Sistemas Distribuídos

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Distributed system

- Collection of autonomous computing elements
- Single coherent system

Design goals

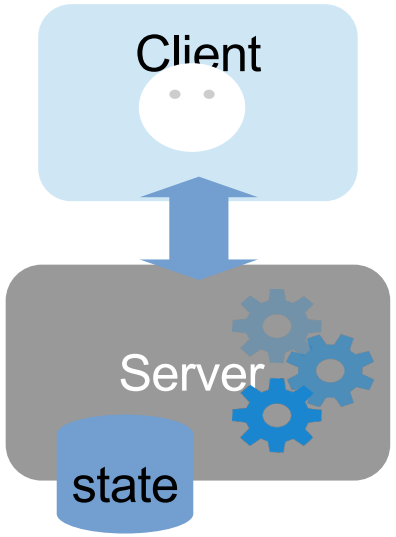
- Share resources: state, function, hardware, ...
- Achieve scale:
  - Numerical (size)
  - Geographical (distance)
  - Administrative
- Provide openness: interoperability between multiple vendors
- Transparency: do not show distribution boundaries

System architectures

- How are distributed components organized
- Centralized architectures:
  - Asymmetric / special roles
  - Planned organization
- Decentralized architectures:
  - Symmetric / equal peers
  - Self-organizing

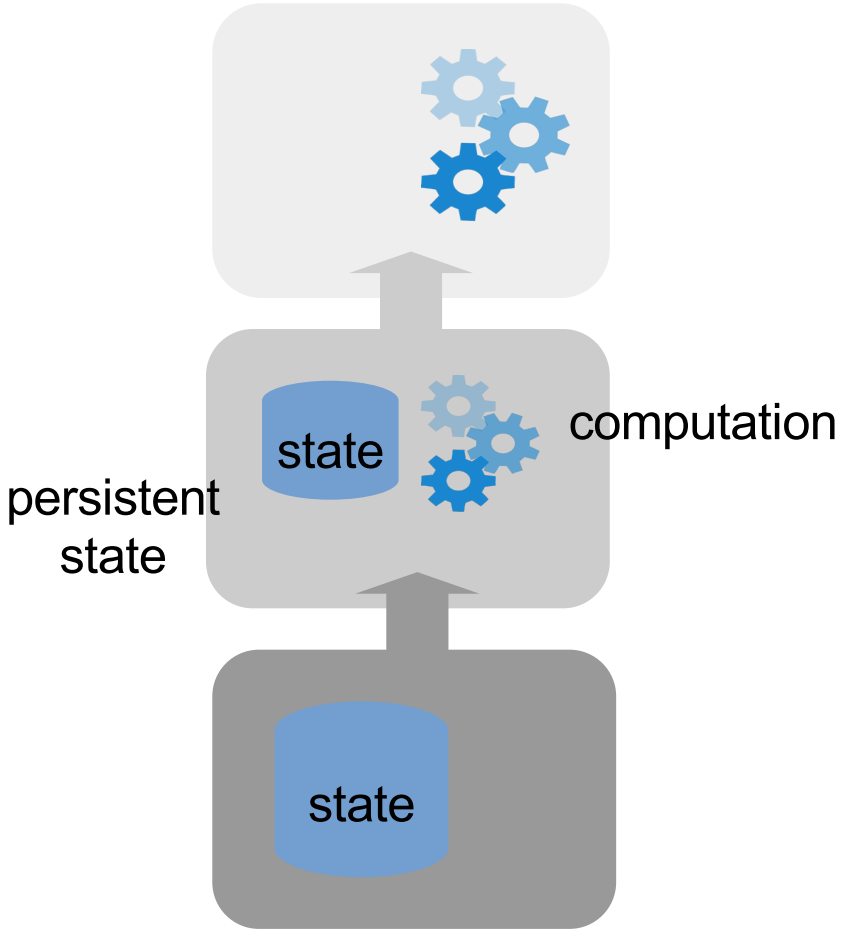
Client-Server

- Server encapsulates resources and function
- Server is a well known centralized entity
- Anonymous clients initiate synchronous interactions
- Example: Network File System



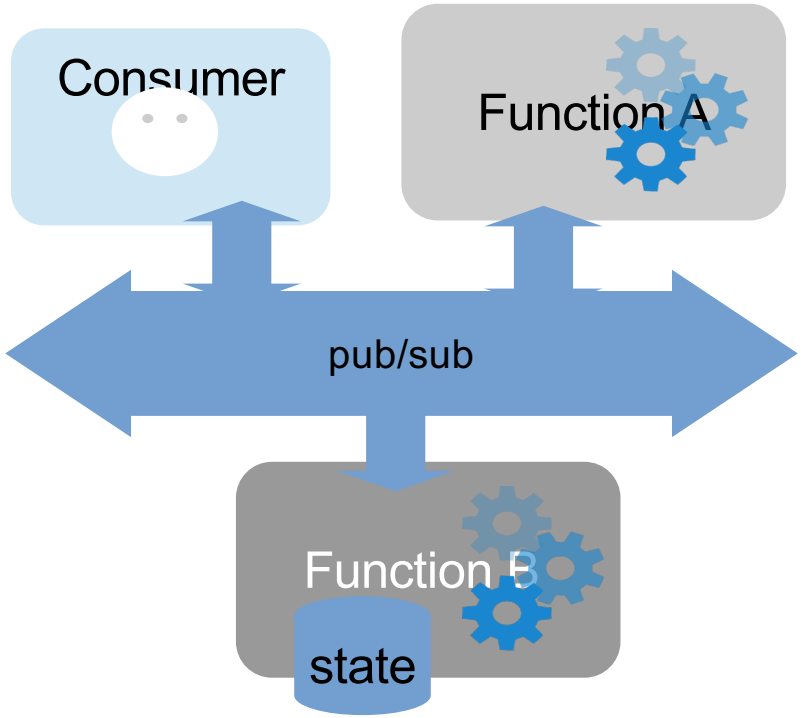
Layered

- Extends client-server
- Standard interfaces and interchangeable layers
- Separation of concerns:
  - Computation
  - Persistence
- Example: 3-tier Web application architectures



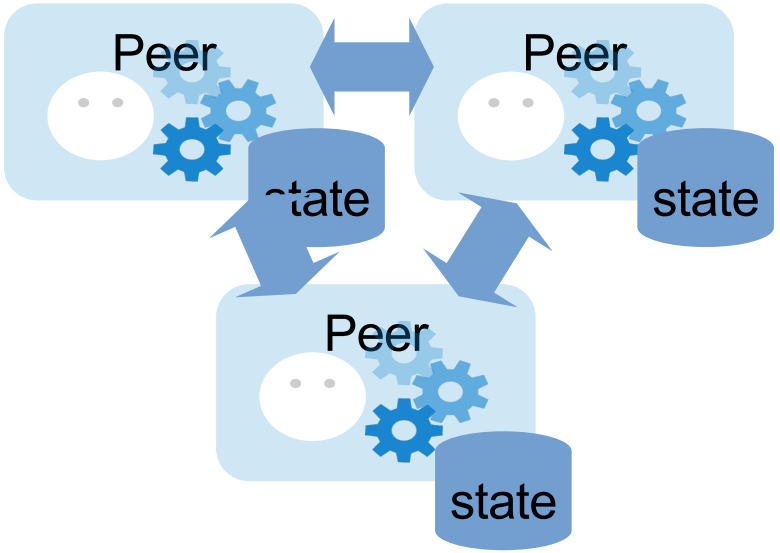
Event-based

- Referential decoupling with publish-subscribe
- Temporal decoupling with with store&forward
- Example: Enterprise Application Integration



Peer-to-peer

- Equal peers
- Decentralized and self-organizing
  - Overlay network
- Example: BitTorrent



Summary

- Definition and main goals of distributed systems
- Client-server as the main architecture and protocols as the key concept