

Chapter 81

Current State Survey and Future Opportunities for Trust and Security in Green Cloud Computing

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ABSTRACT

In this paper, the authors present a state of art survey of cloud computing, highlighting its architectural principles, implementation as well as research directions in this increasingly important domain. They cover the different security issues that has emanated due to the nature of the service delivery models of a cloud computing system. Furthermore, in this survey the researchers highlight the concept of trust in digital environment as well as the use of containers like Docker, the block chain principle, artificial intelligence, last findings in the field of cryptography and other new concepts used in the domain of security and privacy related to cloud computing environments. They provide in the end an overview of the metrics which are mandatory in order to have a green flavor of cloud computing and the strategies that are currently used.

INTRODUCTION

Cloud computing is an emerging as a model which support the “everything-as-a-service” (XaaS) (Baran, 2008). Virtualized physical resources, virtualized infrastructure, as well as virtualized middleware platforms and business applications are being provided and consumed as services in the Cloud (Lenk, Klems, Nimis, Tai, & Sandholm, 2009). Cloud computing started its base in the mid of 2007 and is

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growing rapidly till date (Rizwana & Sasikumar, 2012). It has many features that make users want to switch to the cloud computing environment. The manufacturer provides relevant hardware, software and service according to the need that users put forward (Shuai, Shufen, Chen, & Huo, 2010). With the rapid development of the Internet, user's requirement is realized through the Internet. In fact, cloud computing is an extend of grid computing, distributed computing, and parallel computing. Its foreground is to provide secure, quick and convenient data storage (Shuai, Shufen, Chen, & Huo, 2010). Many forecasting agencies have said that cloud computing is large and it's only going to grow exponentially. IDC said that in the next year's spending on IT cloud services would increase a lot and would reach several billions of dollars. Another agency said that cloud computing would go to \$500 billion as an industry by 2020.

One of the quotes way spread across actually was "There is no reason anyone would want a computer in their home" from Ken Olson who in 1977 who was a president chairman and founder of Dec big business mainframe computer company that was later bought by Compact which was later bought by HP. Back then there was those big mainframe computers and everyone could access them. Over the years and the evolution of the desktop computer everyone had a computer in their home, every person who works in a company has a desktop computer on his desk. Fortunately, things have started to come back around with the growth of server based computing which is similar to mainframe in the concept that computing is happening actually in the datacenter and you really just viewing the screen. Back in the mainframe it was just text that we would see in the screen but today of course there are those nice GUI environments. Some people called this server based computing "the cloud". Marketers throw the term cloud around left and right and that's what created so much confusion. So back to the quote, actually today everyone can use a thin client device and can access the computers that's running in the cloud. But then the question is what exactly is cloud computing?

According to VMware, "Cloud computing is an approach to computing that leverages the efficient pooling of on-demand, self-managed, virtual infrastructure". In other words, IT doesn't have to be as involved. IT provides the virtual infrastructure and the resources that virtual infrastructure can expand or it can contract when it's not needed and this provides us and the company many benefits. So, cloud computing abstracts the business services from the underlying complex IT infrastructure. The think is that the infrastructure today, the servers, storage, network, all those pieces of complex IT infrastructure that IT people struggle to put together to make useful for the business are becoming easy to manage with virtualization which is able to pull all that together and then this pool of resources can be consumed on demand just like utility which gives the business what they need when they need it. As said before cloud computing allows to save both time as well as money. Eli Lilly, which is one of the largest customers of AWS, reputedly, for instance has been benefiting from the ability to bring up new servers fairly quickly. Earlier they reported that it used to take seven and a half weeks for them to deploy a new server. This would involve them setting the specs for the server, then actually purchasing it, and then going through the purchasing process, the server comes in and they set it up and install the necessary operating system and software, and all of this takes took several weeks. Now they can rig up a new server in around 3 minutes, and a 64-node Linux cluster in 5 minutes while it was taking months earlier. This of course saves them time; it also saves them money, because they can save the costs that they might have otherwise had to pay the sysadmins (Gupta, 2016).

Another issue which is important also that also should be analyzed is the importance of green cloud computing. So as known the main room in a datacenter is of course the server's room. It doesn't look very different from the front or from the back; they're just regular machines. But where does the power

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