Midterm Project – Chord Practices for Distributed Systems and Cloud Application Development

Goal

- Build a distributed file system based on Chord DHT
    - The system should automatically scale based on storage usage
    - The system should evenly distribute the load across all nodes
    - The system should be able to recover from failures (i.e. be fault-tolerant)

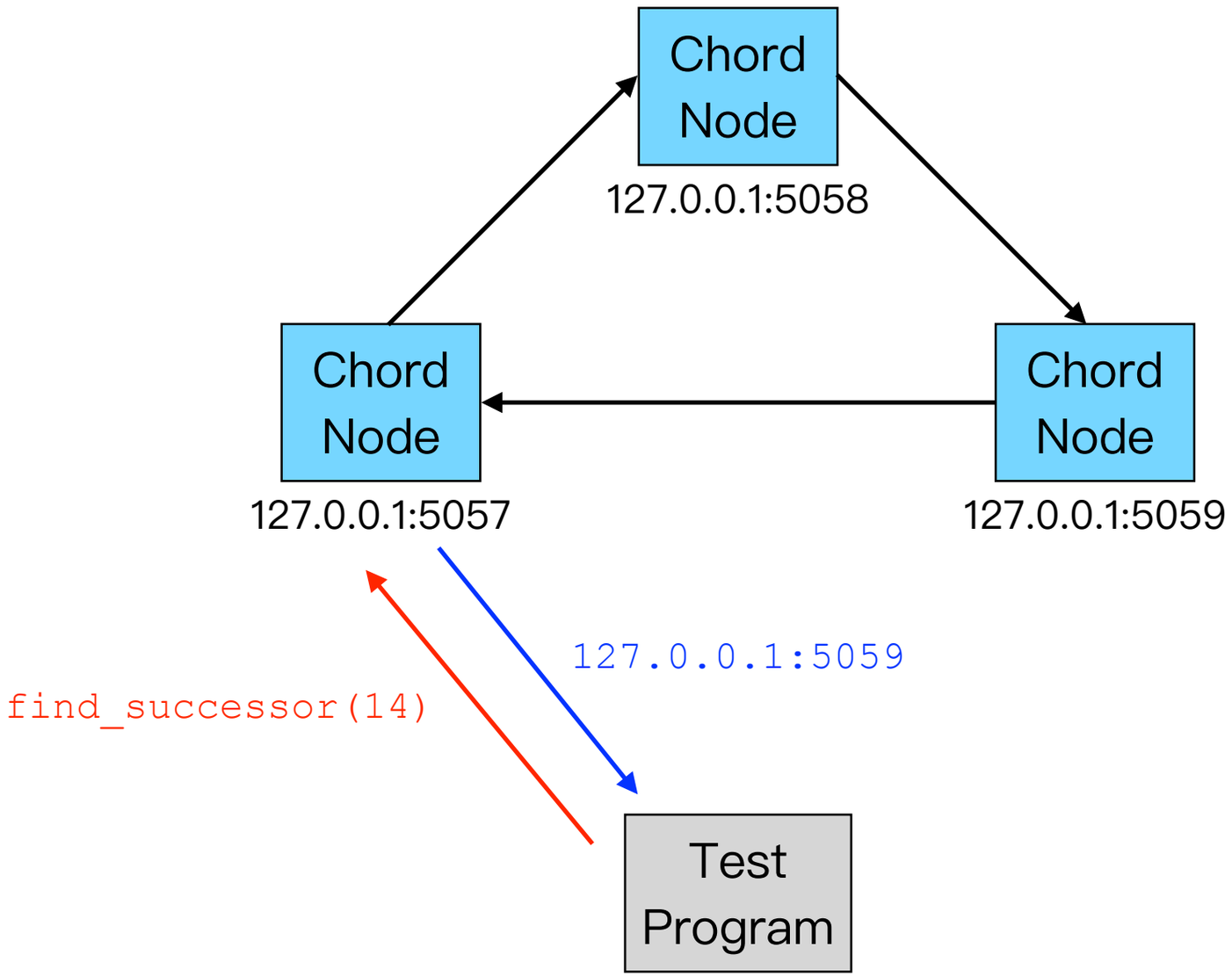
Schedule

Week 4 (3/16)	Part 1 Announced
Week 5 (3/23)	
Week 6 (3/30)	Part 1 Due, Part 2 Announced
Week 7 (4/6)	Part 3 Announced (TBD)
Week 8 (4/13)	
Week 9 (4/20)	Midterm Exam
Week 10 (4/27)	Part 2 & Part 3 Due (4/30) (TBD)
Week 11 (5/4)	Demo (5/1 – 5/3)

Part 1: DHT Layer Implementation

- Implement Chord node
- Test your implementation locally

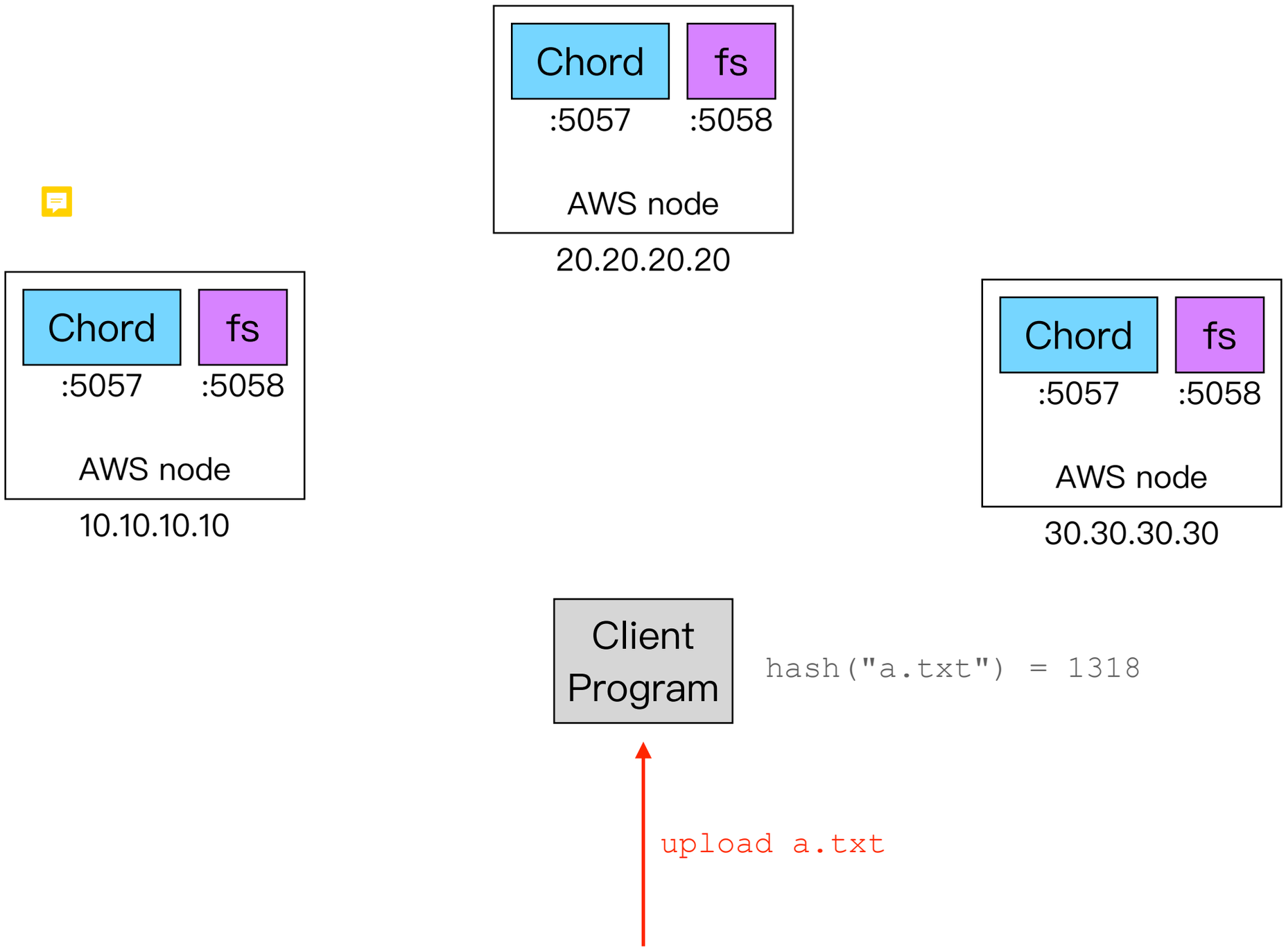
Part 1: DHT Layer Implementation



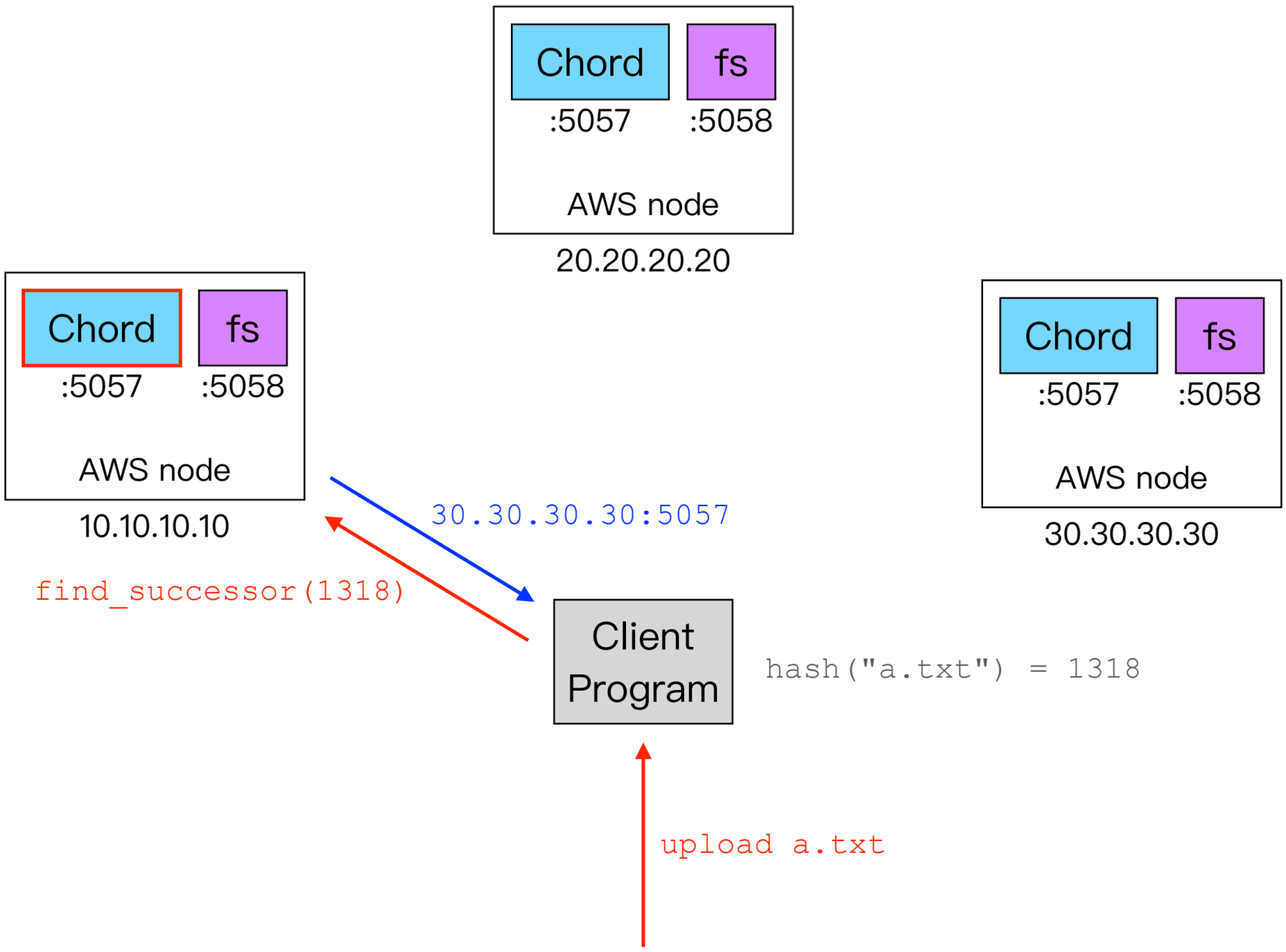
Part 2: Automatic scaling on AWS Cloud

- Deploy Chord system and file system on AWS cloud nodes
- Upload or download files to/from an AWS cloud node
- Automatically scale the system based on the amount of storage used
- Binary will be provided for those who have not completed part 1

Part 2: Automatic scaling on AWS Cloud



Part 2: Automatic scaling on AWS Cloud



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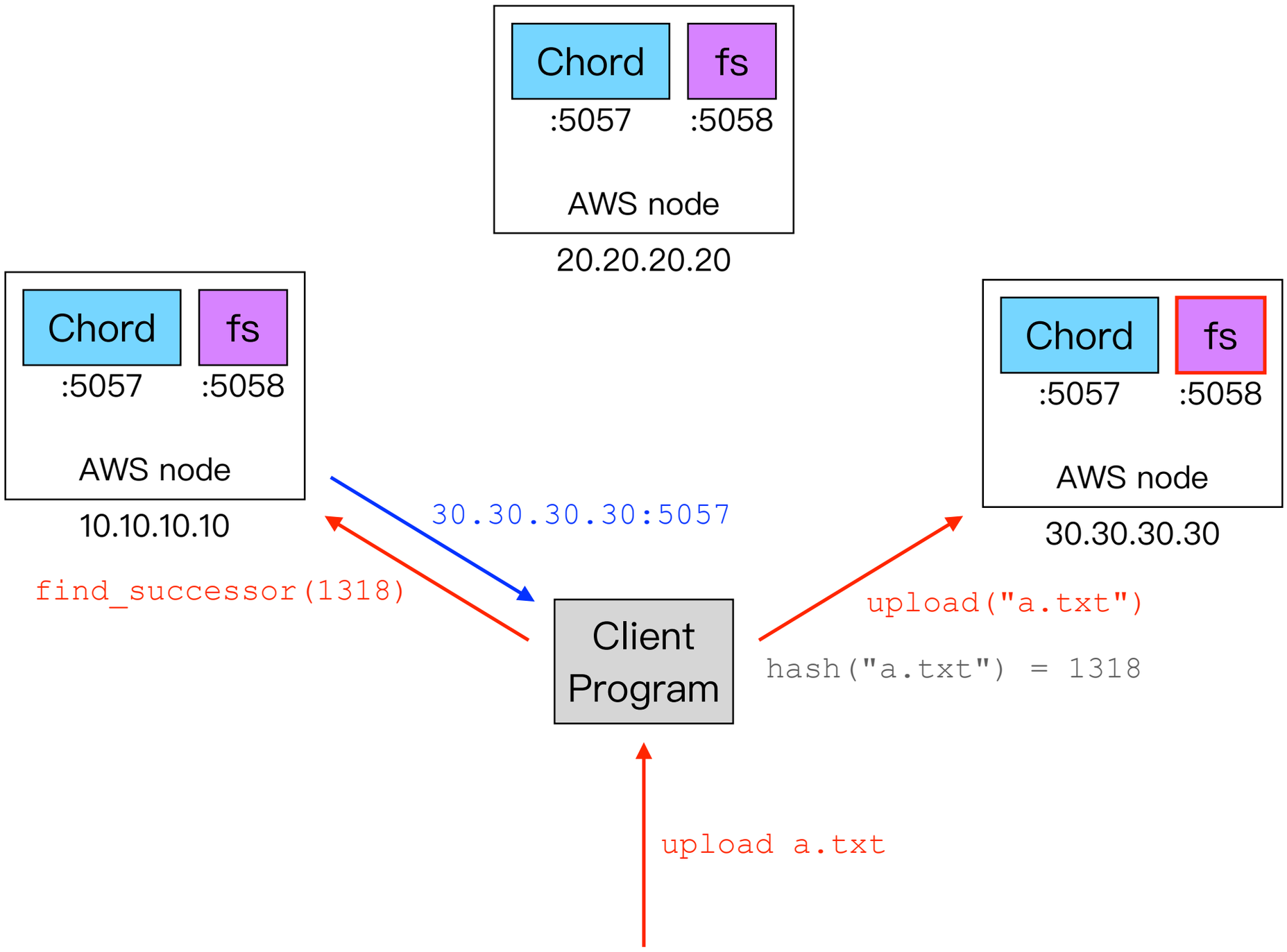

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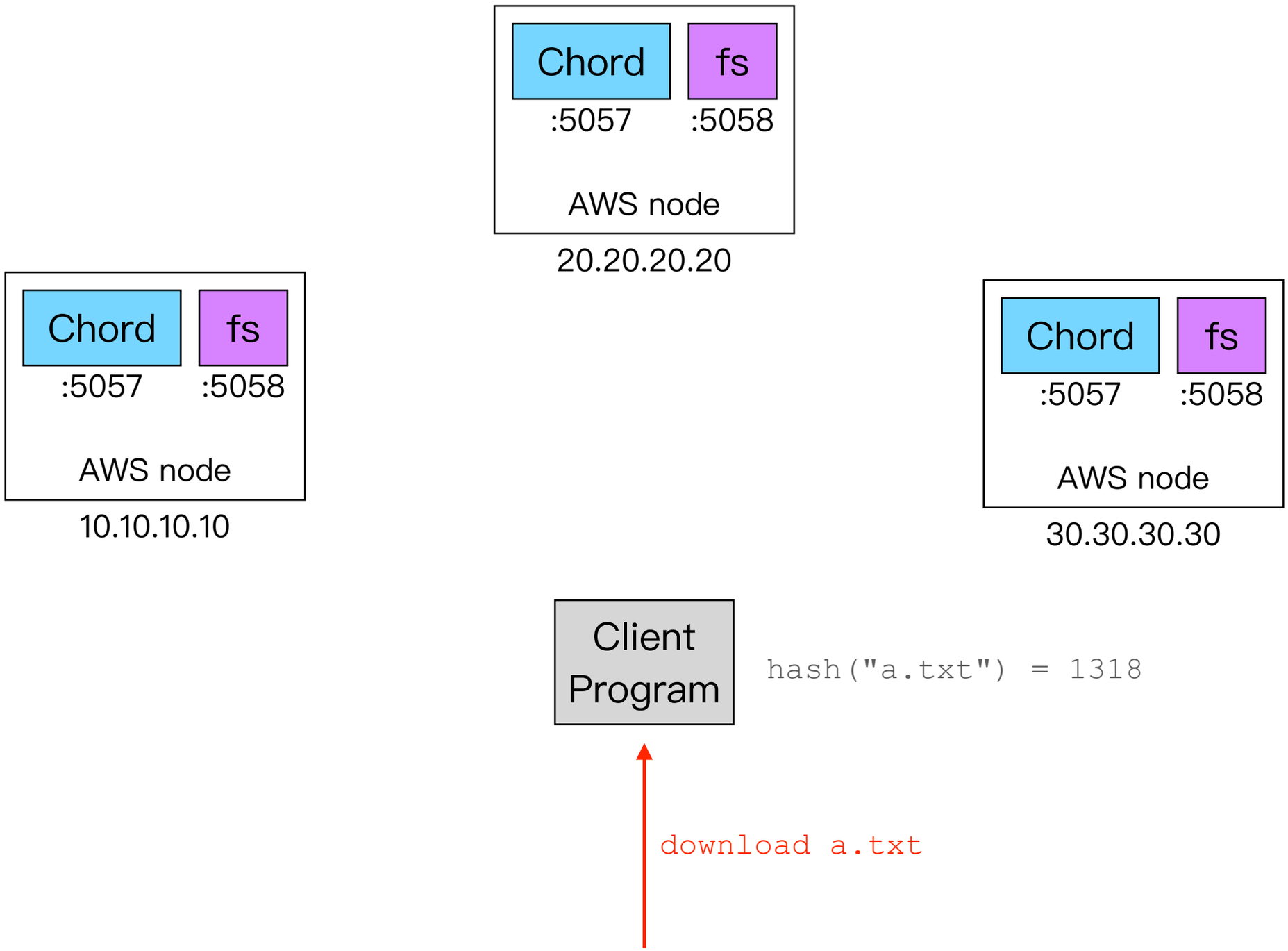

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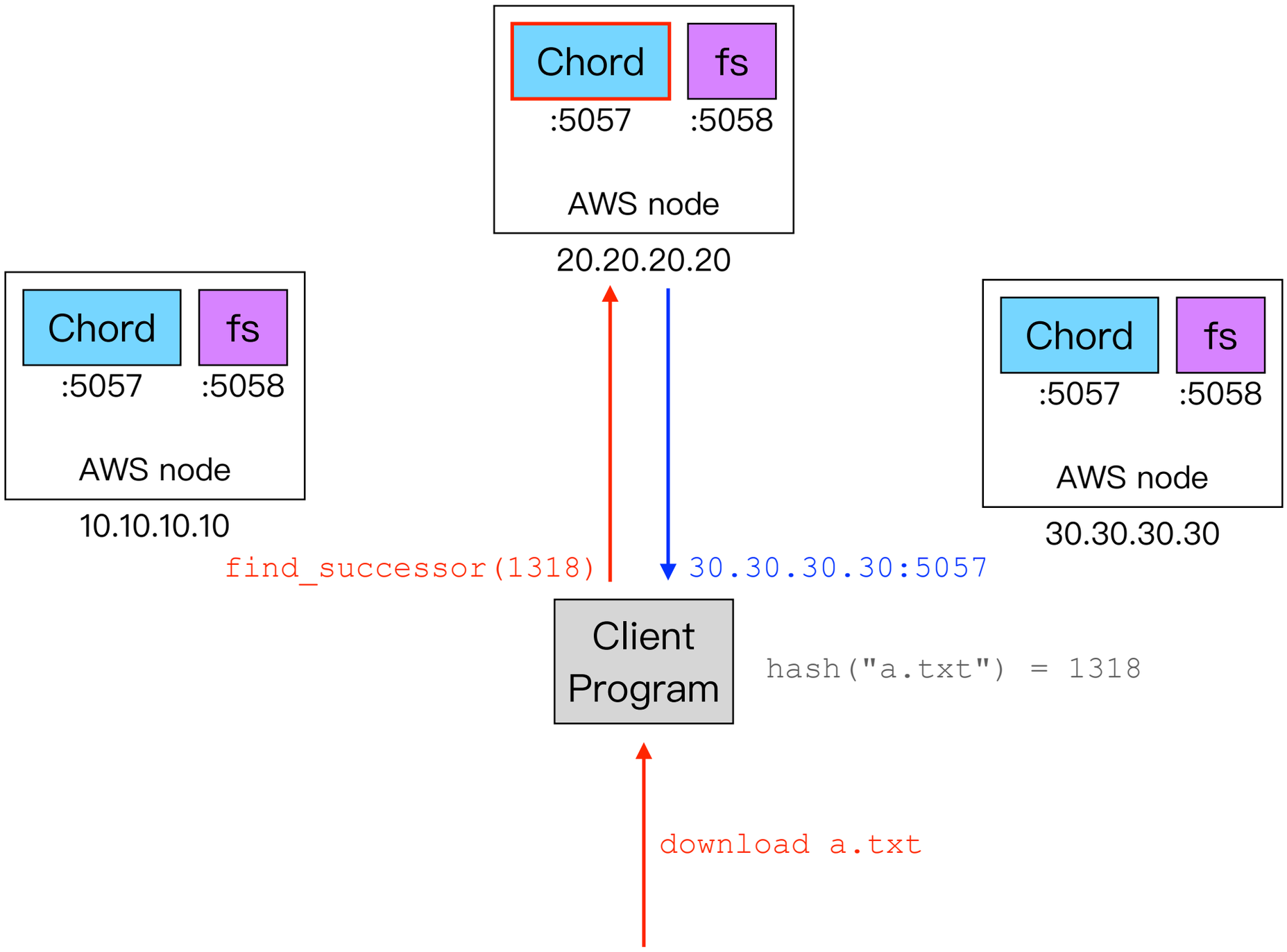

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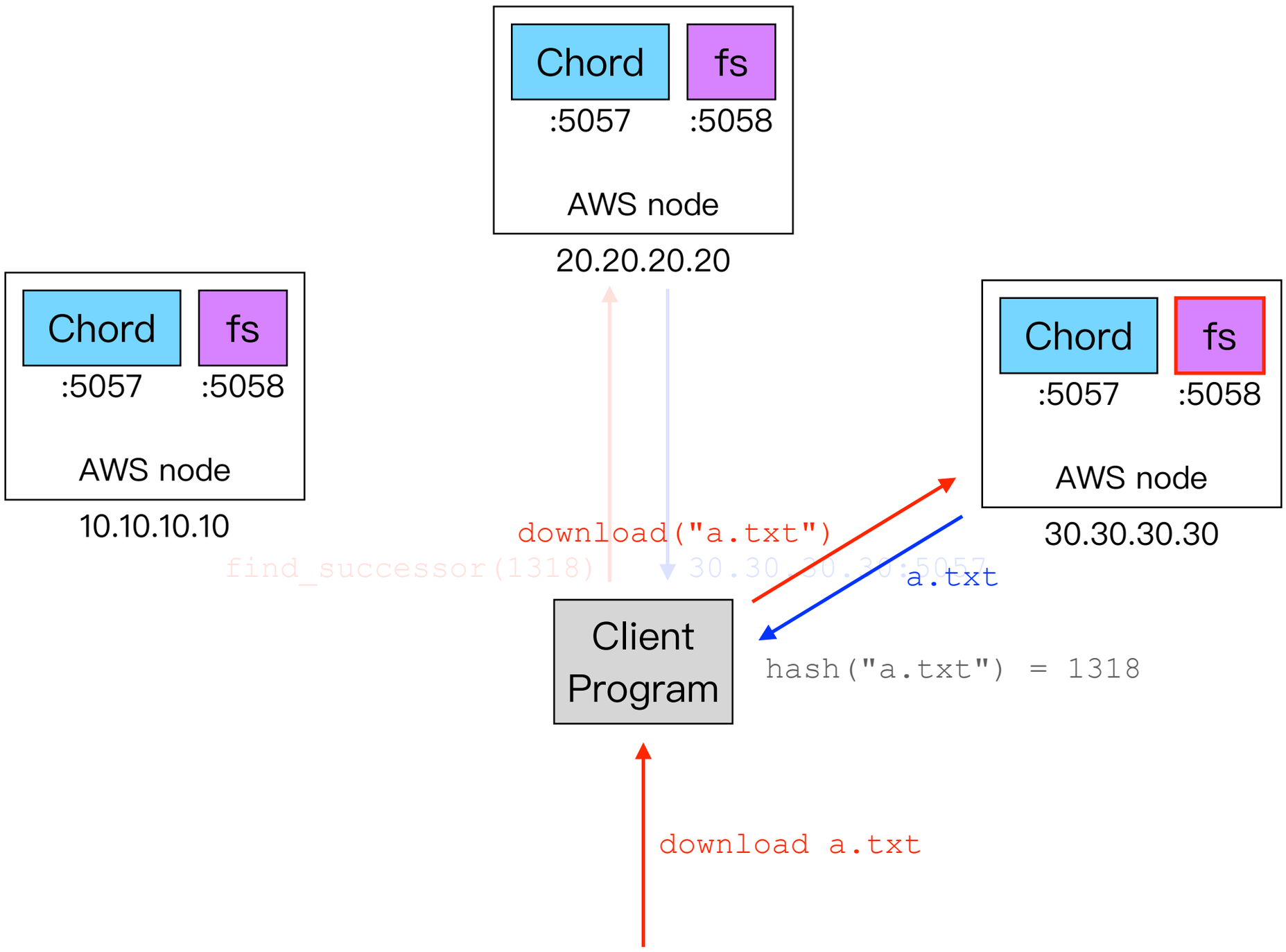
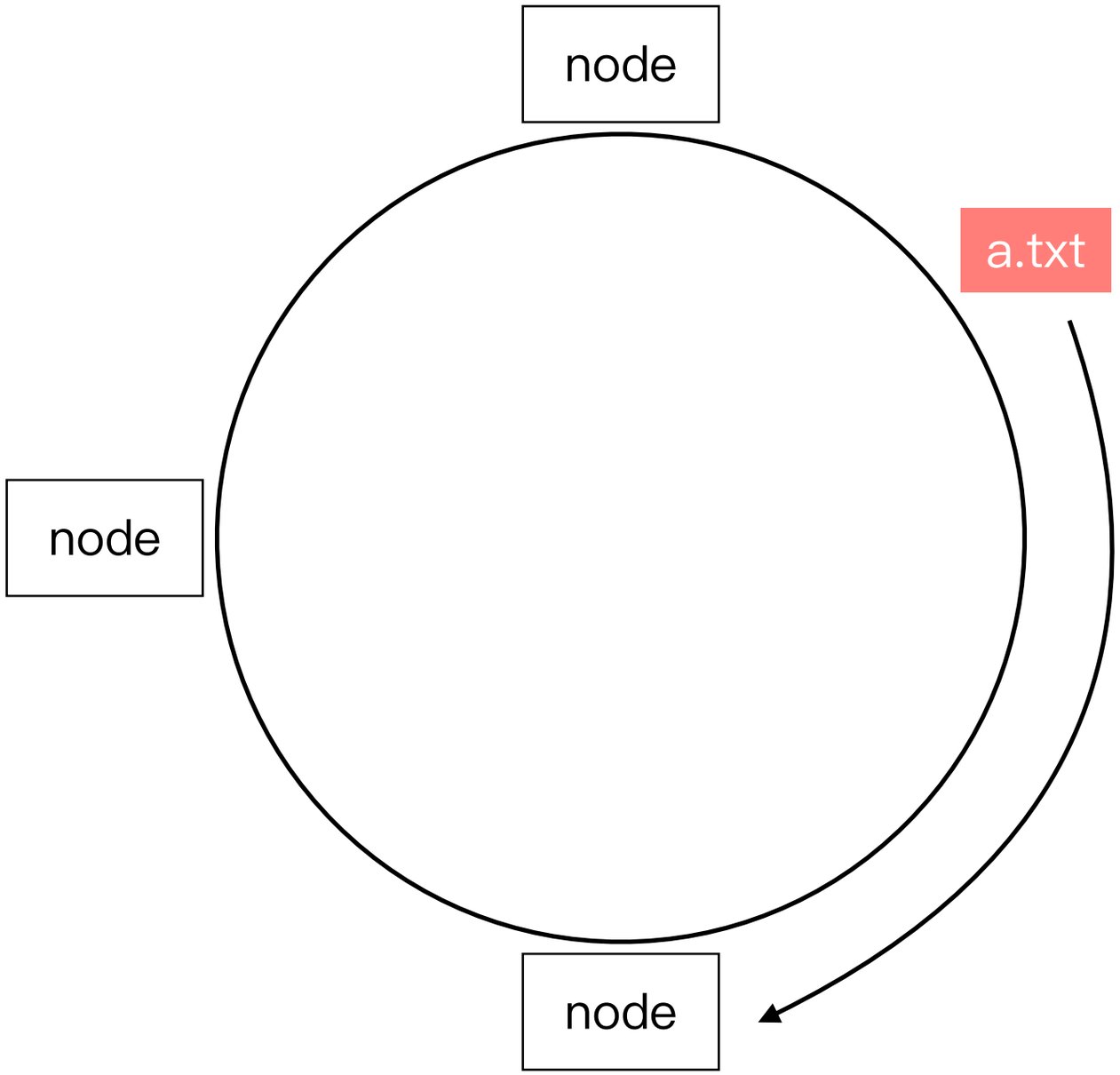


Part 3: Distributed File System Implementation

- Migrate the data when new nodes are added
- Balance the load on each node by dividing files into smaller file chunks
- Implement file replication to ensure fault tolerance

Correctness – Data Migration



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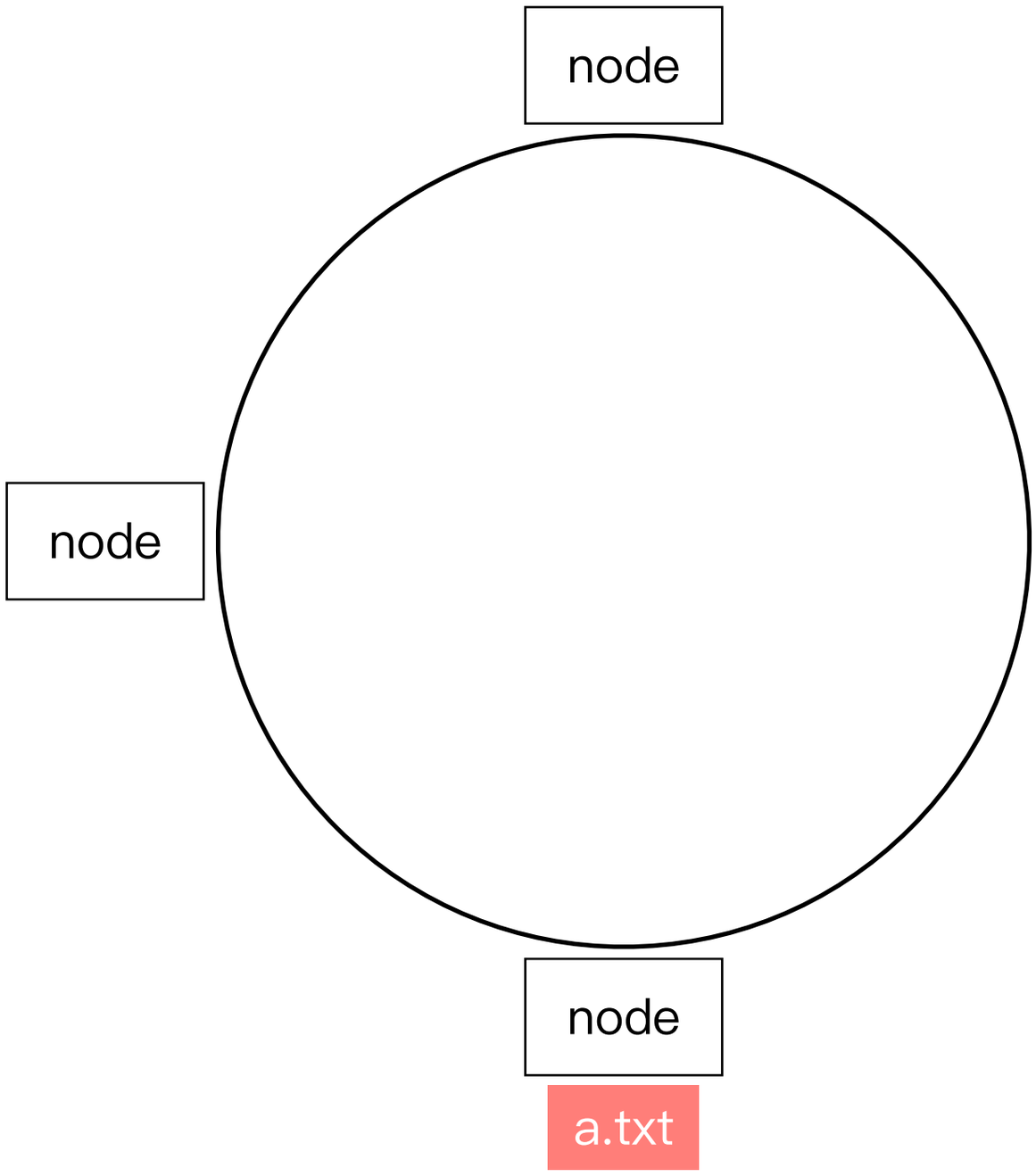

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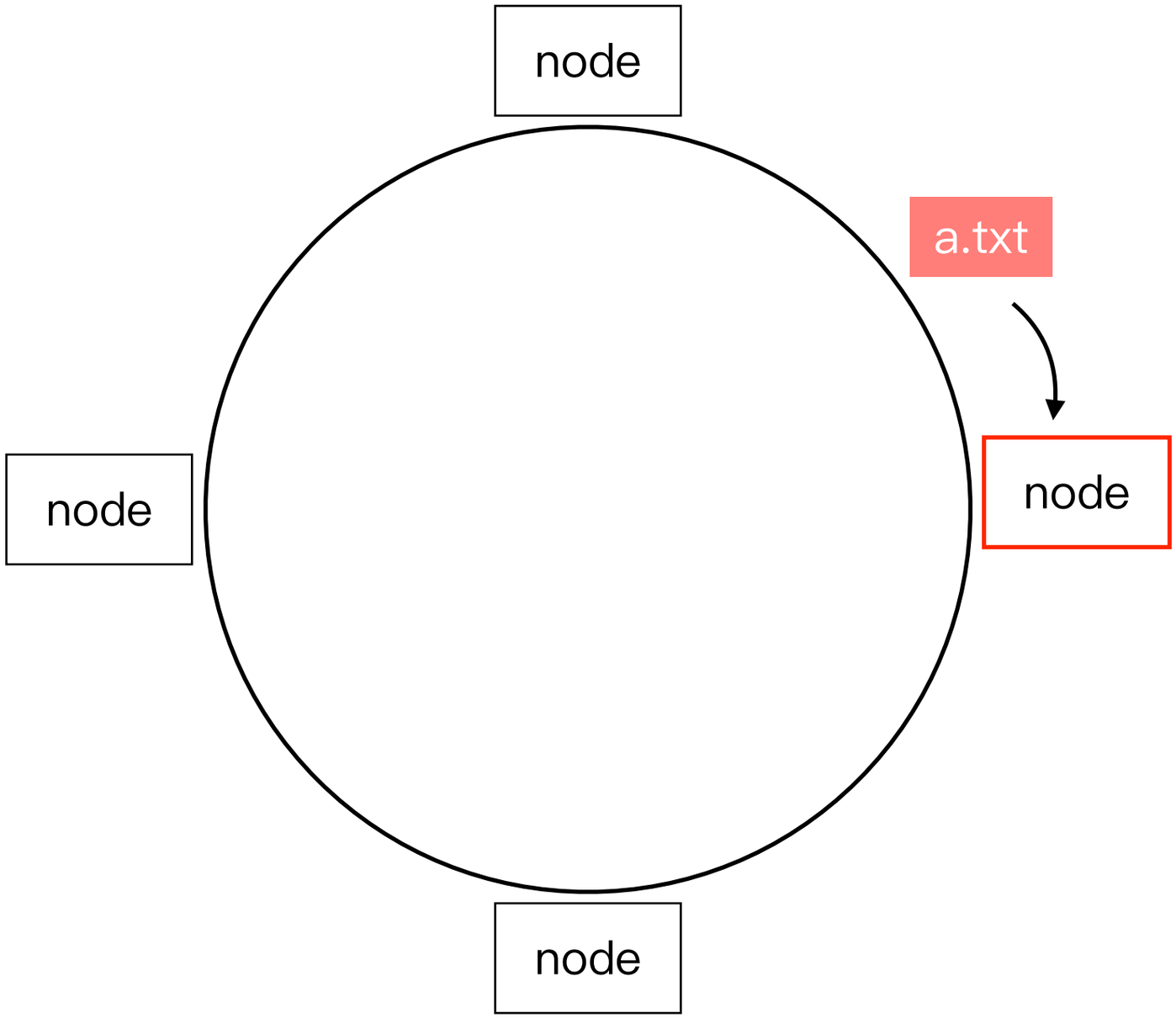

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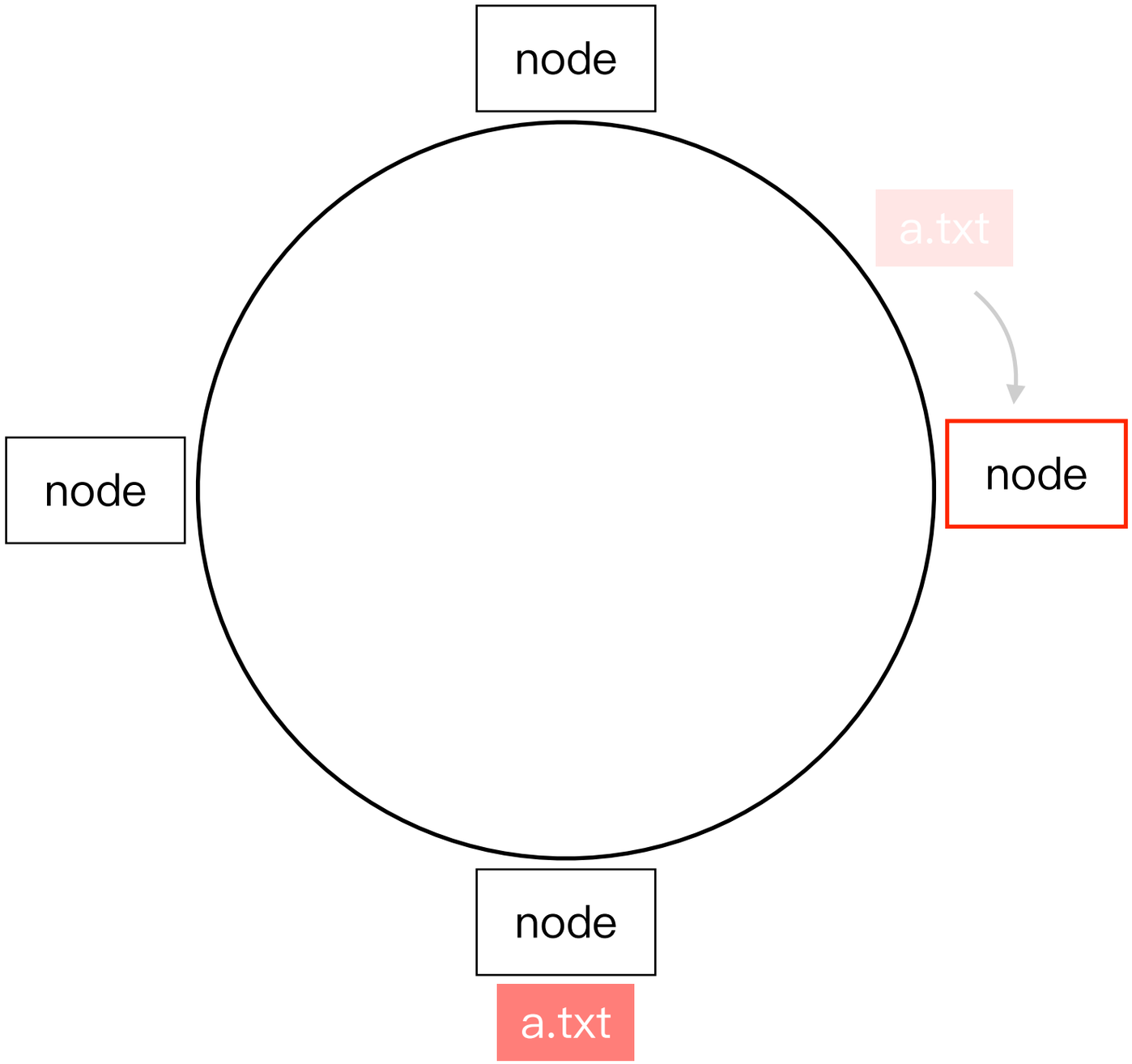

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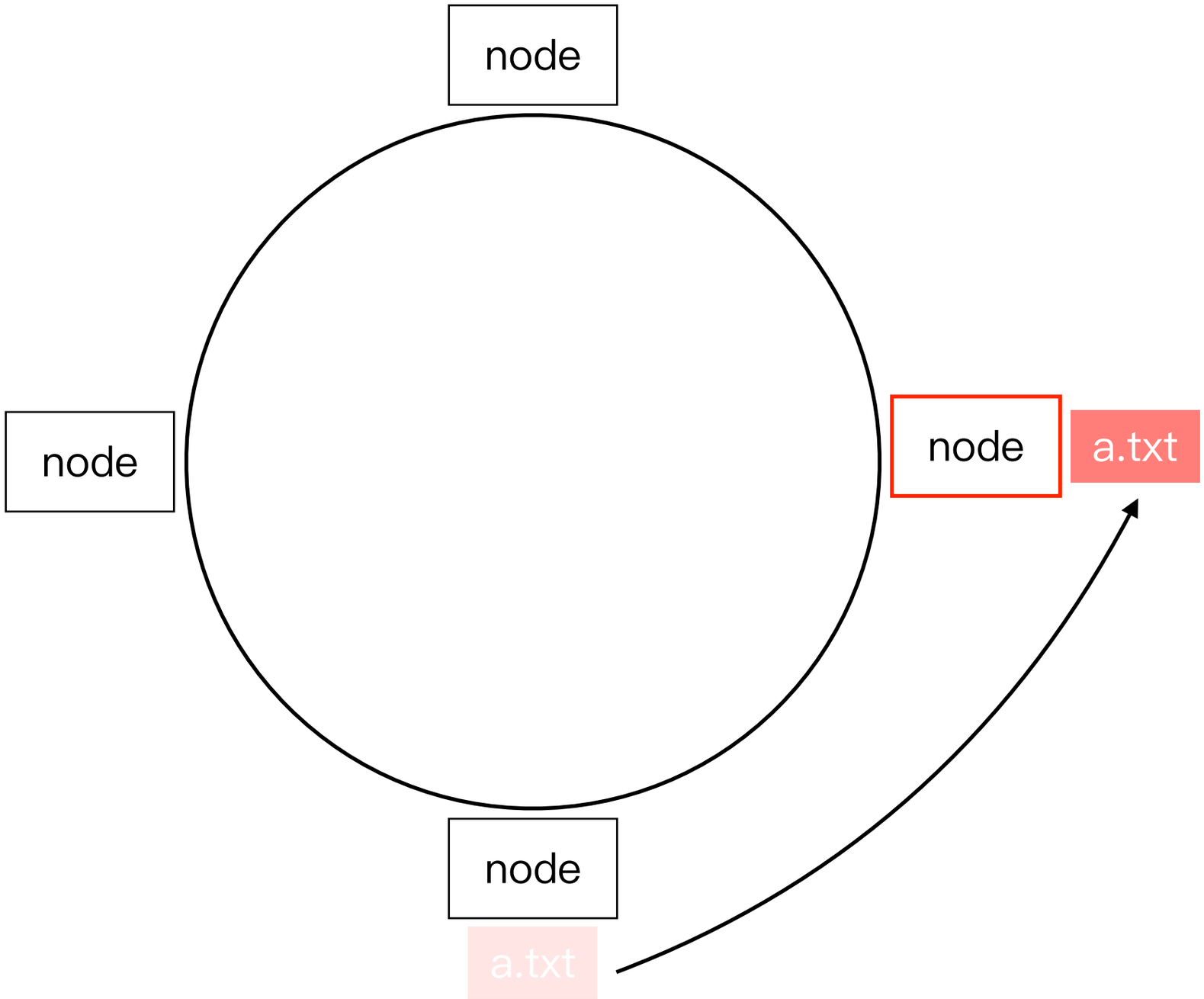
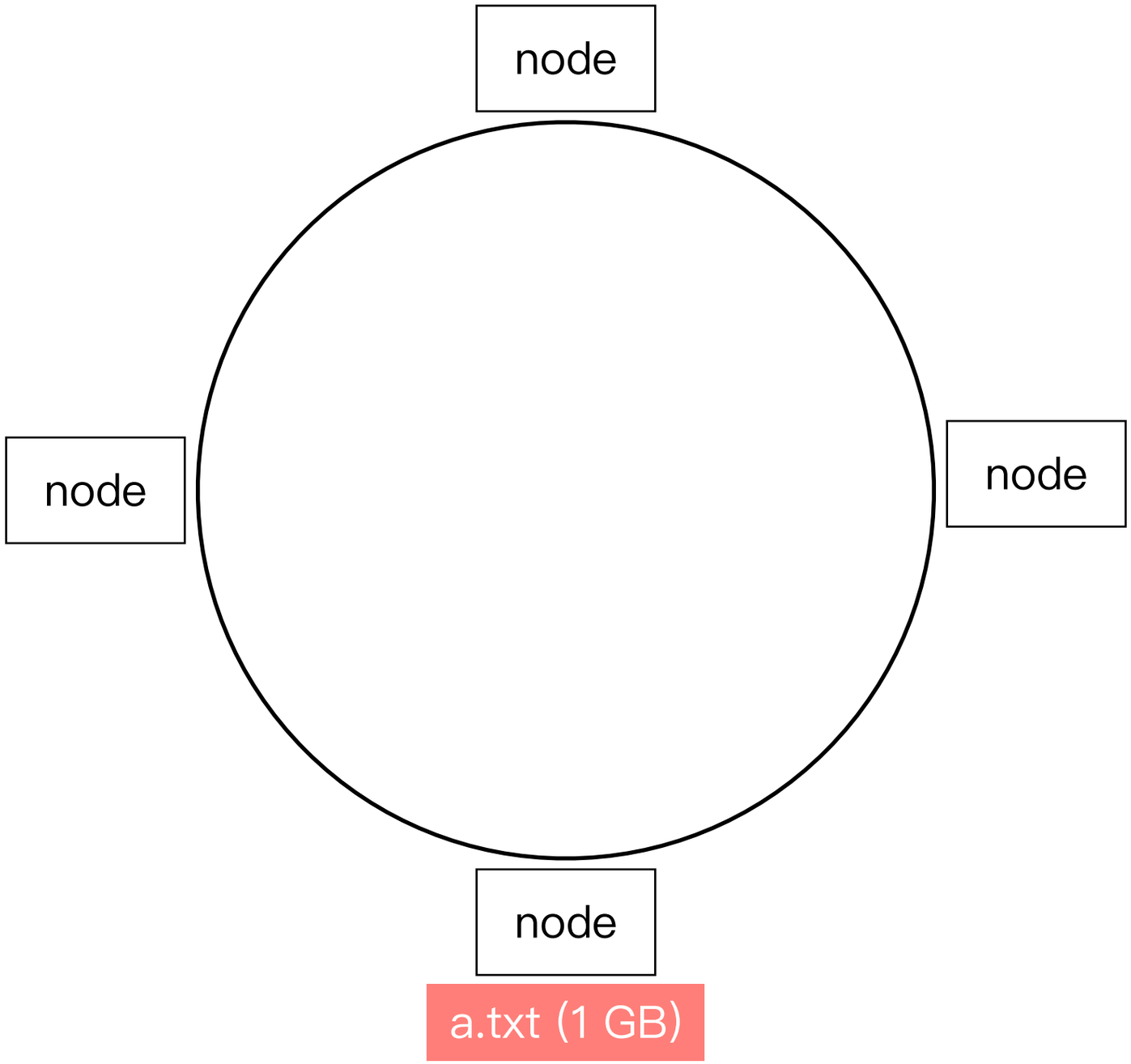


Load Balancing – File Chunks



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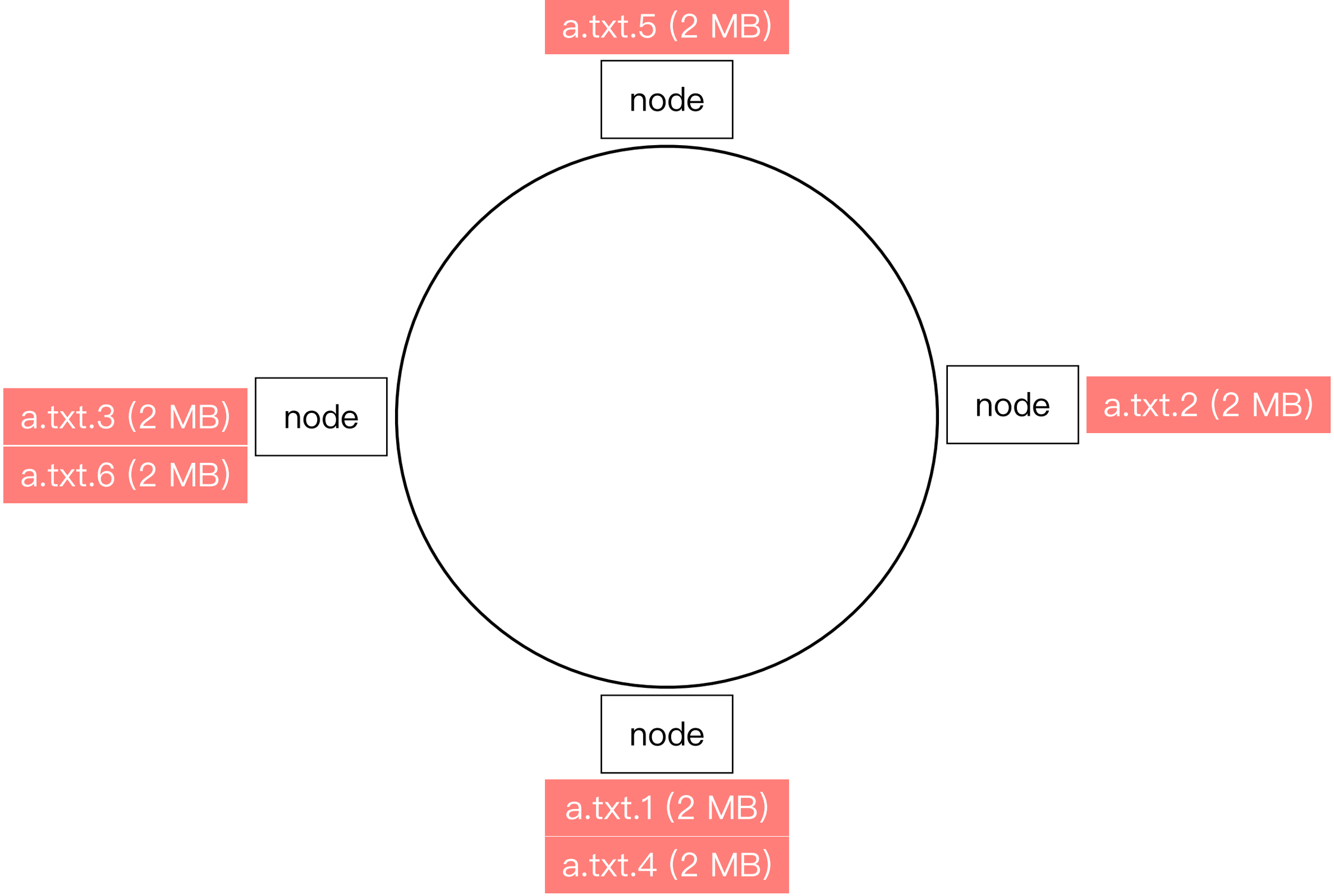
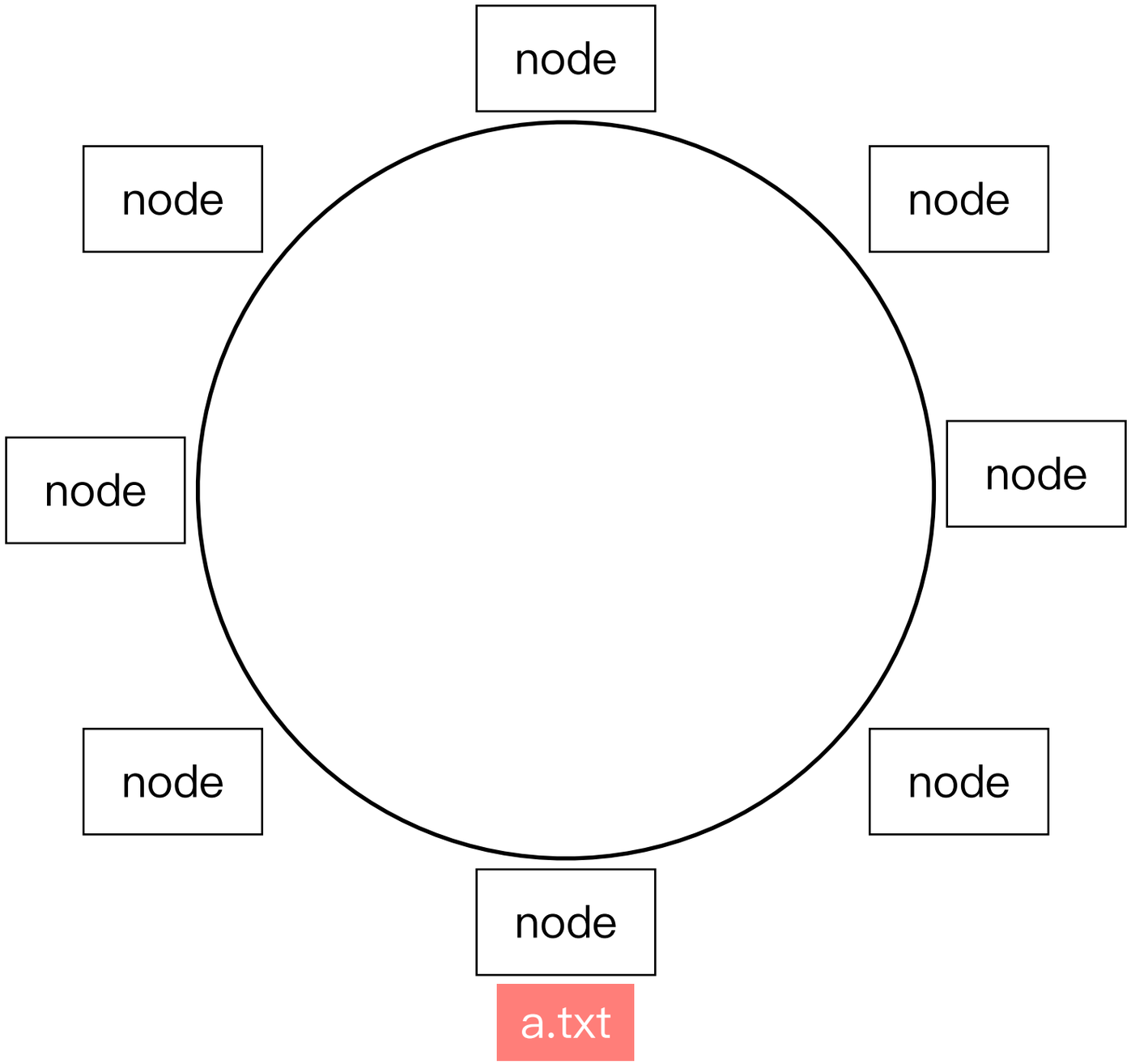


Fault Tolerance – Replication



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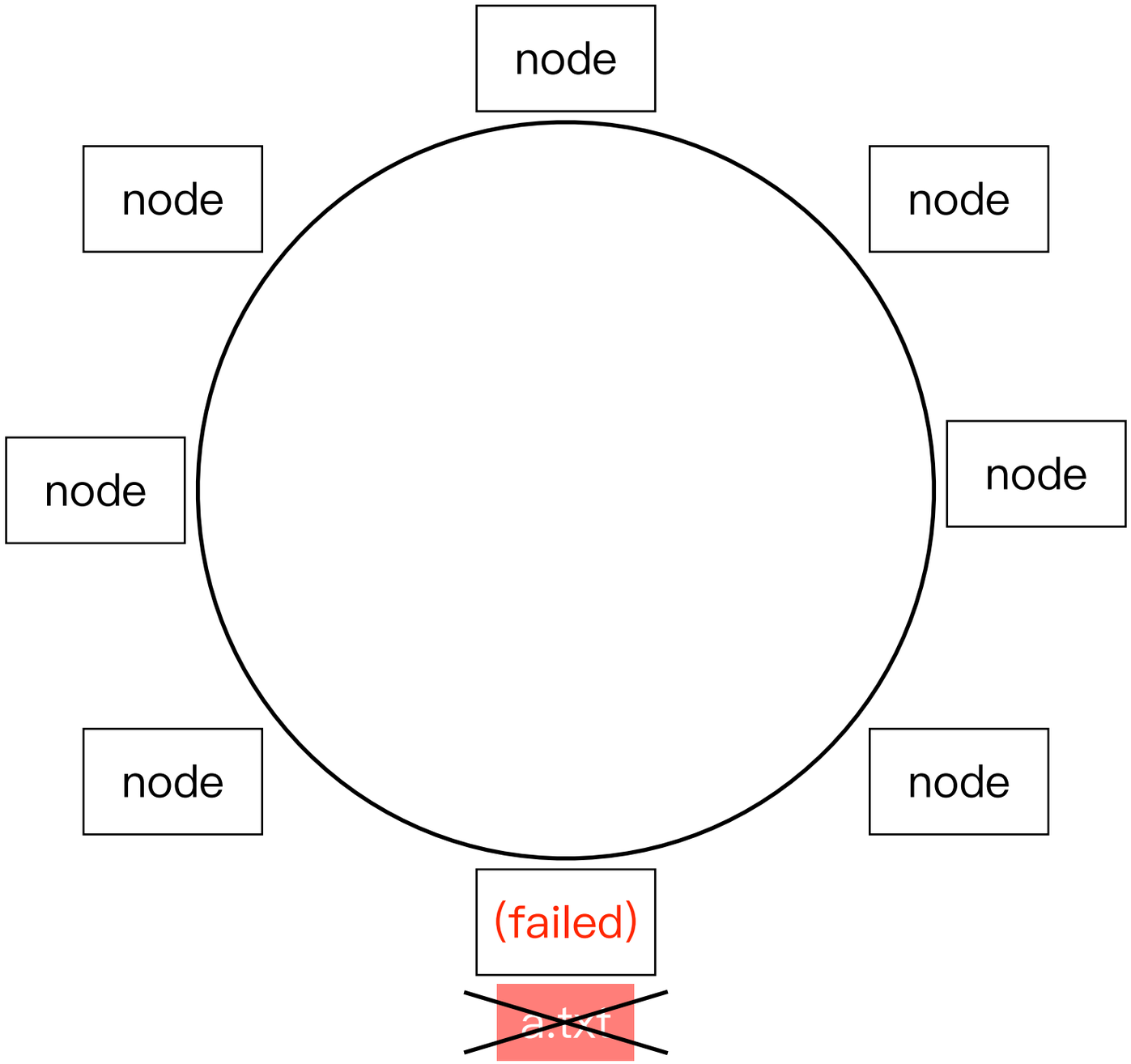

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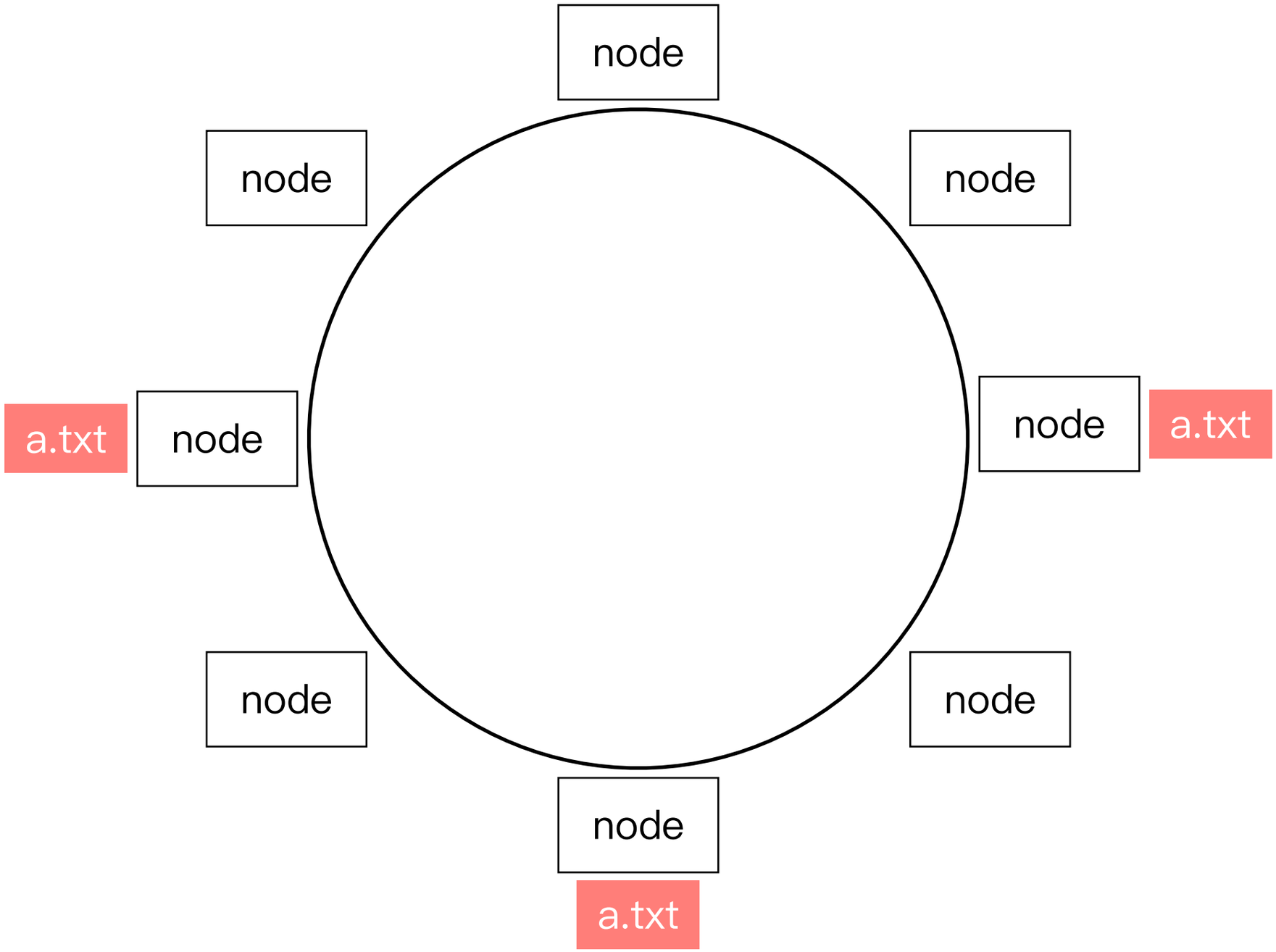

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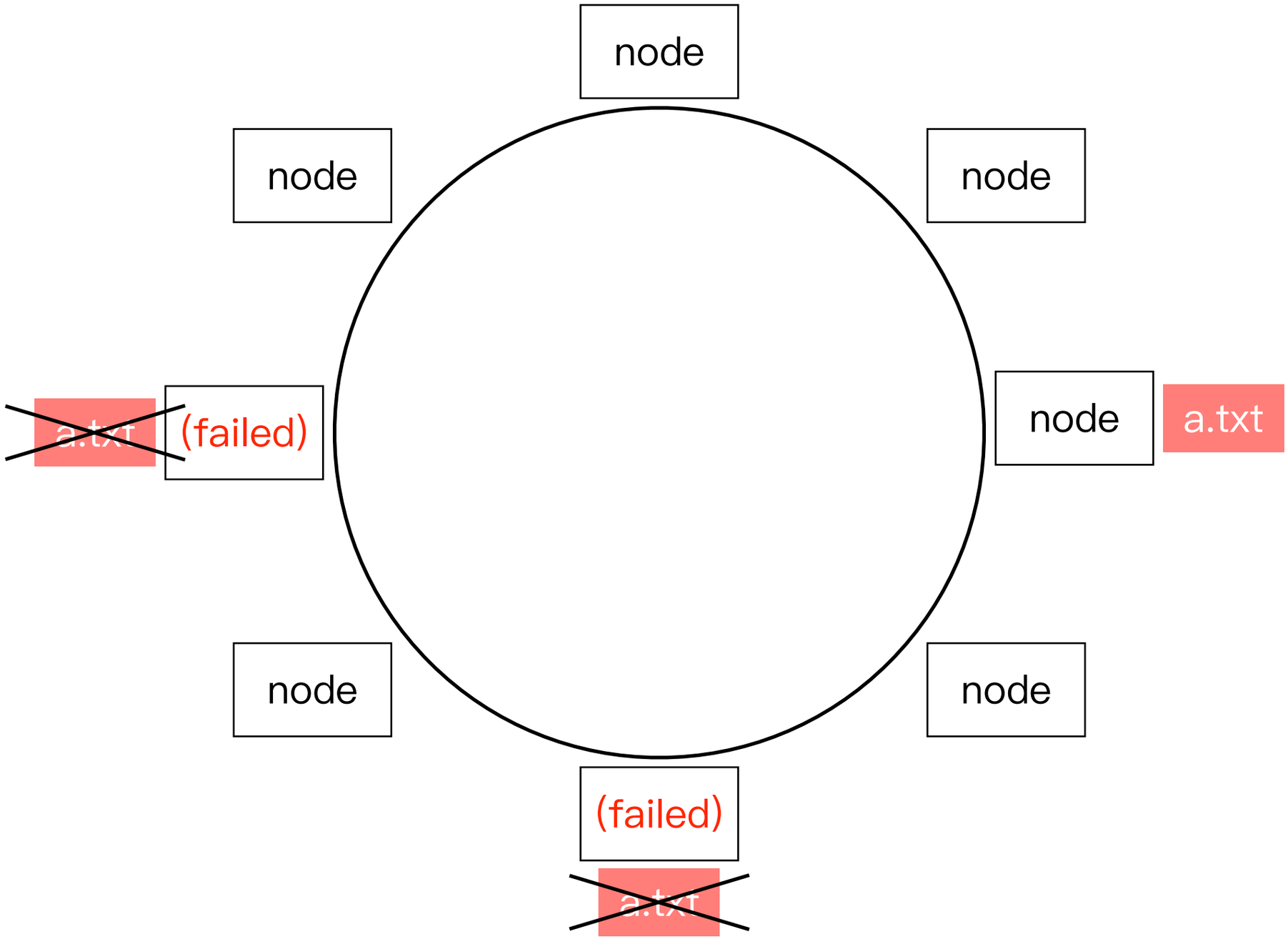

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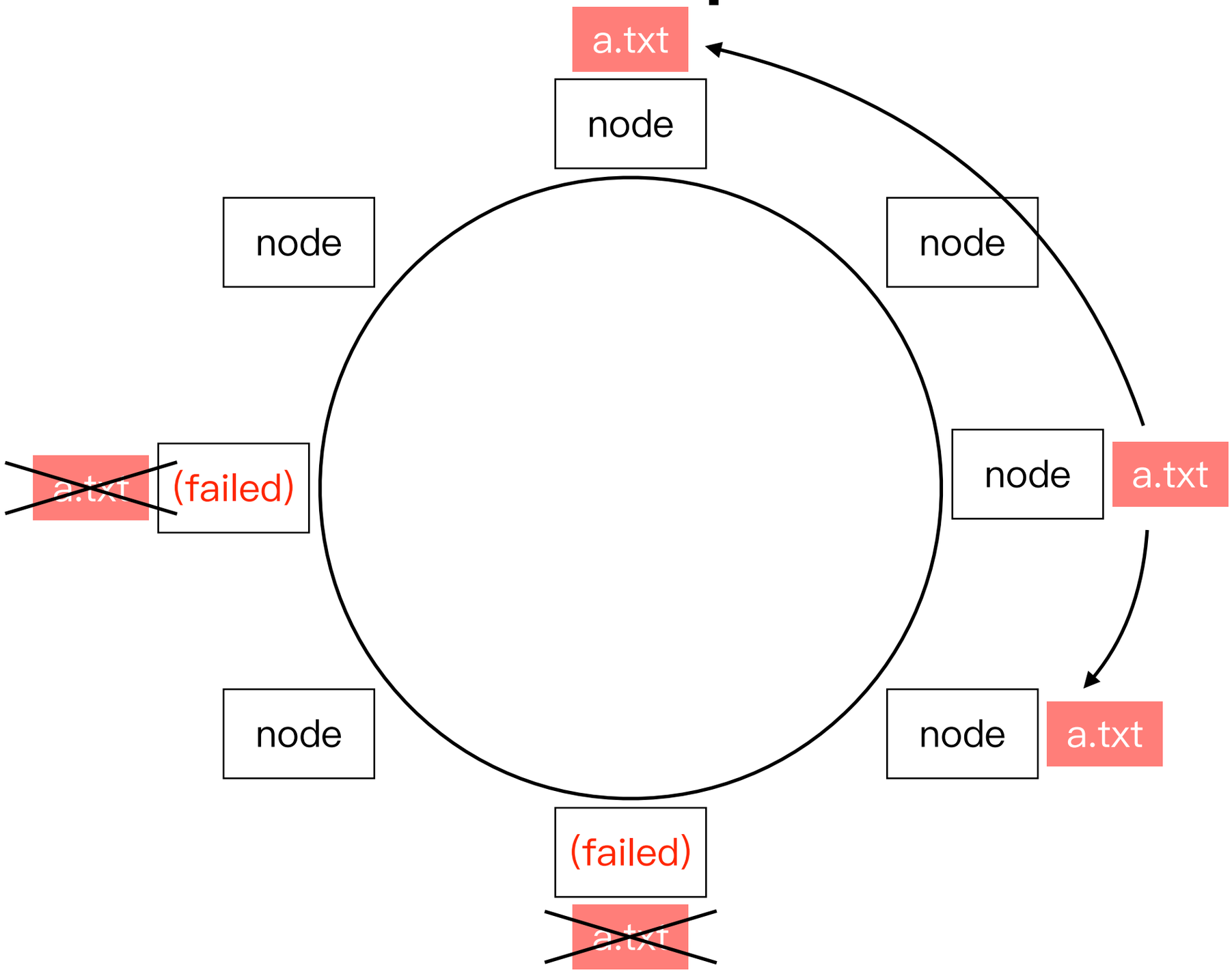

Grading Policy

- Part 1: 10%
    - Correctness: 4%
    - Message Complexity: 3%
    - Fault Tolerance: 3%
- Part 2: 6%
- Part 3: 9%
    - Data Migration: 3%
    - File Chunks: 3%
    - Replication: 3%