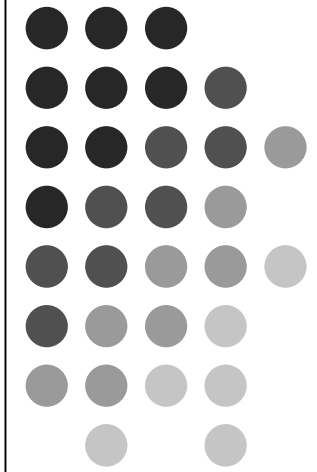
Future of Internet Applications
A Security Perspective



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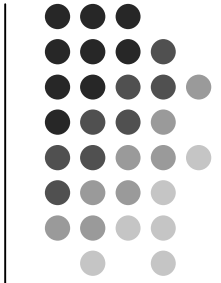
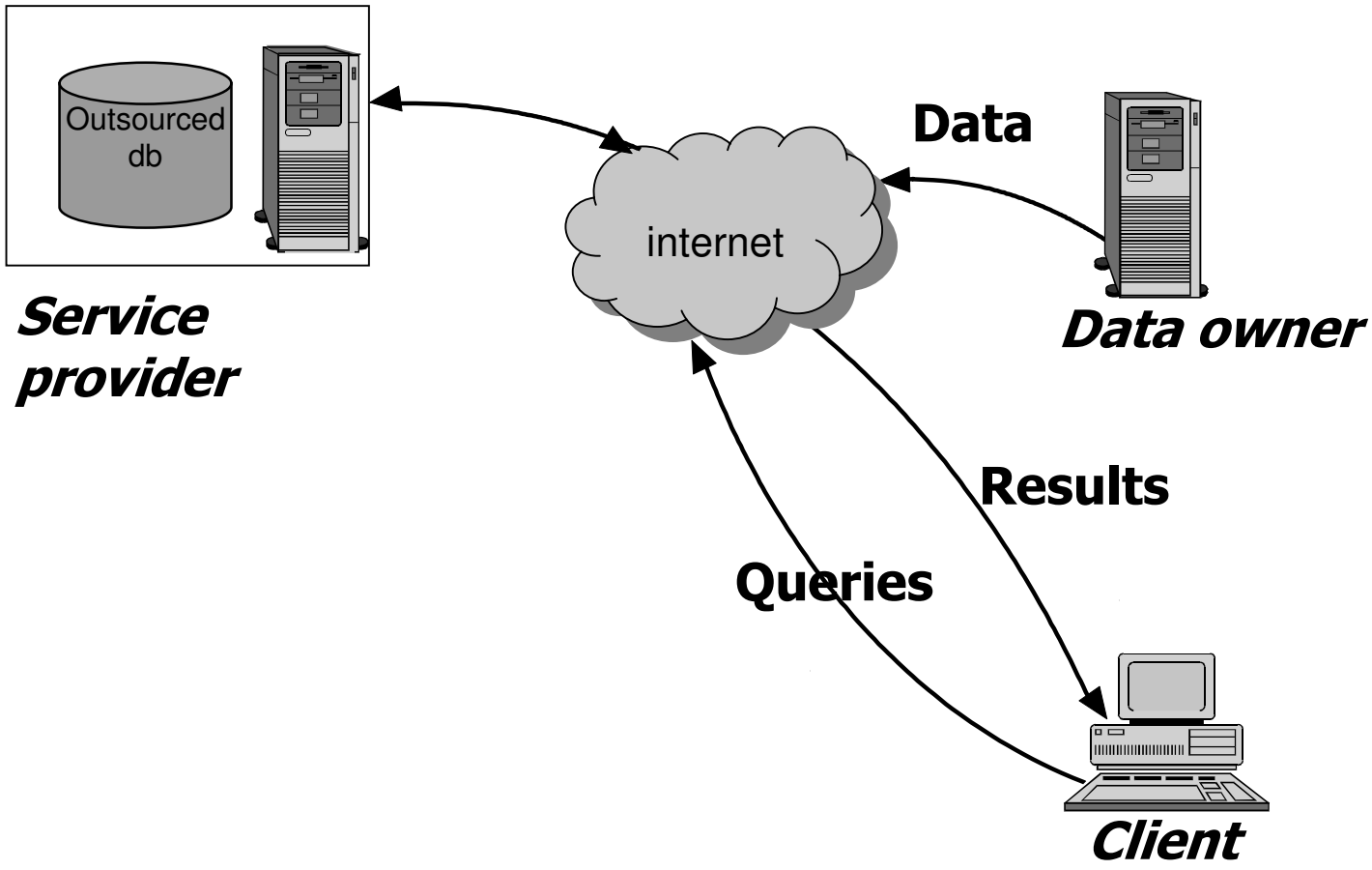
Emerging trend: data outsourcing

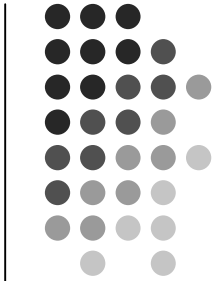


- Database as a service, why?
  - Most organizations need efficient data management
  - DBMSs are extremely complex to deploy, setup, maintain
  - require skilled DBAs (at very high cost!)

Database as a service

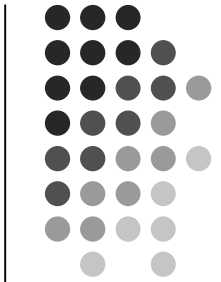


Database as a service



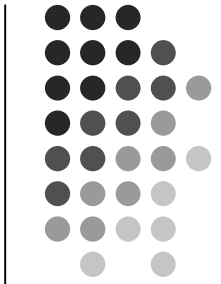
- Driven by faster, cheaper, and more accessible networks
- reduced cost to client:
  - pay for what you use and not for: hardware,software infrastructure or personnel to deploy, maintain, upgrade…
- reduced overall cost:
  - cost amortization across users
- better service
- scalability

Research Issues



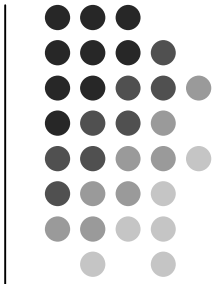
- **Economic/business model:**
  - How to charge for service, what kind of service guarantees can be offered, costing of guarantees, liability of service provider
- **Scalability in the web environment:**
  - Overhead costs due to network latency (data proxies?)
- **Security:**
  - Main requirements: confidentiality (privacy), integrity, authenticity, ownership protection

Security Properties



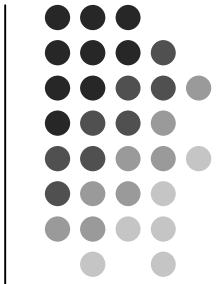
- To be satisfied even in the presence of an unstrusted service provider that:
  - Can modify/delete the data
  - Can access sensitive information
  - Can send the data to non authorized subjects
  - Can send a subject not all the information he/she is authorized to access
- To be satisfied by incurring minimal computation and bandwidth overhead

Possible solutions



- **Encrypted databases:**
  - Encryption driven by the specified ac policies
  - Techniques for querying encrypted data
  - Key management
  - Data/policies updates
- **Non conventional digital signature techniques:**
  - Merkle Hash Trees, RSA extensions

Some references



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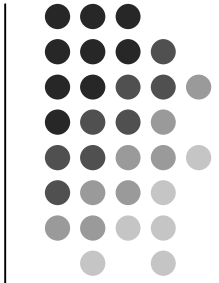

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