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Trustworthy Data From Untrusted Servers

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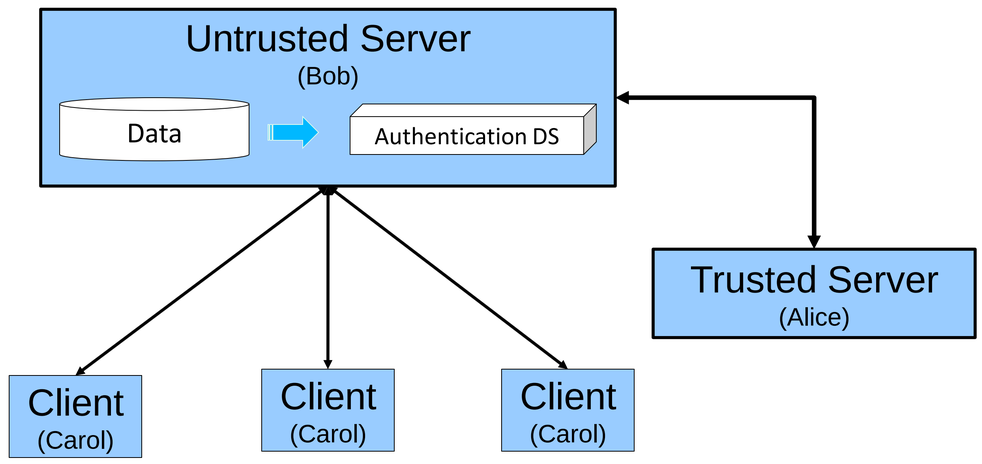
Motivation

- Data is often stored at untrusted servers
  - Data in the cloud
  - Insecure server
- Can we establish the trustworthiness of data from these servers? I.e. :
  - Authenticity of retrievals
  - Integrity of data (updates)
  - Provenance of data
  - Indemnity for the server (cloud)

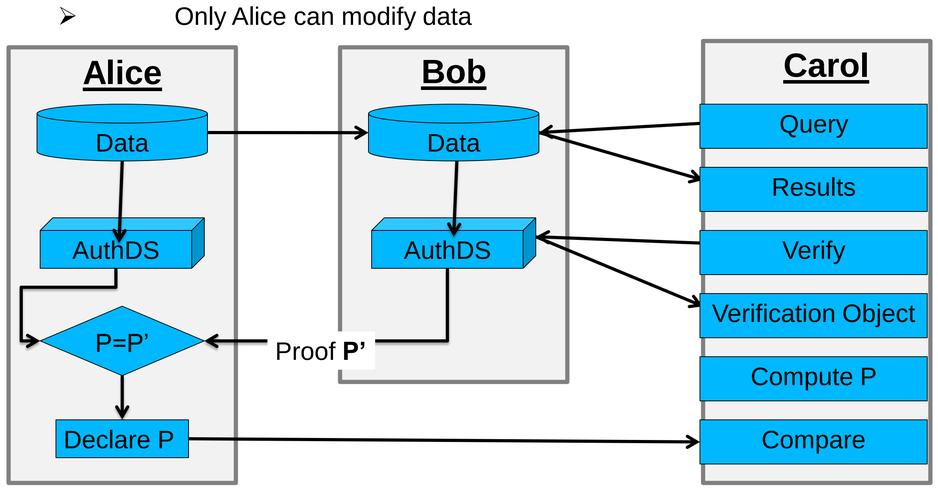
Model



Protocol for Static Data

Data is static

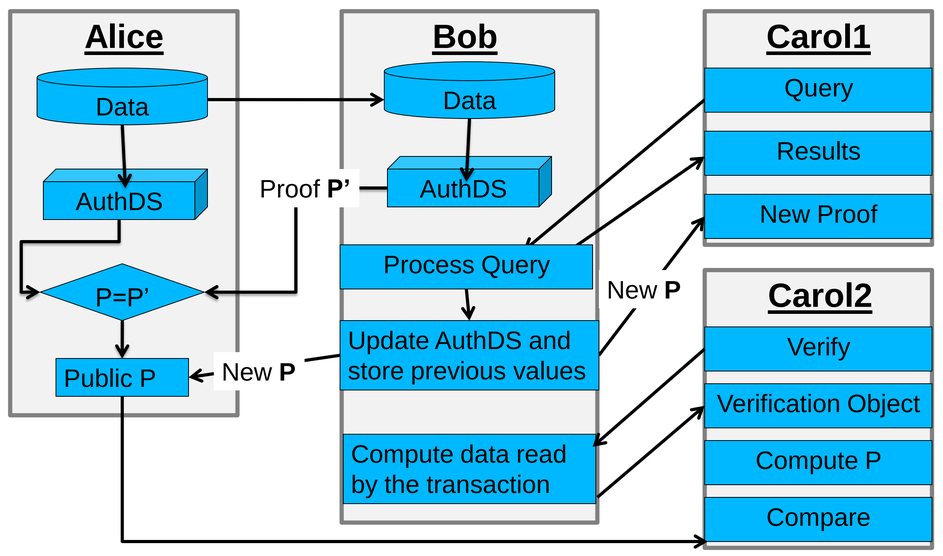
- Only Alice can modify data



Challenge : Dynamic Data

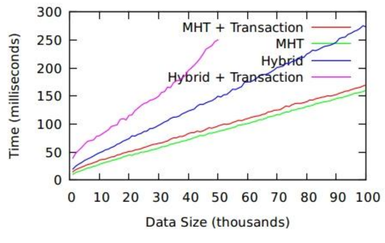
Clients can modify data. No centralized vetting of updates

- A trusted server is used to keep track of *proofs*



Experiments

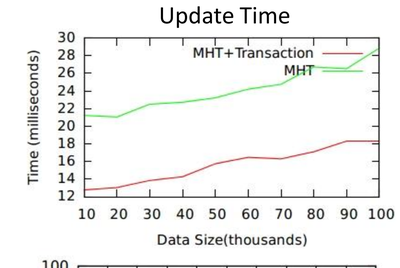
Easy to implement on top of an existing DBMS (e.g. PostgreSQL)

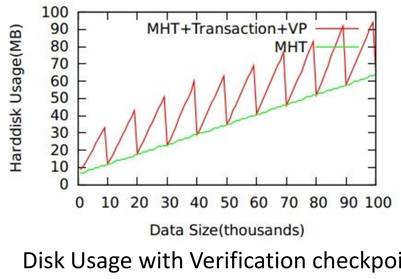


Insert Time

MHT: Merkle Hash Tree
Hybrid: Signature Chaining with MHT
"+ Transaction" : With updates

Update Time





Disk Usage with Verification checkpoint

Conclusion

- Protocols provide authenticity, integrity and indemnity for relational databases
- Significantly reduces level of trust required
- Verification is decoupled from transaction execution
- Easy to implement
- Reasonable overhead

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