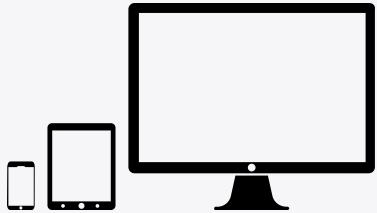


System Design Fundamentals

Data Server Architecture

Client Application



Network Layer



Application Layer



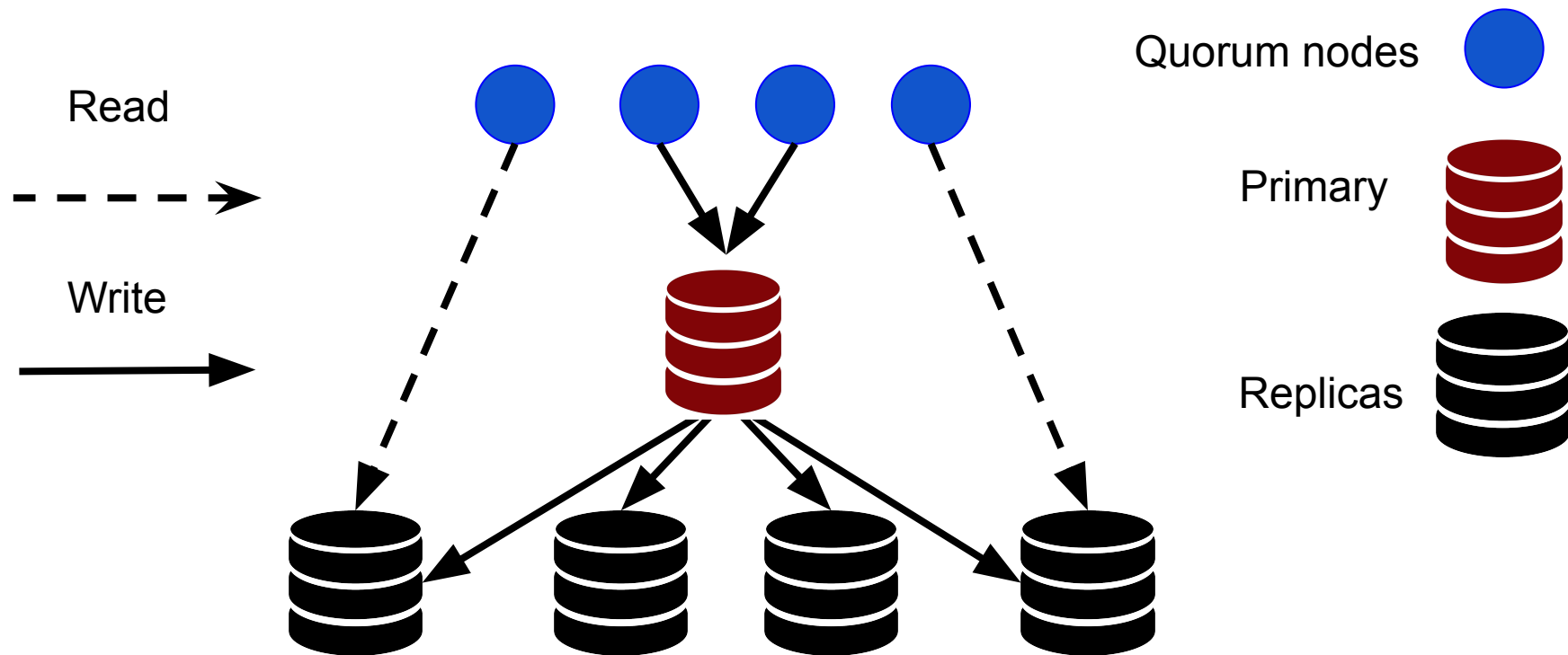
Cache Layer



Database Layer

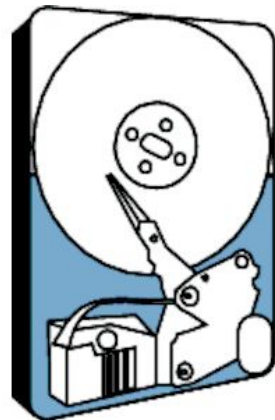


Primary-Replica Architecture



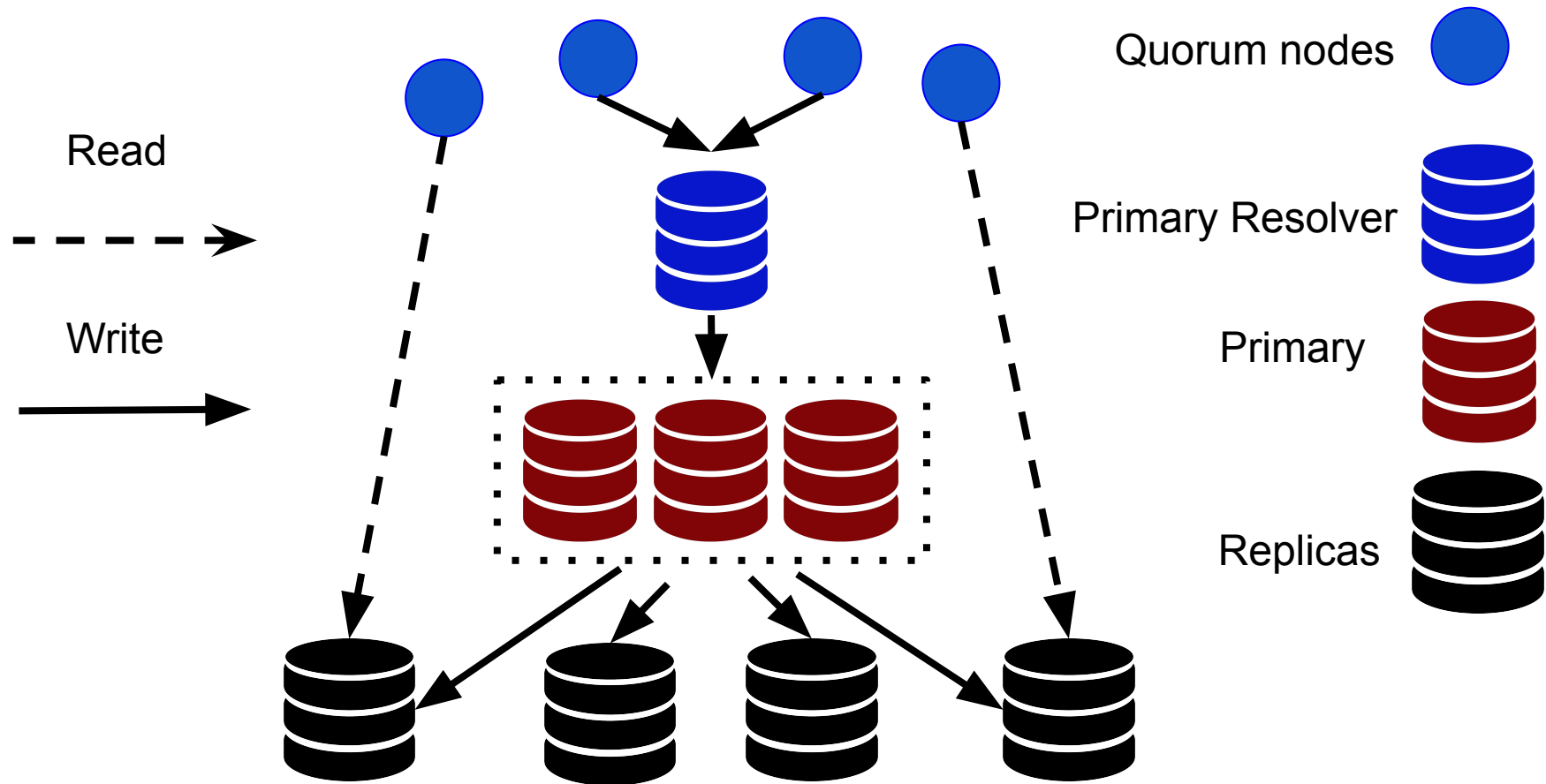
Primary-Replica Architecture

- CPU overhead reduction ✓
- Disc access reduction ✓
- Consistency ✓
- Central Storage for archiving ✓
- Availability (Single point of failure!) ✗
- Primary bottleneck ✗
- Primary failure = data loss ✗

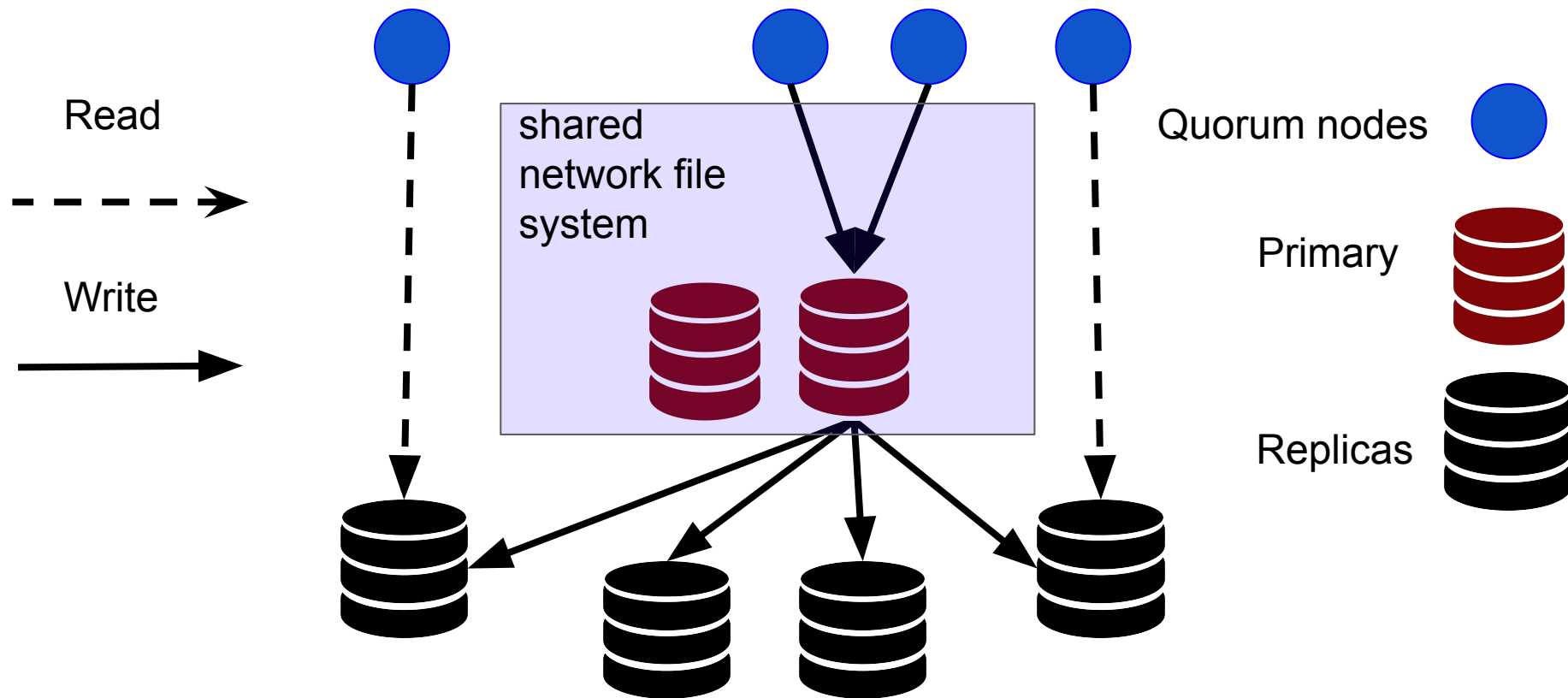


Hard disk

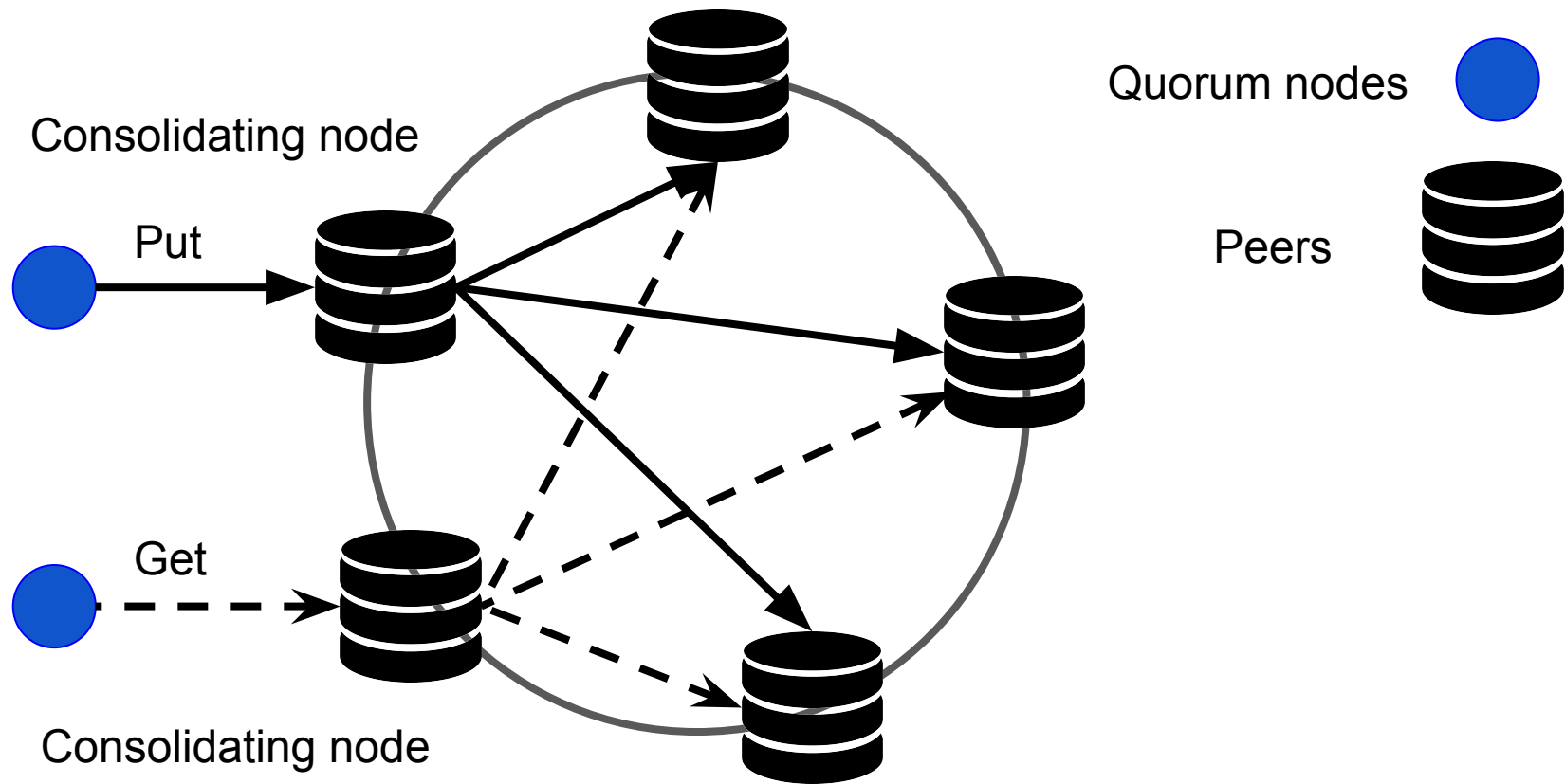
Multiple Primary Architecture



Standby Primary Architecture







Peer-2-Peer Architecture



Peer-2-Peer Architecture

- **P** = Replication factor
- **W** = Write consistency number
- **R** = Read consistency number
- **$W + R \geq P$**

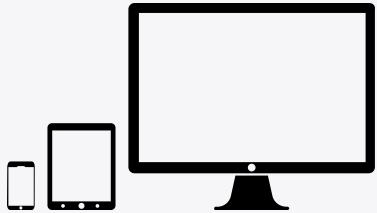
Peer-2-Peer Architecture

- Availability (No single point of failure!) 
- Eventual consistency 
- Security 
- No central storage for archiving 

System Design Fundamentals

Data Server Architecture

Client Application



Network Layer



Application Layer



Cache Layer



Database Layer

