SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Cloud Dependability and Data Privacy

Outsourcing Data Without Outsourcing Control

Computer Systems Research Group

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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Objectives

Cloud Security and Dependability Solutions

- Prevention of Malicious Actions: insider and outsider attacks against Clouds
- Cloud Vendor Lock-In Practices
- Reliability and Availability with Privacy Concerns
- User Control & Auditing
- Optimization of Trade-offs: Security vs. Dependability vs. Performance

New Foundations and Mechanisms:

- Trusted Computer Base Minimization Under the User Control
- Cloud-Vendor Independence: "Cloud-of-Clouds" Architecture
- Encrypted Operations on Encrypted Cloud Data Repositories
- Intrusion Tolerance
- Efficient Solution: Latency Aware

Methodology

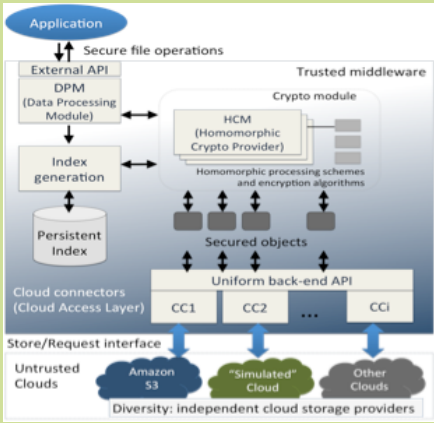
A Middleware Approach to Security and Dependability Services:

- **Homomorphic Encryption Schemes**: implementation and assessment
- **A "Cloud-of-Clouds" Software Architecture**
- **Ranked and Proximity Searching of Encrypted Heterogeneous Data** (Secure Media Searching over Cloud Private Encrypted Data)
- **Flexibility of Deployment (TCB/TPM in local devices vs. Trusted Computational Cloud offering "Dependability as a Service")** (meeting different trade-offs: security vs. latency vs. reliability vs. availability)
- **Dynamic Profiling:** user resources matching cloud operation metrics and costs

Expected Results

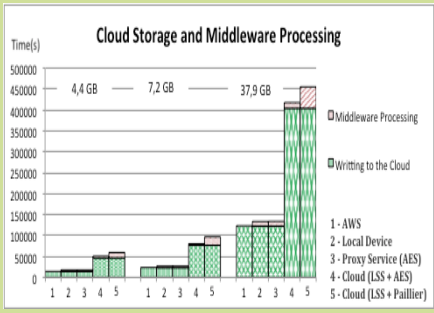
- **Enhanced Privacy with small overhead**
- **Lightweight Encrypted Queries over Encrypted Cloud Data Domains**
- **Appropriate Response Times for Real-Time use** (overhead < 1 sec)
- **Optimization of Cloud Operational Metrics and Costs**
- **Scalability for Real Scenarios of Cloud-Based Solutions**
- **Experimental Assessment with Real Clouds**

Architectural Model (Ref)

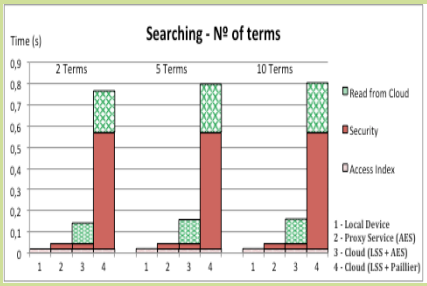


TSKY / CloudCryptoSearch Prototype Implementation

Some Achieved Results



Cloud Storage vs Middleware Processing



Ranked Encrypted Searching

Funding:

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA

PEst-OE/EEI/UI0527/2011

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