# Application Backup And Restore Across Multiple Devices

## Pooja Chate[1], Piyush Khadse[2], Shubham Kadam[3], Mayur Padma[4], Prof. Ruhi A. Patankar[5]

*[1,23,4]UG Student, Department of Computer Engineering, MIT Pune College, Maharashtra, Pune, India*

*[5]Assistant Professor, Department of Computer Engineering, MIT Pune College, Maharashtra, Pune, India*

-------------------------------------------------------------------***-------------------------------------------------------------------

**Abstract –** *Computer system is widely used across the globe for several purposes in different fields and failure in this system is natural. It is not acceptable as it might lead to loss of important data. There are several reasons which can cause the computer system or an application to crash or fail, thus causing loss of important data lead to redo all the activity or task, user was performing before the system crashed. Our system proposes a solution to this problem by backing all the data to the cloud and thus can be restored when the system recovers from the crash, allowing to resume the task which the user was initially performing.*

***Key Words*: Cloud Computing, CRIU, Backup and Restore, Selenium WebDriver.**

## 1. INTRODUCTION

We live in the era of information and technology where application software plays a significant role. We use software applications on everyday basis because they make our life easier than it was ever before. Humans rely on software of different kinds, specific to their purpose, to perform different activities like use of editors to create a digital document, use of web to perform money transaction; there are many simulators which are also one kind of software system which is used for testing purpose before any physical implementation or rather actual implementation of project.

As useful as they sound software application are also prone to failure. These applications might lose their current state due to several reasons which might include power failure, application failure or the system hosting the application itself may crash. Thus, leads to loss of application state and eventually the data. There is no provision available for restoring the previous system state and the data we lost during system or application failure causing user to redo all the task or action user was performing before the failure. In the proposed system we aim to backup and restore the state of the application to the one before the failure. Several mechanisms are used to keep track of the activity the particular application is performing and every data set being generated by the application and after fixed time interval it is being backed up on cloud so it could be restored when the application or system recovers and starts running.

The proposed application uses multithreading approach to handle the data generated by the multiple (currently running) applications or tasks and uploads its data to the cloud system consistently after several intervals.

## 2. PROBLEM DEFINITION

Our problem includes two major sections. The first section deals with backup of application programs state and in this section applications state will be stored on cloud and the backing up process will be handled by thread allocated to each individual application. The second section involves restoration of application selected by user. In this section user will select application to be restored and from cloud the data relevant to the application will be sent to users system for restoration. The application can be restored on multiple devices providing the user with flexibility with usage of different system.

## 3. ARCHITECTURE OF THE SYSTEM

The system architecture involves the components namely cloud and the users device. The cloud is where the users data is stored after its backed-up. Cloud system decides to which node the data should be backed-up by determining the load on the different available nodes, the traffic or congestion in the network and other aspects.

The user system has different application installed and is using different web services. While using these applications the system constantly keeps backing up data and accordingly the cloud system stores the data attributes in the database. So, if the application fails because of certain reasons the data stored in cloud system is used to restore the state of the system when the user requests for state restoration.



**Fig -1**: ASBAR System Architecture

## 4. TECHNOLOGIES

Selenium is an automated testing suite for web application. It is open source (free) and can be downloaded from web. It is not a single tool but a collection of several suite of software which are used for testing purpose based on the organizations need. It has four components namely Selenium Integrated Development Environment (IDE), Selenium Remote Control (RC), WebDriver, Selenium Grid. Our problem statement is to take backup and restore state of an application, so to restore state of web application we are going to use Selenium WebDriver API.

Every browser has default automation feature and feature is exploited by Selenium WebDriver. Selenium WebDriver is basically a well-designed object oriented API which enables communication between programming languages and browsers.
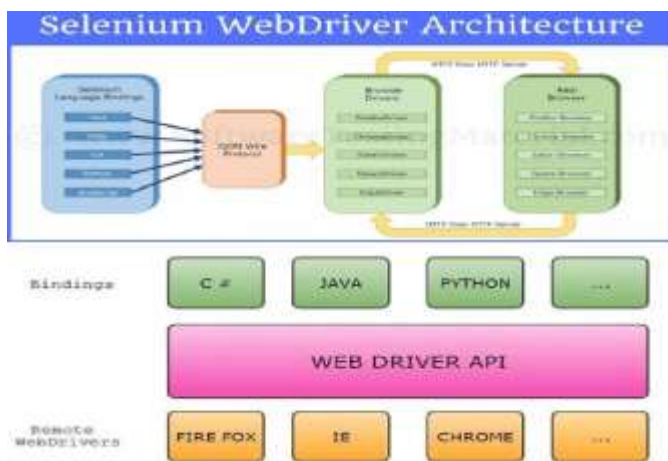


**Fig-2:** Selenium WebDriver Architecture

As it could be seen in fig 2 the client, that is, the user program makes a specific request by issuing a command to the client library and as soon as the client library receives the command it converts it to the JSON format to communicate with the browsers driver. Later, on receiving the request the browser processes the request and returns the status.

In our proposed system we are using this functionality of Selenium WebDriver to gain access to the contents of the website fed by the user. This data is later backed-up and is used when user initiates restore operation.

CRIU is used to implement checkpoint or restore functionality for Linux. It stands for checkpoint or restore in user space. CRIU is used for application live migration, snapshots of apps, remote debugging, process duplication etc.
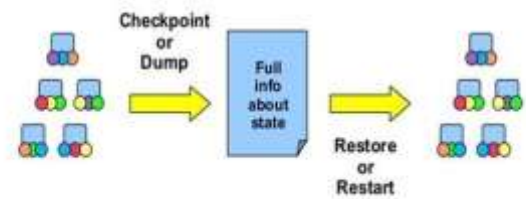


**Fig-3**: CRIU Process

In our proposed system in order to restore system applications state we are using criu. Using criu we can freeze the running application and store checkpoint of the application on local machine as well as on cloud storage. Later we can restore application by retrieving that checkpoint. criu provides dump and restore to perform checkpointing and restoration of application state. criu uses the kernels ptrace interface to seize the application process. Then, it injects its parasite code to dump the memory pages of the process into image files from within process address space. These are the image files which are later used for application state restoration.

## 5. OBSERVATIONS

### 5.1 System Application Restoration Result

#### 5.1.1 Text Editors state Restoration

Based on users demand to restore the requested application, the dumped image files of the application state which are stored on the cloud platform are downloaded and are used to restore the application state. XTerm terminal environment is used to display the restored state of the application.

#### 5.1.2 Restoration of Program Execution State

It involves restoration or rather resumption of the program execution from where it left off. The programming languages involved are C, C++, Java, and Python. Our system namely ASBAR resumes the program execution form the point it stopped. All the previous resulting output of the program execution is stored in a text file.

### 5.2 Application Restoration Result

#### 5.2.1 Content Restoration

It involves restoration of the web application data fields, for example gmail account creation form, which demands data values of those fields to be fed by users.

### 5.2.2 Session Restoration

It involves restoring the current user session irrespective to which website the user visits.

## 6. CONCLUSION

This system proposes a solution for application state restoration using several different techniques to backup and restore the data securely and in an optimal fashion reducing significant amount of effort that the used would have had to spend on re-performing all the task. The system provides different users with unique ID allowing to restore the application on multiple devices based on the ID provided.

## REFERENCES

[1]. S. Luo, Y. Wang, W. Huang and H. Yu, "Backup and Disaster Recovery System for HDFS," 2016 IEEE International Conference on Information Science and Security (ICISS), Pattaya, 2016, pp. 1-4.

[2]. S. Biswas, R. Roy, M. R. Chowdhury and A. B. Bhattacharya, "On the Advanced Strategies of Next Generation Online Examination System Implementing Cloud Based Standardization: Next Generation Online Examination System," 2016 IEEE 6th International Conference on Advanced Computing (IACC), Bhimavaram, 2016, pp. 834-839.

[3]. H. E. Camacho, J. Alfredo Brambila, A. Pea and J. M. Vargas, "A cloud environment for backup and data storage," 2014 IEEE International Conference on Electronics, Communications and Computers (CONIELECOMP), Cholula, 2014, pp. 111-117.

[4]. Y. Gu, D. Wang and C. Liu, "DR-Cloud: Multi-cloud based disaster recovery service," in Tsinghua Science and Technology, vol. 19, no. 1, pp. 13-23, Feb. 2014.