Data Location Optimization
for a Self-Organized Storage System

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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
Profile
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 random/100nodes

- Data Items
- Move Operations

Sample

Data Items

Move Operations
Bucket Amount vs. Average Size random/100nodes
Conclusion

• Brood Sorting works! *
Thank You!

Questions?

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