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The RENU Cloud - a Collaborative Solution for Storage and Computational Resource Constraints for the Research and Education Community in Uganda

There is an ever-growing need for data storage and computational resources in every education and research institution. This need has traditionally been addressed by the institution procuring servers and installing hardware in some form of primary data center facility at the institution. This remains the most preferred option for many institutions. This solution however, has to always be complemented with an offsite disaster recovery facility, where all data hosted locally at the institution is replicated at another site. The disaster recovery site should preferably be at a location different from the primary site's location. To achieve this at the very least, there has to be a very reliable and high bandwidth connection between the two sites, and the institution always has to procure at least two sets of hardware - rendering the solution expensive. This is even before considering other challenges like; scalability, unreliable power supply to the institution's facilities, high cost of setting up and maintaining storage facilities. There are also institutions that opt for commercial cloud service providers, which solution too has limitations such as cost and network latencies. In some setups, reliance is only on one existing site hence disaster risks that can lead to massive data and infrastructure losses.

In this paper, we present a cloud computing solution at the NREN level. We explain in detail how Infrastructure as a Service (IaaS) has been provided to RENU member institutions to help address their constraints around storage and computational resources. We also bring out how the cloud has aided the growth of RENU as an NREN, in terms of traffic on the network and financial diversification. We further present a use case of collaboration among three RENU member institutions through the RENU cloud. We conclude by emphasizing that cloud computing at the NREN level is a very fundamental solution to researchers and academics, and to the NREN in the avenues of; strengthening collaboration among NREN member institutions, building the bond between end users and the NREN, growing traffic local to the NREN network, and propelling the NREN towards financial self-sustainability.

Keywords/phrases: cloud computing, data center, disaster recovery, collaboration, Infrastructure as a Service (IaaS).

Summary

Sub-Theme

SMART Universities: Concepts, Characteristics and Technologies

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