Tolla: A User-Isolating Data Management System

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MOTIVATION

Exploitation of personal and sensitive data stored in the cloud by 3rd party apps is on the rise. Common implementations give one-stop access to the data.

However, such solutions do not provide the owners with the ability to manage and enforce granular privacy controls dynamically.

IMPLEMENTATION

- Personal data is stored in a per-user **location-agnostic** container guarded by granular privacy policy
- **2-level protection** for data access (**Certificate** + **Privacy policy**)
- The **Ciphertext-Policy Attribute-Based Encryption** (CP-ABE) scheme enforces current privacy policy

EVALUATION

- A series of benchmarks identify the additional latency incurred.
- Feasibility evaluation at different computing platforms for life-logging applications.

TOLLA ARCHITECTURE

PE: Policy Engine **CA: Certificate Authority**
DPU: Data Processing Unit **DSU: Data Storage Unit**

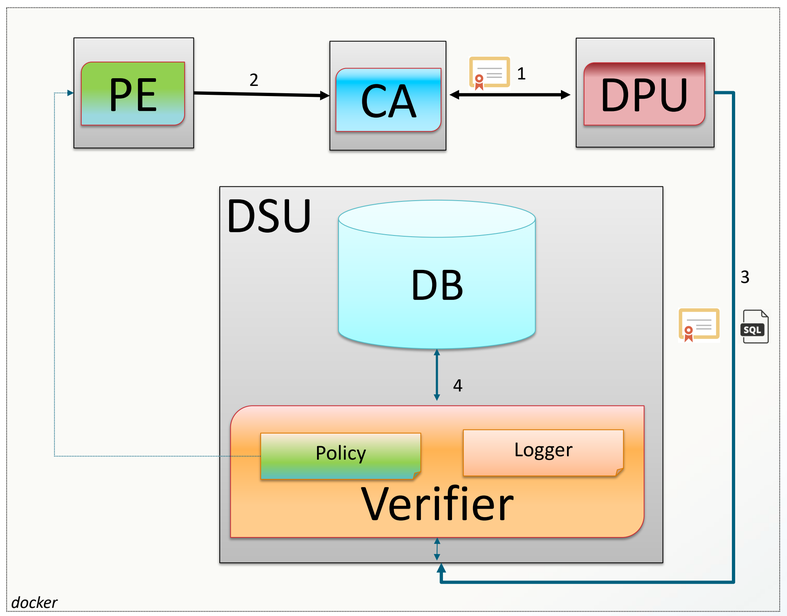


Figure 1: Tolla runs inside docker, the components and their interactions with each other.

TOLLA DATA FLOW

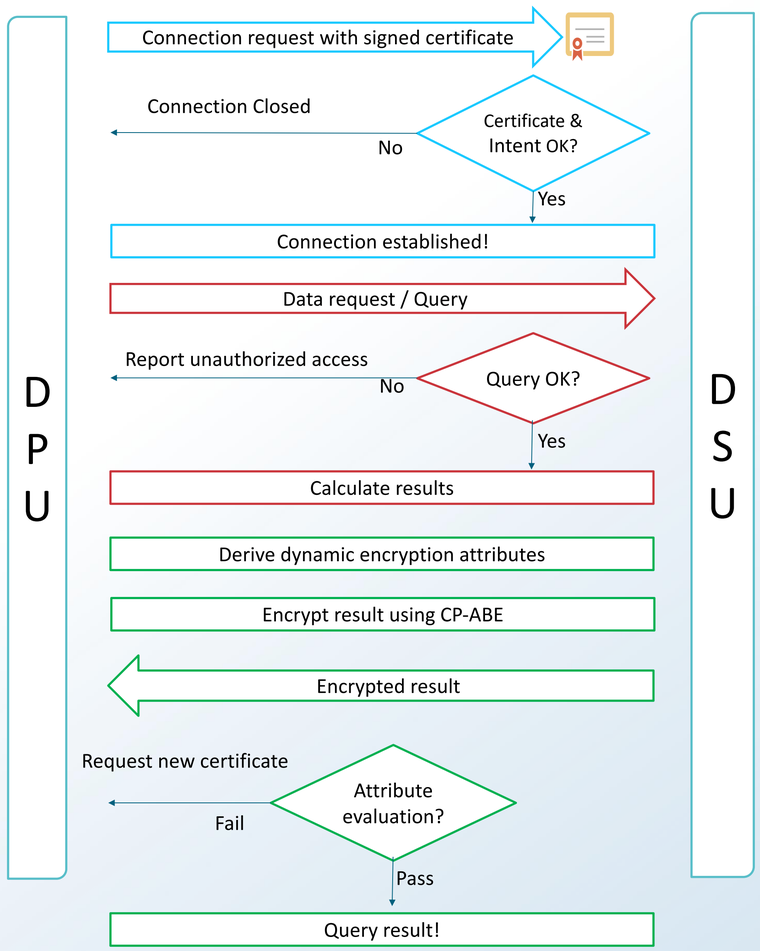
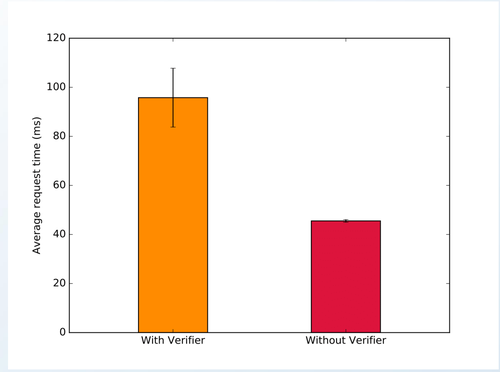


Figure 2: Data flow in Tolla

SINGLE READ LATENCY



MULTIPLE READ LATENCY

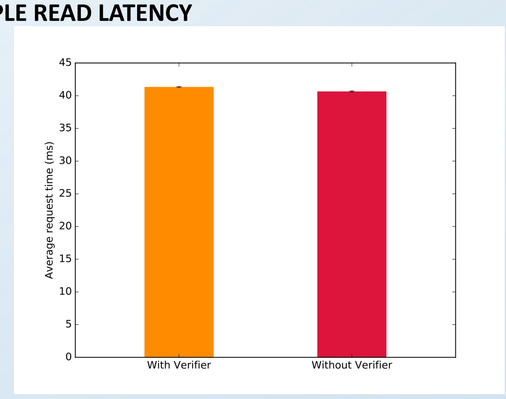


Figure 3: Latency comparison for single read (110 Bytes) and multiple (1.2 MB) continuous read operations.

MORE INFORMATION