“SECURITY AND PRIVACY ENHANCING MULTICLOUD ARCHITECTURES”

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Introduction: Many enterprises and other organizations need to store and compute on a large amount of data. Cloud computing aims at renting such resources on demand. Today’s cloud providers offer both, highly available storage and massively parallel computing resources at low costs, as they can share resources among multiple clients. On the other hand, sharing resources posses the risk of information leakage. Currently, there is no guarantee that security objectives stated in Service Level Agreements (SLA) are indeed fulfilled. Consequently, when using the cloud, the client is forced to blindly trust the provider's mechanisms and configuration. However, this is accompanied by the risk of data leakage and industrial espionage due to a malicious insider at the provider or due to other customers with whom they share physical resources in the cloud. Due to regulatory reasons, contractual obligations, or protection of intellectual property, cloud clients require confidentiality of their outsourced data, that computations on their data were processed correctly (verifiability), and that no tampering happened (integrity). The project tries to mitigate security risks by implementing four multicloud architectures, each of them providing different security benefits.

Objectives: Security challenges are still among the biggest obstacle when considering the adoption of cloud services. Project implements four multicolor architectures, each of them provide different security benefits.
Methodology:

Owner uploads data and logic files to cloud server and each data and logic file stored in the cloud server is assigned a separate key. To protect data and logic files stored in cloud server against malicious insiders, attackers and to avoid information leakage, project implements four multicolor architectures, which are used by the owner in uploading the files to cloud server.

The four implemented multicolor architectures are:

1. Replication of applications
2. Partition of application system into tiers
3. Partition of application logic into fragments
4. Partition of application data into fragments

User gets the data and logic key files and downloads secure data and logic files using four multicloud architectures mentioned above.

Fig(1) Replication of application      Fig(2) Partition of application system into tiers
Fig(3) Partition of application logic into fragments      Fig(4) Partition of application data into fragments
Result and Conclusion:

The use of multiple cloud providers for gaining security and privacy benefits is nontrivial. As the approaches investigated in this project clearly show, there is no single optimal approach to foster both security and legal compliance in an omniapplicable manner. The four multicloud architectures discussed provides different security benefits such as evidence on integrity of result, protecting data against data leakages, maintaining the confidentiality and so on. Hence at least one architecture model is available to solve each of the security problems.

Scope for future work:

The future research lies in combining the approaches presented in this project. We encourage the research community to explore these combinations, and assess their capabilities in terms of the given evaluation dimensions. Given their excellent properties in terms of security and compliance in Multicloud architectures, these fields can be envisioned to become the major building blocks for future generations of the multicloud computing paradigm.