# Chapter 1 Introduction

Making use of a cloud environment means to keep up with today’s modern technology. Cloud infrastructures are a new subject nowadays, and they can be utilized by either an individual or a group of individuals. Cloud infrastructures can be a good investment for a company to invest in and later successfully reap the benefits from. However, the same technology can also be unbeneficial for another company which has invested heavily to operate in a cloud environment, thus affecting its financial budgets.

Many companies are enthusiastic about such a technology, and are seriously considering making use of the cloud services that cloud service providers such as Amazon, Google, Azure, or even OpenStack provide. Part of these companies’ services include the specifications that the clients need to be able to operate their cloud environment. These are needed to be able to offer the services to their respective employees. Other important aspects in such a service being offered, are the assurance and security to all employees, who will be able to work in a safe environment without any risks. However, there are those companies who are resisting this new technology, and are not even considering engaging such cloud services. Although there might be multiple reasons why such companies are resisting this technology, some of the reasons may be the lack of trust, concerns about the possibility of accessibility of the data and others risks – including the money that would be lost if something happens due to any possible downtime or any prolonged maintenance happening in the cloud technology.

*OpenStack*, is one of the cloud vendors that provide such services of infrastructure and software services, as well as tools to make the cloud environment more robust, secure. It also designs the environment pertaining to the requirements of the company or for the needs of the individual. OpenStack is an open-source Cloud service provider and therefore provides some of the services, tools, and instances for free. Therefore, OpenStack provides an opportunity to its clients that chose OpenStack’s services, to try out the tools, the services, and the software which the provider provides. This is an excellent and exciting opportunity for the client to try out the service before the company or the individual decide to invest and subscribe to any of OpenStack’s services and products.

Since there are multiple tools to create a secure cloud infrastructure and there are clients who have concerns about trusting the cloud infrastructure and its tools, such as *Keystone* and *Nova,* these are to be tested and checked, in order to verify whether the cloud infrastructure is secure and robust for multiple companies. Some assume that cloud infrastructure or the cloud environment, are vulnerable and this is a concern, as multiple companies expect a cloud environment to be reliable and safe. The motivation of this research is to provide new clients or individuals that are considering switching from the standard and physical environment to a new cloud environment with better insight into this technology, assuring them that it offers much more opportunities to meet their specifications, for instance. Another motivation for this research is that since cloud computing is becoming prominent and more attractive to various enterprises around the globe, within years, there could be a possibility that cloud computing is going to be dependable for individuals and for several companies around the world.

The objective of this research is to identify every tool or software utilized by cloud service providers, the same tools and software which provide security and assurance to their clients. By utilizing these tools and software in the cloud environment, such providers ensure a safe and a secure working cloud environment and an environment which does not pose the risk of one losing any type of data or where unauthorised users get unpermitted access to such data. Therefore, this study shall evaluate the various tools that OpenStack cloud provider offers, and will analyse how much security its tools utilized, provide to the client. Additionally, three Virtual Machines will be implemented and set to test the strength of the tools that OpenStack Cloud service provides, by launching attacks and monitoring the packet gathering process.