

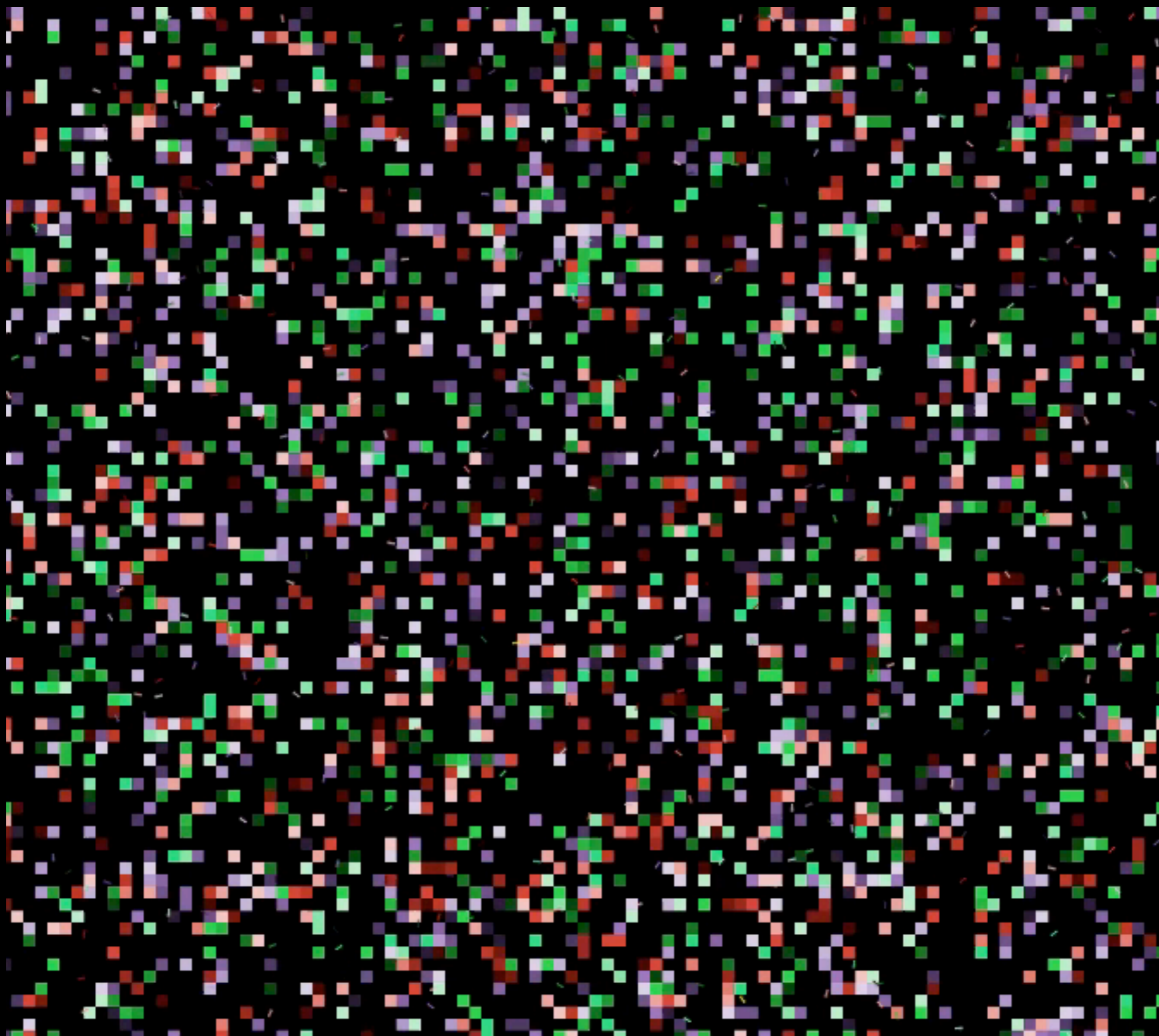


# Data Location Optimization for a Self-Organized Storage System



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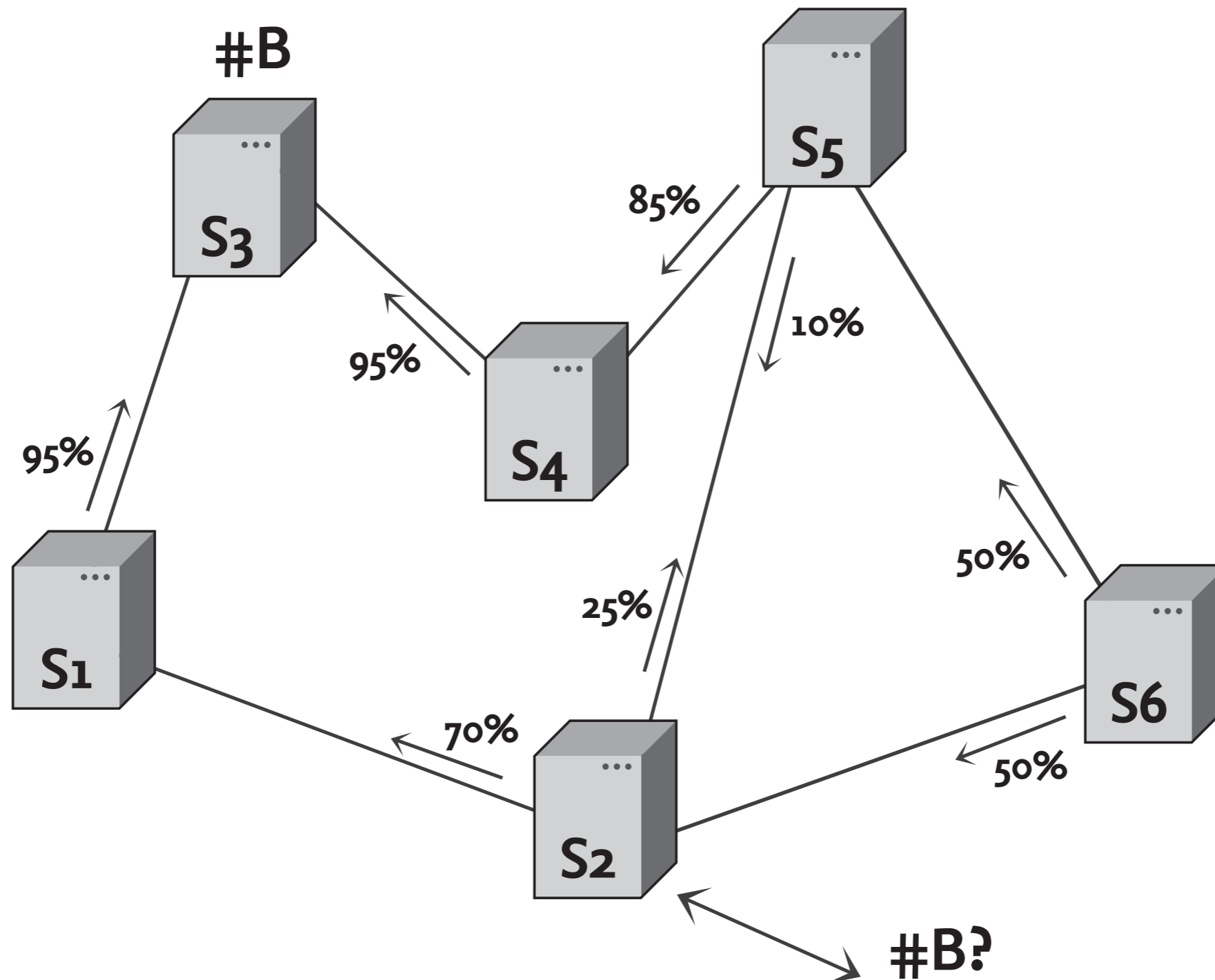


[Thomas Schmickl]

# Brood Sorting - Algorithm

```
item = null;
while (true)
    if (item != null)
        if (similarity(item, nearbyItems()) >  $\alpha$ )
            drop(item)
            item = null
    else
        item = min(similarity(nearbyItems()2))
        pickup(item)
move()
```

# Probabilistic Request Routing



[Lindgren03]

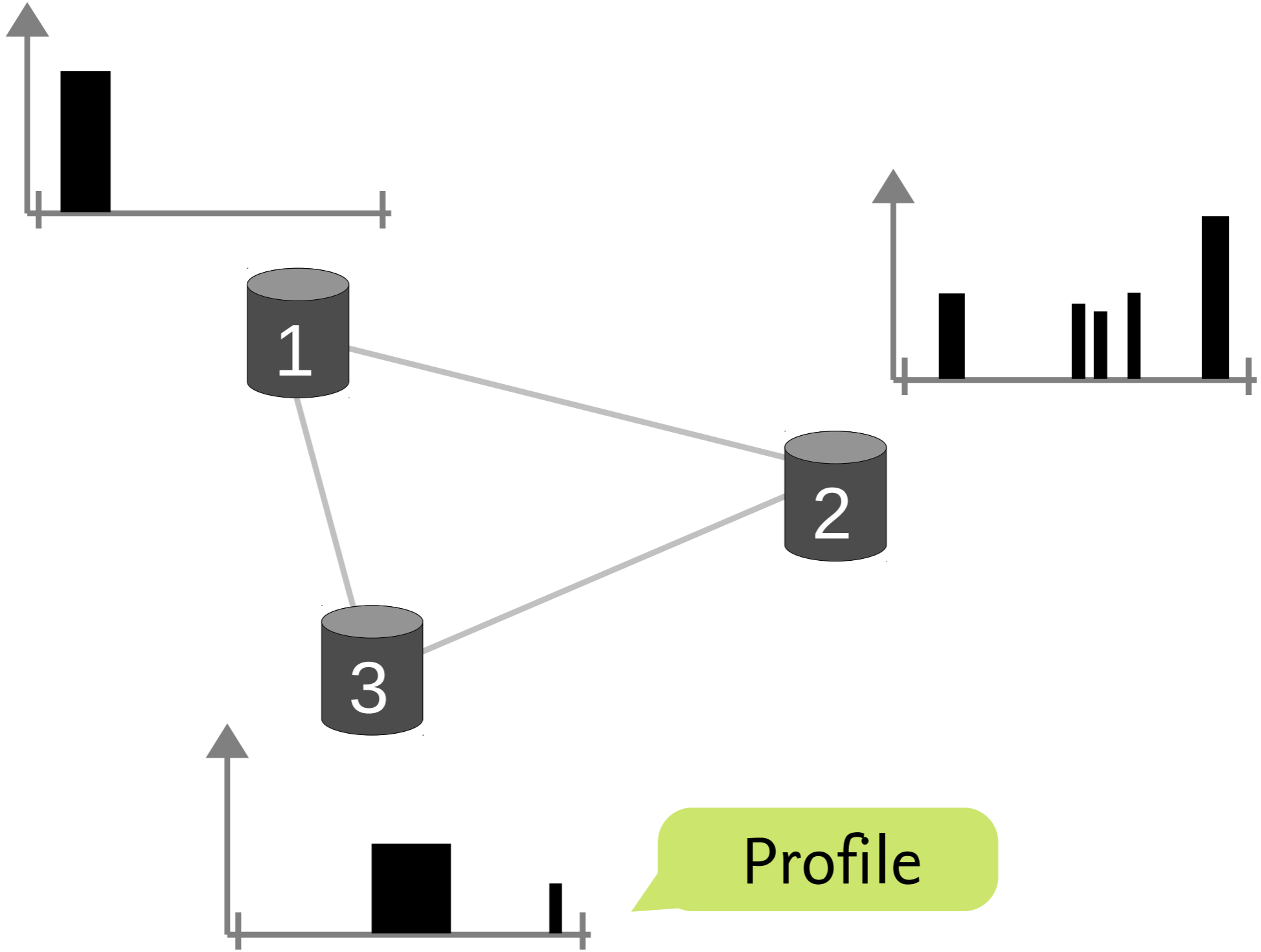
# Research Question

Can brood sorting improve data placement in a large-scale distributed storage system based on probabilistic routing?

# Some Adaptions

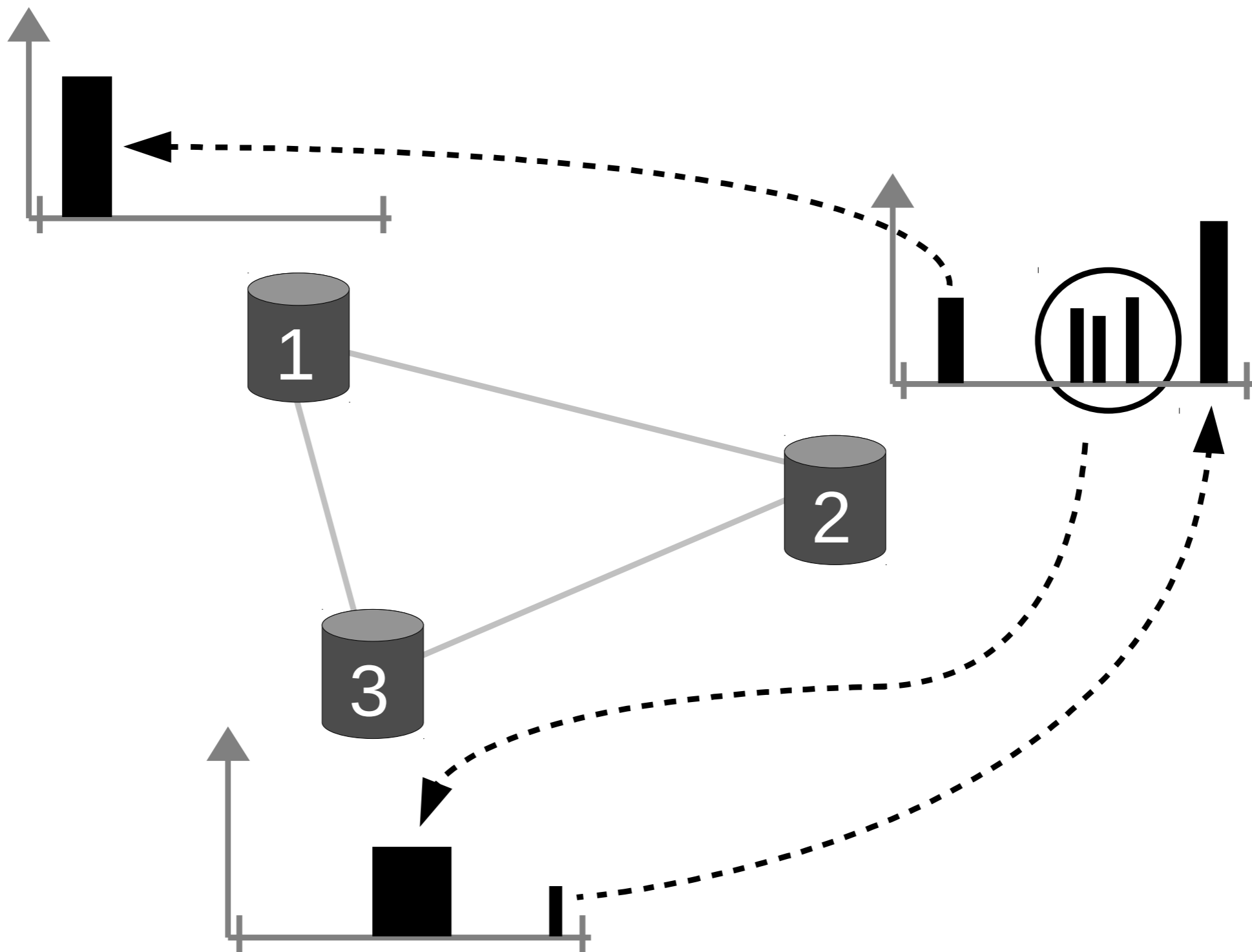
- Data is clustered into a limited amount of “buckets”
- Movement split up into two phases:
  - Search phase: Every node periodically generates “profile” of locally stored data and sends it on its way
  - Response phase: Nodes compare incoming profiles to local stored data, generating movement responses

(1)

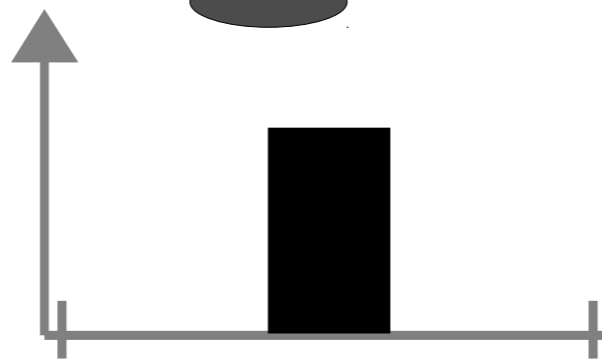
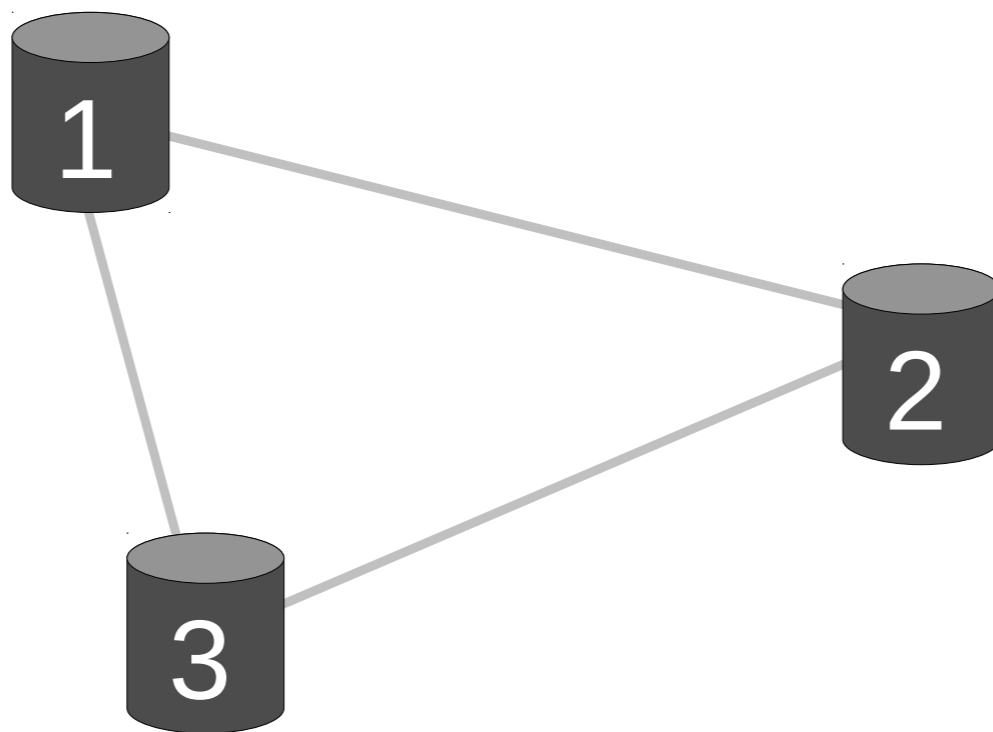




(2)



(3)

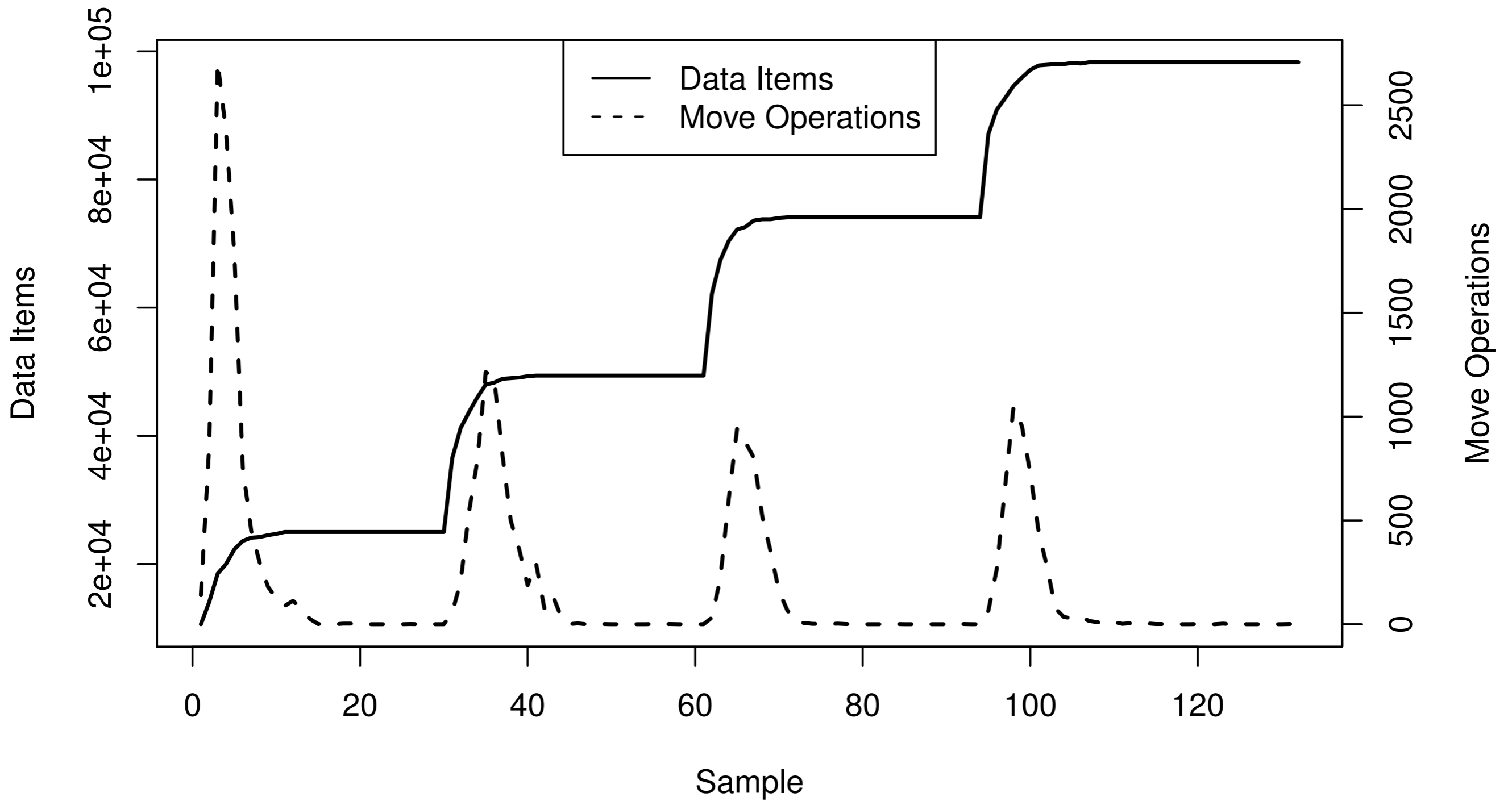


✓ Clean!

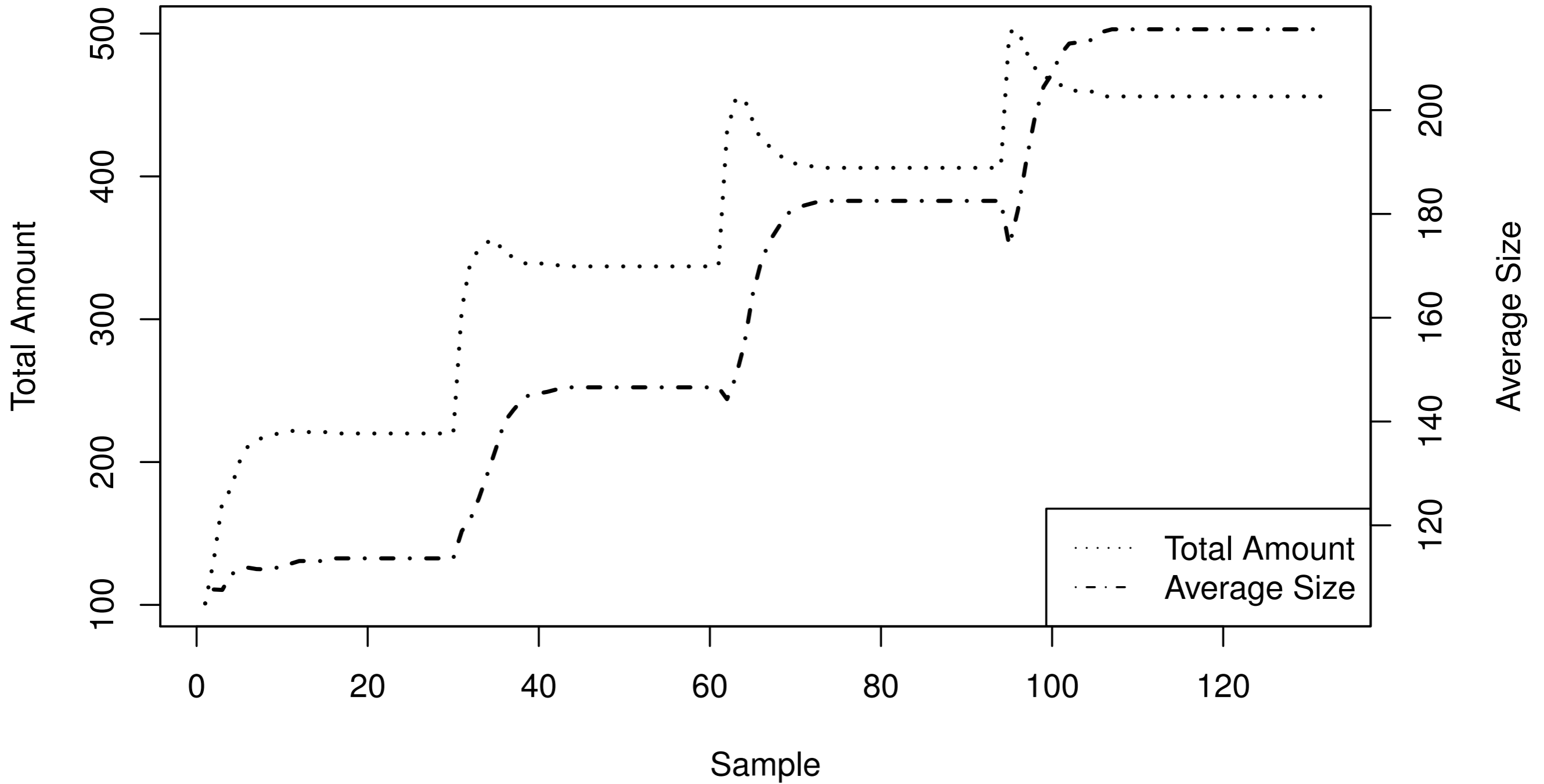
# Evaluation

- Cluster of 100 Linux nodes
- Two datasets, random & synthetic
- 1000 write operations, four phases
- Recorded data:
  - # Data items in network
  - # Successful movement operations
  - Bucket amount & size

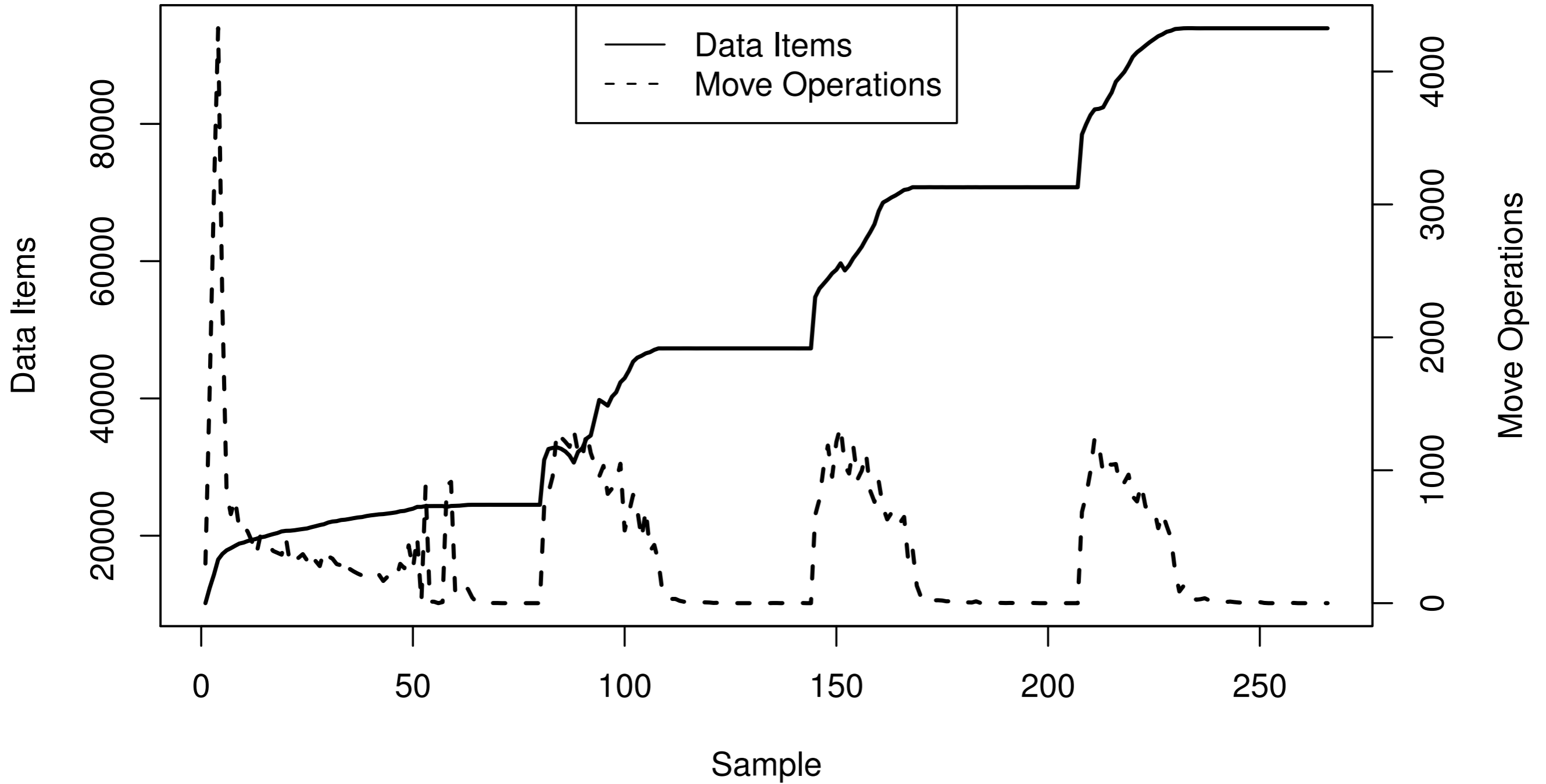
# Data Items vs. Move Operations synthetic/100nodes



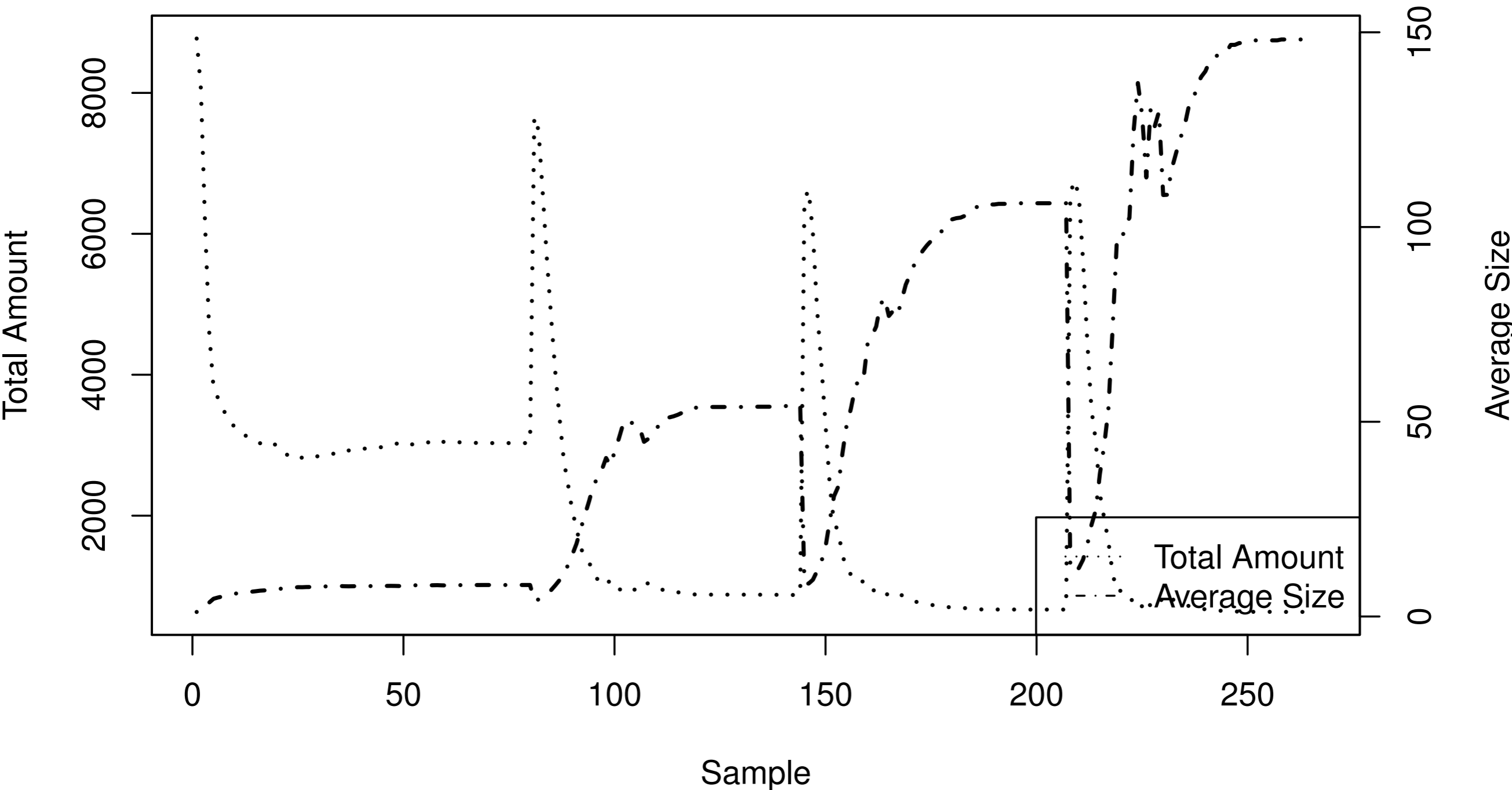
# Bucket Amount vs. Average Size synthetic/100nodes



# Data Items vs. Move Operations random/100nodes



**Bucket Amount vs. Average Size random/100nodes**



# Conclusion

- Brood Sorting works! \*



# Thank You!

Questions?