world using cloud services has become a convenience for software developers to develop application. An integrated development environment(IDE) facilitates the development of apps in shorter software delivery timelines. A cloud based IDE is an 'next gen' solution and still in the incubation stage because the cloud based private workspace is yet to evolve fully.as of now, there still is not any good java-supporting cloud IDE available. Evaluation of different cloud IDEs is discussed in this paper.

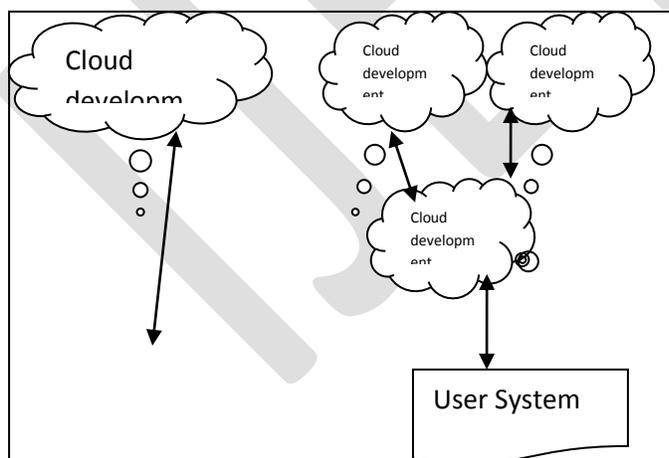
This paper discuss an open source virtual environment for cost effective and better community based collaborative software development. In this paper we analyze a cloud based development facility that can be accessible from anywhere and be used without much interfacing in the local developer system such as software installation, network boundary etc.

**Keywords :** IDE, Software development, deployment environment, cloud IDE, Virtual Environment, Java, J2EE

## 1. INTRODUCTION

The development process plays a vital role in developing a software product. The software development process consists of requirement gathering and analysis, designing, coding, testing, deployment and maintenance. The basic requirements for software development are hardware and software tools, a server to deploy and test the application and a coding development environment. Cloud based development brings in a lot of cost savings and efficiency into the process of software development. The cloud provides a deployment environment for developers and the developer do not require building, developing or maintaining this environment but can share it easily from the public environment.

Figure 1.1 Software development and the cloud IDE



An integrated development environment is a software tool that integrates various features required for the development of a software application. The cloud IDE is the latest improvement in this area. The cloud IDE is a virtual development environment. To develop a java application, we use Eclipse or Netbeans as the IDE, which provides an integrated plugin facility to develop java code, auto complete java APIs, has syntax highlighting, apart from the capability to compile, execute, test and analyze static code. In

traditional software development environment, all developers install the IDE in their respective systems, and upload their developed code into a concurrent version system(CVS) or source code management system. Once the code is checked in, it requires the harmony of other developers, which takes more time if the number of developers is high in a project. So there is the fundamental need to provide a software development environment for a large number of developers to work together on a collaborative project, yet achieve a shorter delivery time, a cloud IDE is one of the best solutions to reduce the development process time, as it provides a more convenient and flexible common environment for software developers.

## 2. THE CLOUD IDE

The basic motive behind the cloud IDE based platform is to create a virtual development environment. It can provide the following features for the software development process :

- a. programmer can develop an application in one or more software technologies such as Java, C++, HTML, JavaScript and so on.
- b. It has an application container to deploy the application on-the-fly.
- c. It offers repository management to store, retrieve and share code between groups of developers.
- d. In addition to these basic features, we need to add security to limit the access to only the selected group of developers. This can be achieved by an authentication system that protects the development environment from public use.

### 2.1 Standard expectation from a cloud IDE

The following standard expectations from a cloud IDE are :

- It should be lightweight and flexible enough.
- It should be able to highlight syntax.
- It should have the auto completion facility.
- It should have an internal compilations facility.
- It should support remote repository management for source code.
- It should provide minimum debugging facilities.
- It should support cloud deployment.

In addition to this, proficient developers who have worked on various IDEs like Eclipse, JDevelopers, IntelliJ, Visual Studio etc would look for some add-on features like :

- Support for screen design with a visual designer tool.
- API or language help; for example, tooltip for a Java API.
- Static code analysis to follow best practices in coding.
- Coding convention and code formatting or styling; for example, the number of characters in a line, tab, indentation etc.

### 2.2 Advantages of working in cloud-based IDEs

- Programming workspace is a single and centralized environment in which multiple people can co-build, co-edit and co-debug
- Easy and instant access to codes and libraries through the web
- Enables developers to work on the go without the need to occupy systems with loads of heavy codes and data
- Accessible through all devices and browsers
- Facilitates better collaboration among developers located at different locations
- Reduces duplication of work

## 3. ANALYSIS OF OPEN SOURCE CLOUD IDES

The popular open source cloud IDEs include Cloud9, codeanywhere, Eclipse Orion, Coderun Studio, Codebox, Codeiad, IDE One and Codenvy-Eclipse Che. In the following section the various features and advantages and disadvantages of these tools based on experience of users are discussed.

### 3.1 Cloud9

Cloud9 IDE is capable of handling projects from JS, HTML, PHP AND Ruby. it support development in JavaScript, GIT, Selenium, HTML/CSS, XML, XQuery, PHP, Ruby and Node.js. it can be used for web application development. Cloud9 supports repositories like GIT, the distributed revision control tool Mercurial, and Apache subversion. It also facilitates

deployment, which can be done directly from Cloud9 to Joyent and Heroku. Its limitation is that it is not useful for Java application development or J2EE application development/handling.

Advantages: Supports a variety of languages and various repository tools.

Disadvantages: can be used for simple application development but not for large or complex applications.

### 3.2 Codeanywhere

This is lightweight browser based IDE tool. It supports web application development. It support HTML, CSS, Java Script, PHP, MySQL, and more.

This tool is used to develop and test code from anywhere i.e from mobile device also as it is also available as a mobile application. Codeanywhere is supported in IOS, Android and BlackBerry based mobile devices and tablets.

Advantages : Lightweight and easy to use. Support for mobile devices.

disadvantages: it is more useful for web page development and it doesnot support a variety of programming languages.

### 3.3 Eclipse Orion

This can be used as a local standalone IDE or an online IDE through a browser. This is the Eclipse version of Orion. It only supports Chrome, FF Safari and IE10. This is more for client side scripting like HTML, JS and CSS. Java syntax highlighting is supported during static code review, and doesn't integrate with the java build and development environment. It has shell features with a very limited command facility.

It doesn't support the private cloud and hence is not suitable for secured application development. This is one of the lightweight cloud IDEs for software development in HTML/CSS and javascript.

Advantages : can be used as a standalone local installation tool or as a cloud IDE. It offers static code analysis. Shell features provides facility for UNIX script development, which is a unique feature many cloud IDEs do not offer.

Disadvantages : it doesn't support the private cloud/secure development, and doesn't support build/compilation of code or online testing.

### 3.4 Coderun Studio

This is simple and efficient cloud IDE. It support application development in ASP.net, HTML, CSS and JavaScript, Microsoft visual studio. It also facilitates code completion, syntax highlighting, debugging and native compilation. This provides flexibility for community development by providing a unique URL and access to peers for a multi-user development environment.

Advantages : unique URL for multi-user development, in parallel. More suitable for pair/peer programming. Supports Microsoft code development, debugging and native compilation.

Disadvantages : development using latest frameworks or languages like Scala, Ruby, NodeJS, AngularJS is not supported by this tool.

### 3.5 Codebox

This is an open source IDE with code available. It enables the users to customize the tool and encourages them to share it for community development.

Programmer can download the code from this repository, and build to prepare an IDE in their local desktop. It supports Windows, Chromebox and Mac based operating system. This tool is used to develop local or cloud based application. It facilitates pair programming by providing cloud based IDEs for sophisticated community development in Java, JavaScript, C++, Ruby, Scala, HTML, CSS, NodeJS and UNIX script programming.

It provides auto completion of code, syntax highlighting and supports cross-platform development on the desktop, laptop , tablet and on Chromebook.

This tool provides supports for Scala based program development and deployment to cloud based platforms. It is an open source with licensing under Apache 2.0, and provides command line development for shell programming. It provides supports for Google Docs and database support using MySQL.

Advantages: provide support for variety of repositories, cloud deployment, scala based program development, cross platform support and auto completion of code.

Disadvantages : it does not support PHP application development.

### 3.6 Codiad

This is simple tool which supports more than 40 programming languages, and provides plugins for integration with other popular IDEs like Eclipse. There is no database required to be installed locally, and no application server or local installation required to run this browser based IDE tool.

Advantages : simple and efficient tool that supports a variety of languages. Application server support for local deployment is available.

Disadvantages : it doesn't support a variety of database types and is not so flexible in pair programming.

### 3.7 Online java IDE

This IDE has facilities for java/J2EE development. It also supports spring, ojdbc, MySQL, mail APT and Axis frameworks. This IDE is not very user friendly and typing/editing is not too comfortable. The package creation option is not available for modular programming. There is no download and upload facility to synchronize with the local development environment.

Advantages : supports a variety of database drivers and frameworks like Mailx, Axis etc

Disadvantages : Packages and deployment is not available limited to java development only.

### 3.8 IDE One

This is a very simple online IDE which supports Java. It can be more useful as a unit or stub testing environment- as a quick try. The code development in this tool is done online and there is no 'Save' option. It doesn't have extensive support for real-time application development/deployment.

Advantages : simple tool with real-time application

Disadvantages : lacks user friendliness.

### 3.9 Codenvy - Eclipse Che

It supports a variety of Java/J2EE frameworks. This IDE provides unlimited open source community development support and user access. Usability is high, being as simple as using a desktop version of Eclipse or the Netbeans IDE. The deployment facility includes a variety of PaaS cloud environments. Integration is seamless and automatic. When user trigger deployment from an IDE, it connects to the PaaS and pushes the build to the deployment zone.

GIT is the default management repository and it has a local as well as remote GIT facility, where users can either keep the source local to Codenvy (like storing in local development machine) or connect to remote GIT to check-in/check-out.

It has JSP AND SPRING support in built, using the project template features. It has features to import external jars and hence JSF or the Struts Framework can be used for code development. Applications with DB support can be simply chosen from the wizard. Archive download of the project to a local system is available. Uploading the existing projects is possible, and so the user can switch between the local environment and the online IDE. Package creation support is also available. Codenvy is bit slow when 'initialising Java tool' and supports non-IE browsers such as Safari, Firefox or Chrome.

It has shell access for UNIX development with basic commands. Build and deploy is integrated in the IDE. It supports deployment to cloud environments

Advantages : has a variety of features and is flexible in development. Supports download of archive code-on-the-fly.

Disadvantages : it doesn't support IE browser. Slows down sometimes when users compile or do a cloud deployment.

## 4. CONCLUSION

For a developer or a small company that lacks the capability to install an IDE locally for software development or wants to develop a program on-the-fly, the tools described above would be helpful to experiment on, prior to choosing a development

environment. With the adoption of several simple security precautions and an open mindset, any software developer can reap the rewards of Cloud software suites without any real danger.

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