UNIVERSITY OF BAHRAIN
College of Information Technology

Improving the Security of Storage Systems Using Cloud Computing

A Thesis Submitted in Partial Fulfillment of the Requirements for the Master Degree in IT

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Abstract

Cyber security is an evolving critical and important topic that has affected IT systems, organizations and technology trends. The importance of information that resides on storage systems exceeds all other IT systems in an organization. This importance makes a breach in the confidentiality, integrity or availability of storage systems unacceptable.

In this thesis, storage systems and cyber security are introduced. An assessment plan for evaluating cyber security of local storage systems in organizations is proposed. This assessment plan is based on research and literature available in the fields of risk and security assessments, cyber security and storage technologies. The assessment proposed has been implemented on two prestigious and important organizations in the Kingdom of Bahrain. These organizations and the outcomes of the cyber security risk assessment of their storage systems are believed to reflect the cyber security status of local storage systems in majority of organizations. Storage systems of the assessed organizations found to have cyber security risks of different scales. This conclusion gives certainty to the fact that organizations are not capable of following the cyber security evolution and secure their storage systems from cyber security vulnerabilities and breaches. Utilizing cloud computing for storage systems is introduced in the thesis. The benefits of migrating storage services to the cloud are discussed. Cyber security effects of such a transition for storage systems are presented in the thesis thoroughly. This thorough study includes the effects of this transition to the available cyber security issues. In addition, breaches that are introduced because of the transition due to the nature of cloud computing services are also presented.

In this thesis, a migration of storage services to cloud is found to solve most of the existing cyber security issues in local storage systems. This is found to be a result of different features of cloud providers such as staff dedication and specialization. On the other hand, a number of cyber security breaches enablers found to be a direct result of a migration such as public networks exposure and multitenant shared infrastructure.