A Best-effort Mechanism for Service Deployment in Contributory Computer Systems

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Outline

- Introduction
- Architecture
- Mechanisms
  - Service creation
  - Service activation
- Validation
- Conclusions

Introduction

- Contributory computer system:
  - Users provide their own resources to be used collectively.
  - The use of the resources is determined by the functionality and objective of the specific contributory application.

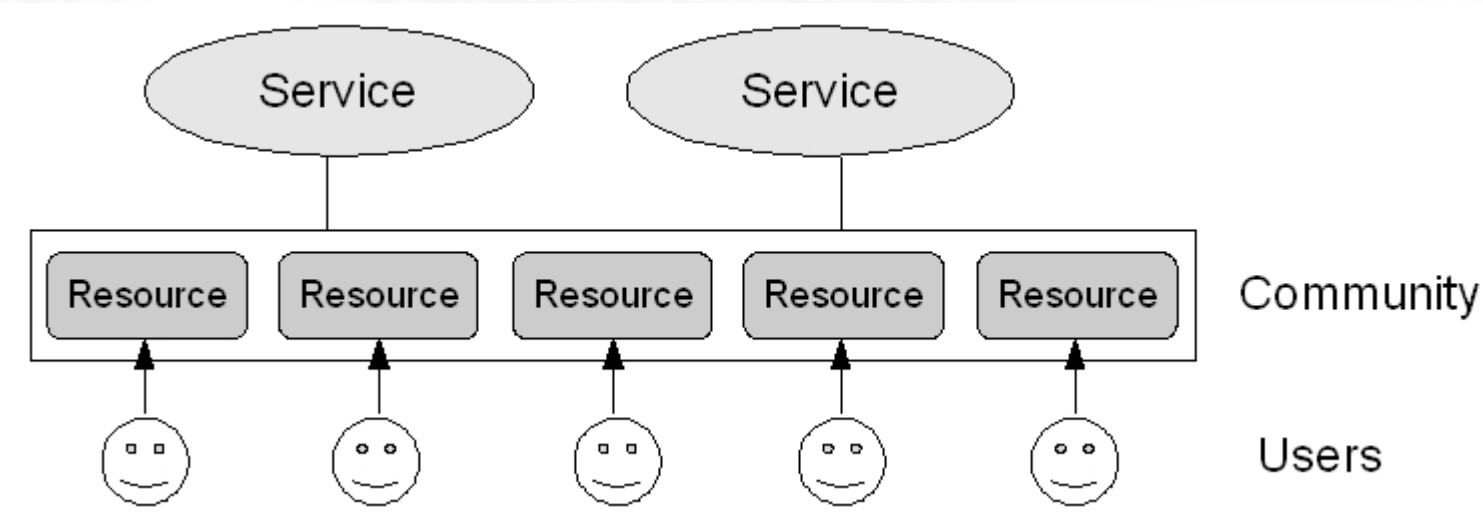
Introduction
Contributory systems

- Main characteristics:
  - Unpredictable individual resource availability.
  - Heterogeneity.
  - Ease of use.

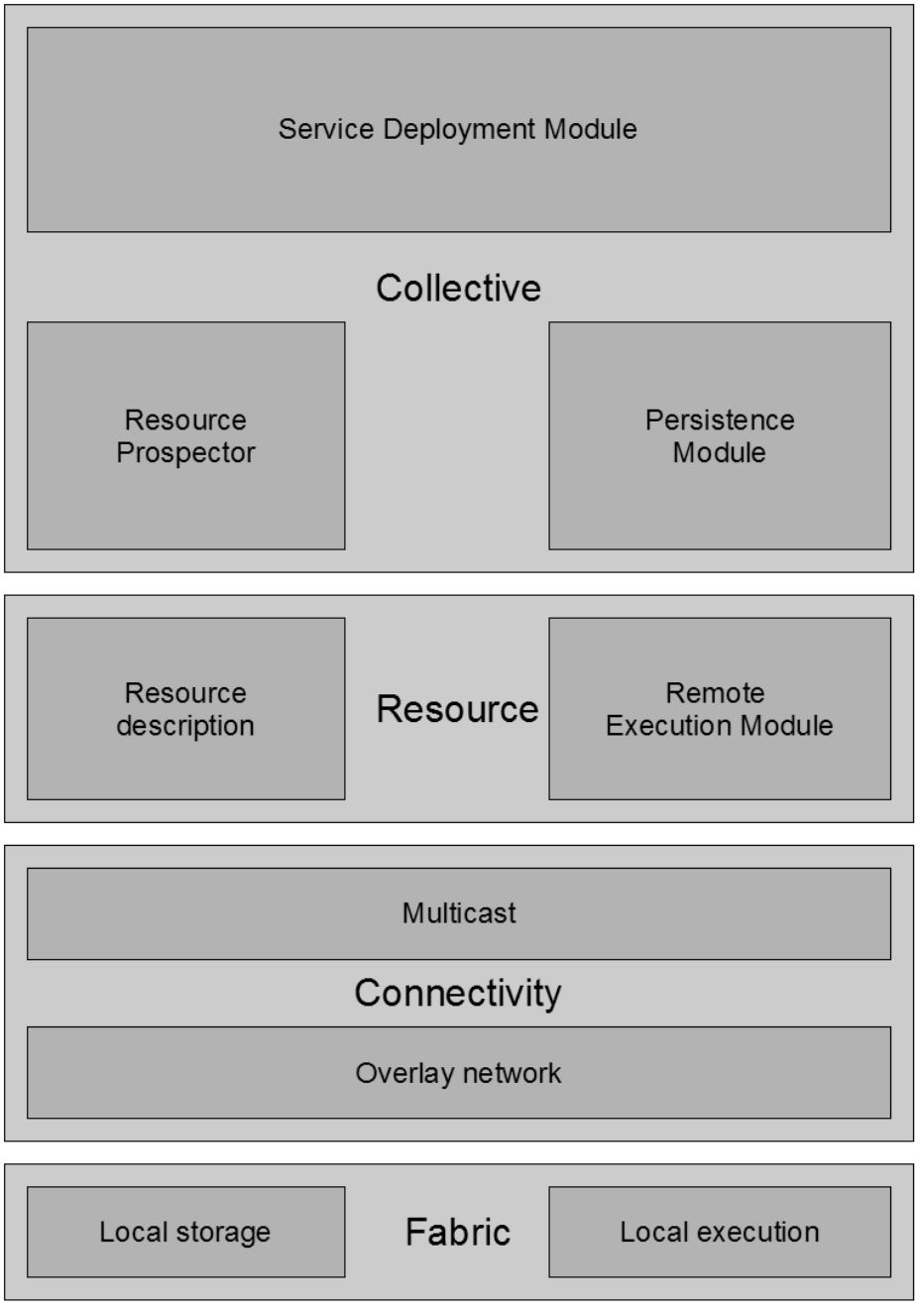
Introduction
Service deployment

- Service deployment as building block for contributory applications:
  - Centralized componens deployed as services can make applications easer to build.
- Service:
    - Always available in the community,
    - Offers a functionality. E.g.:
        - Web server
        - Video conversor

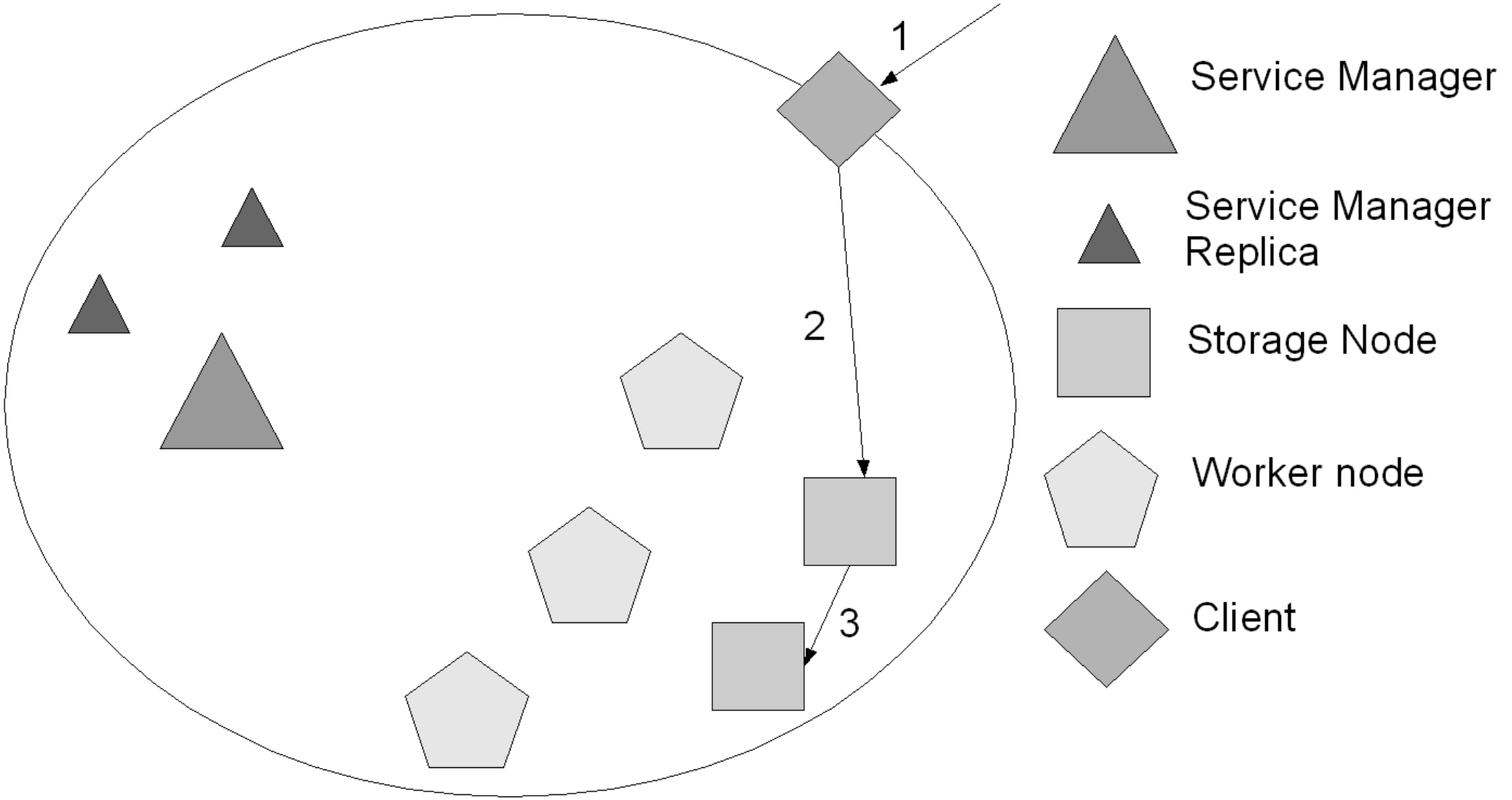
System model



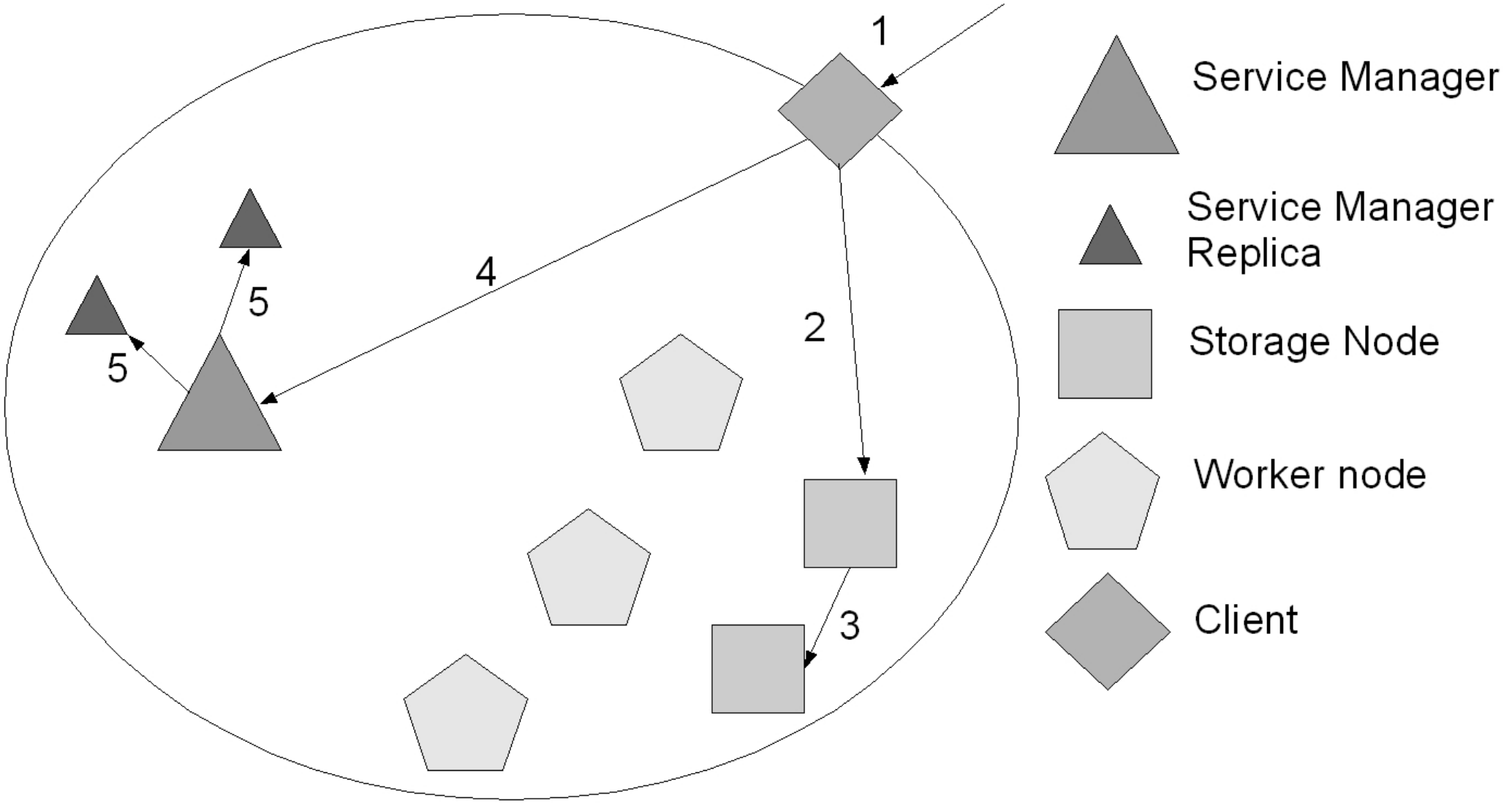
Architecture



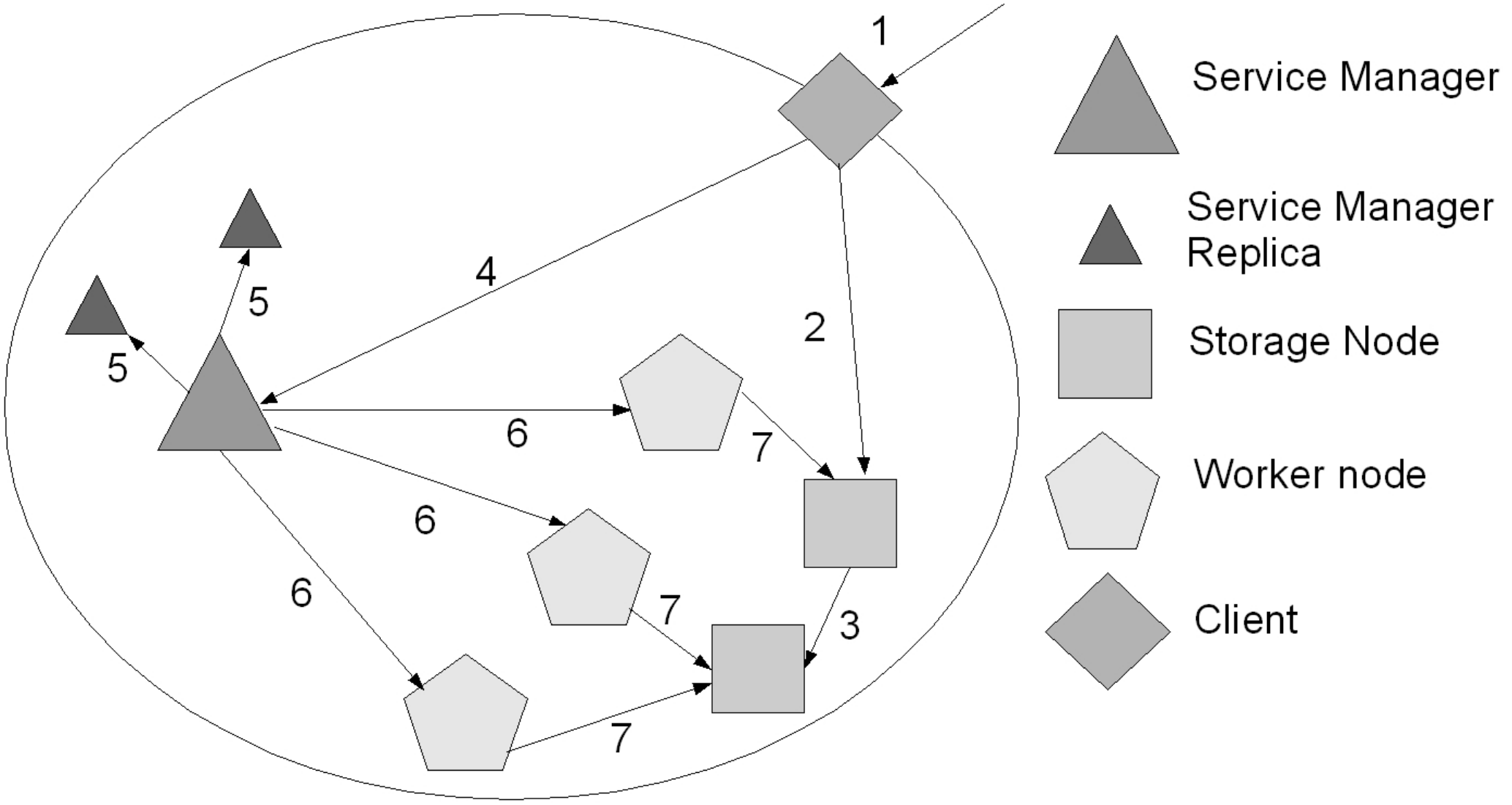
Mechanisms


1
2
3
Service Manager
Service Manager Replica
Storage Node
Worker node
Client

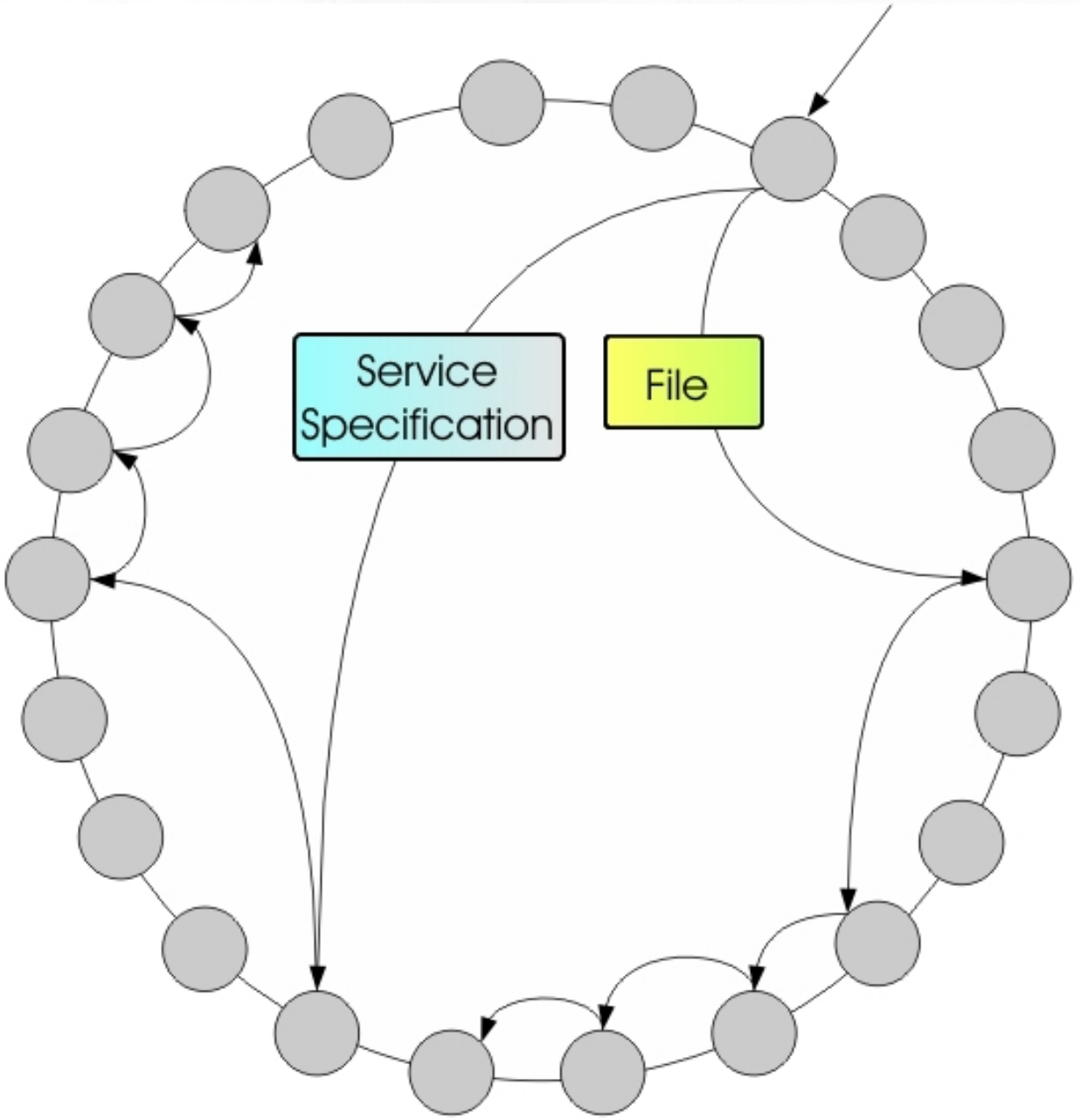
Mechanisms


1
2
3
4
5
5
Service Manager
Service Manager Replica
Storage Node
Worker node
Client

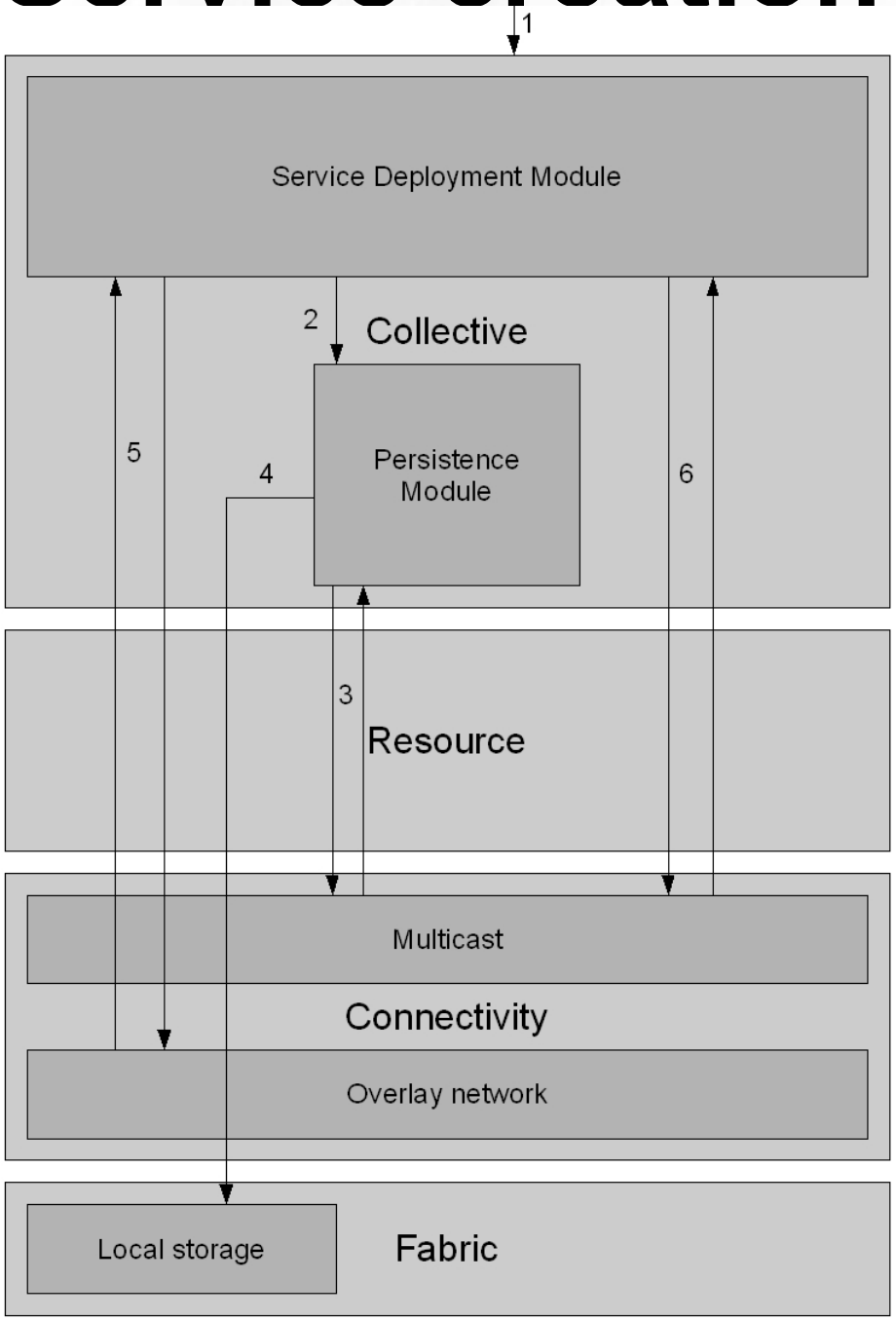
Mechanisms


1
2
3
4
5
5
6
6
6
7
7
7
Service Manager
Service Manager Replica
Storage Node
Worker node
Client

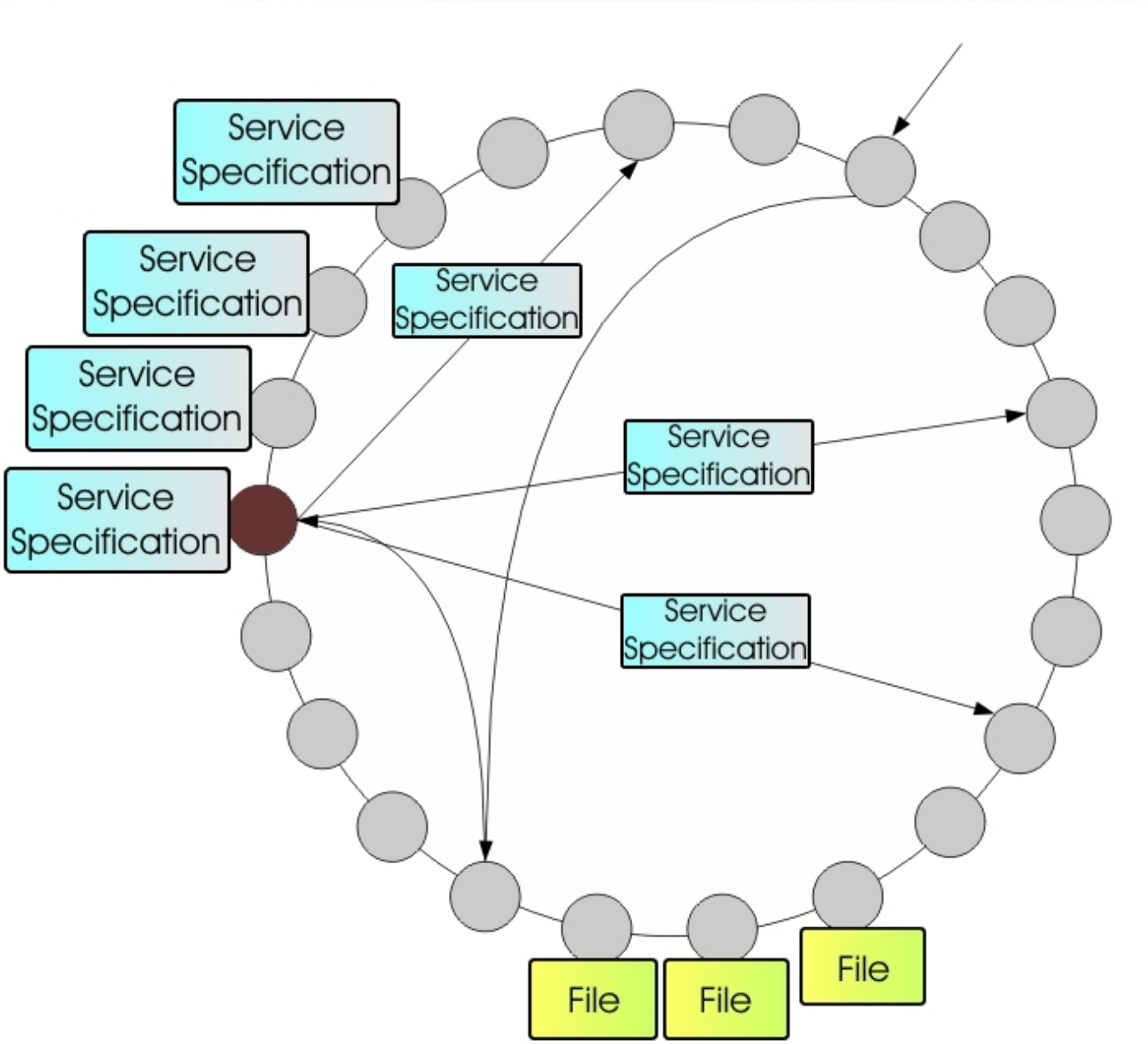
Service creation



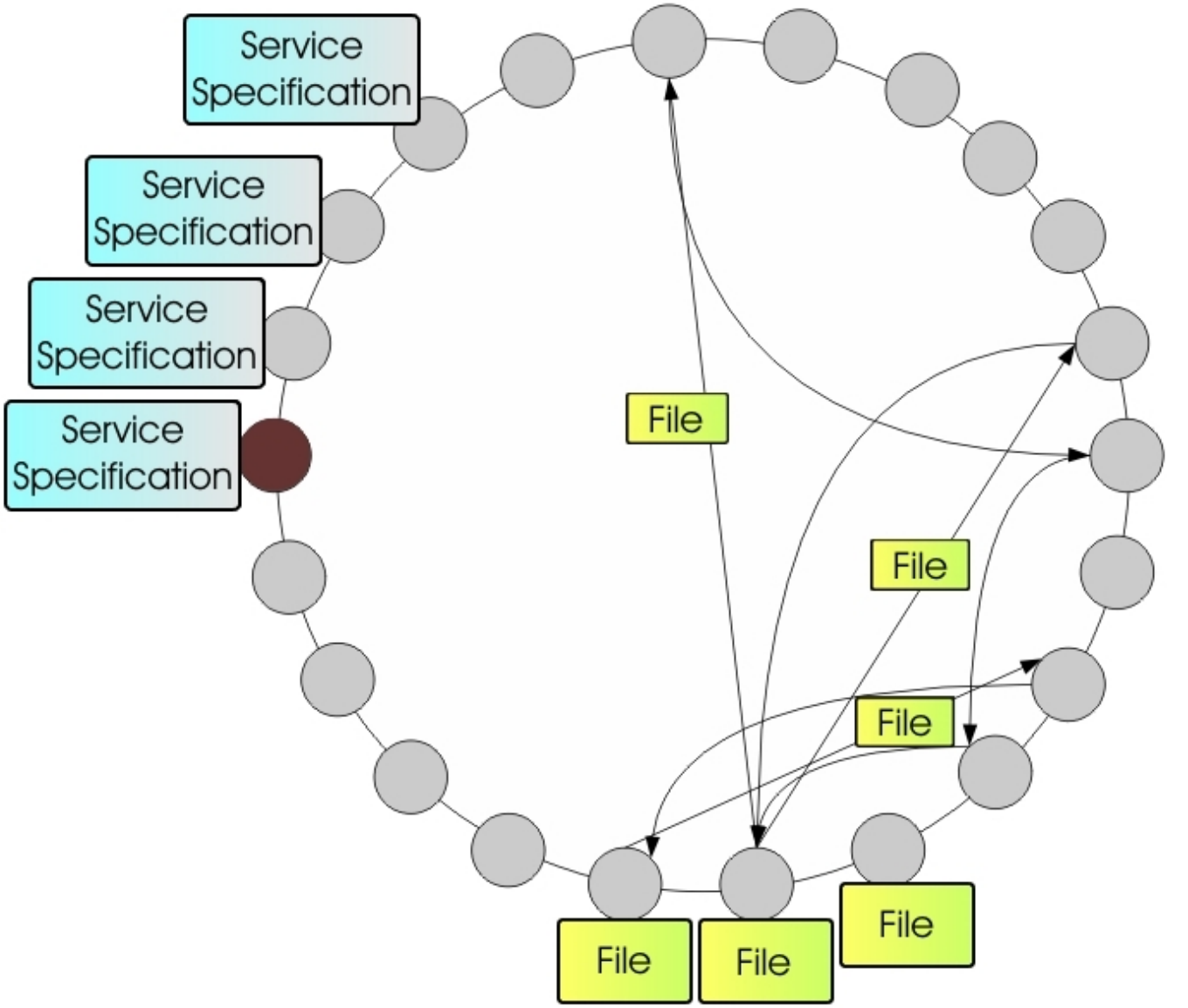
Service creation



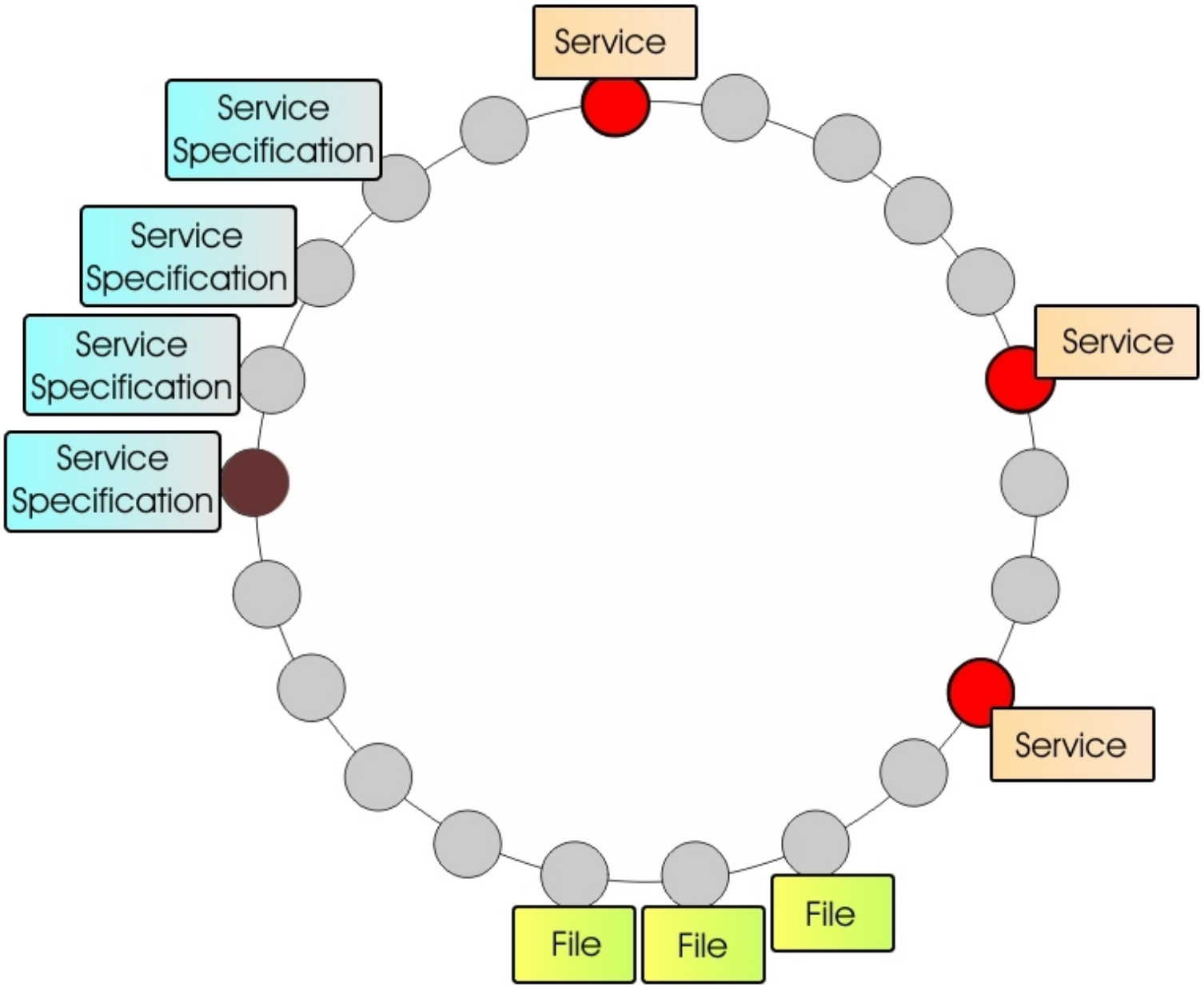
Service activation



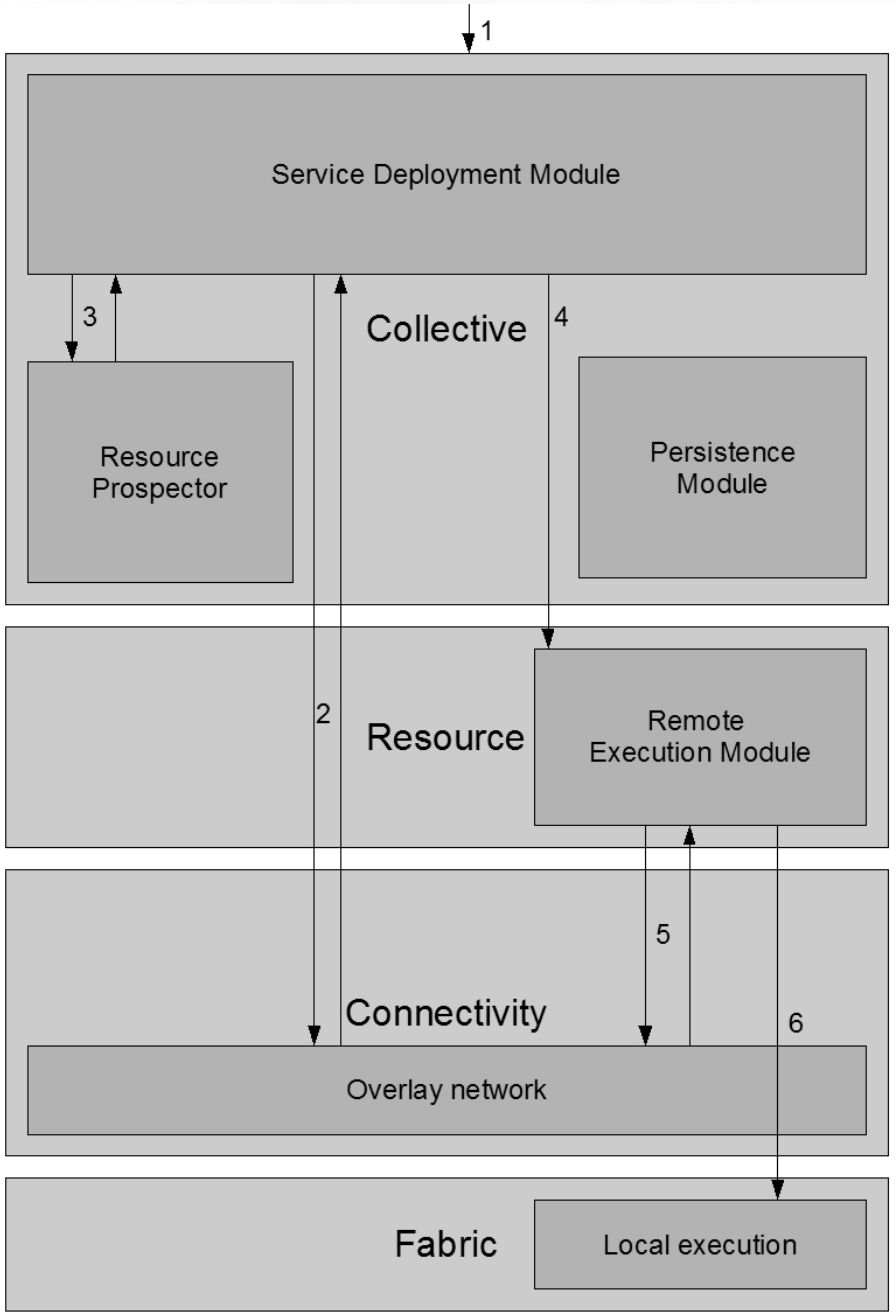
Service activation



Service activation



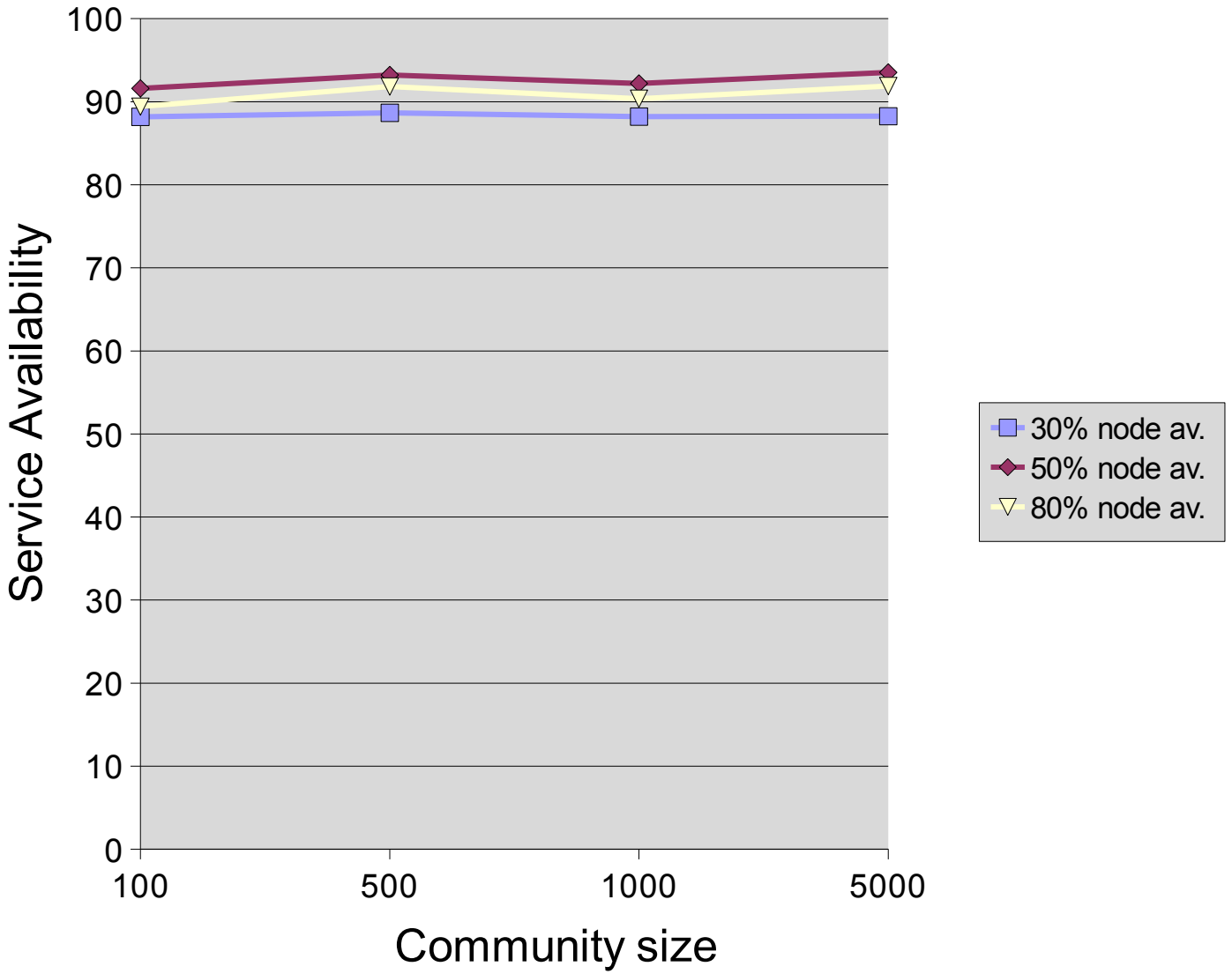
Service activation



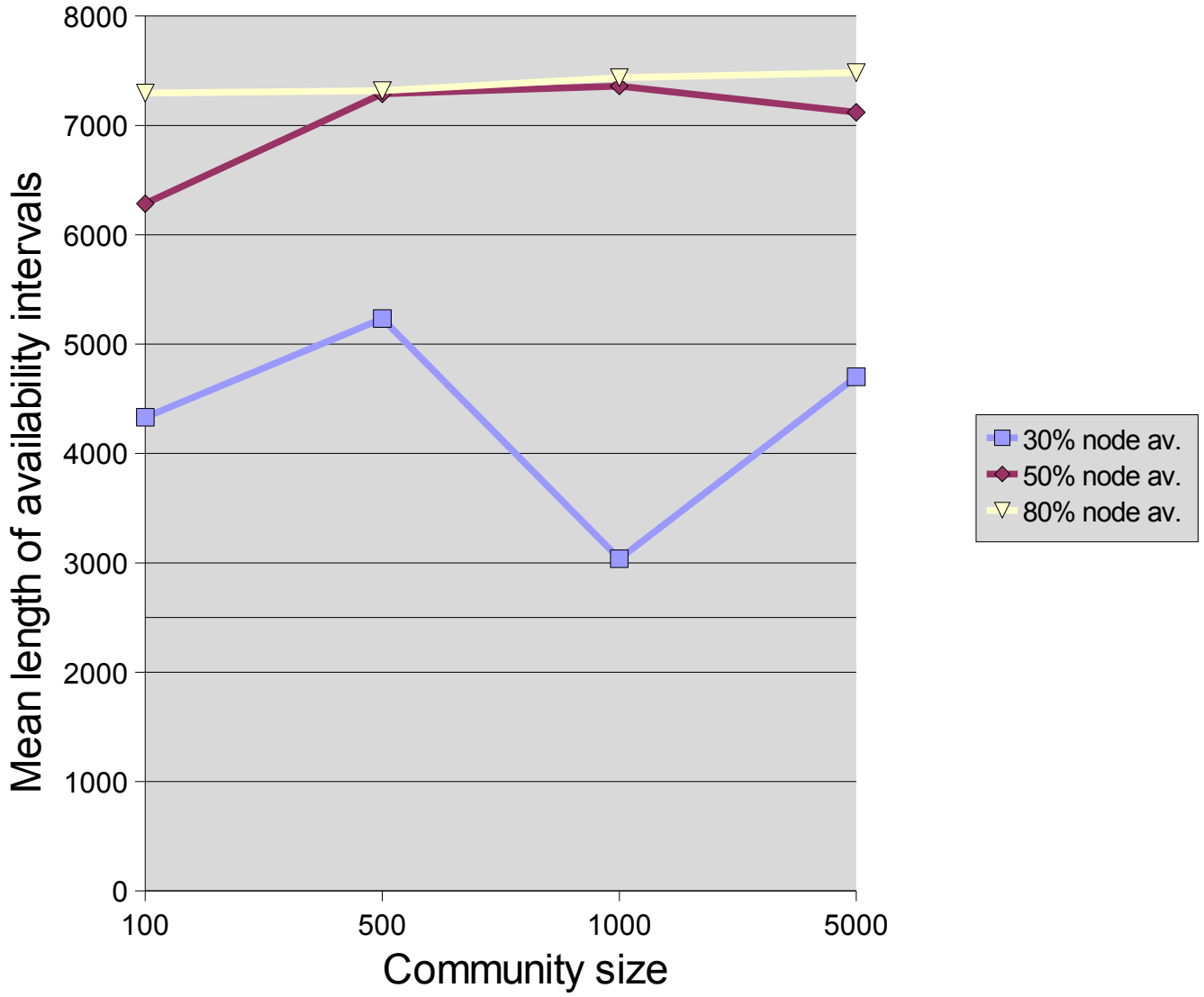
Validation

- Implemented in DHT simulator PlanetSim.
  - Chord DHT.
- Centralized resource prospector.
- No specific resource requirements.
- Different configurations
  - Node availability: 30%, 50%, 80%
  - Community size: 100, 500, 1000, 5000 nodes

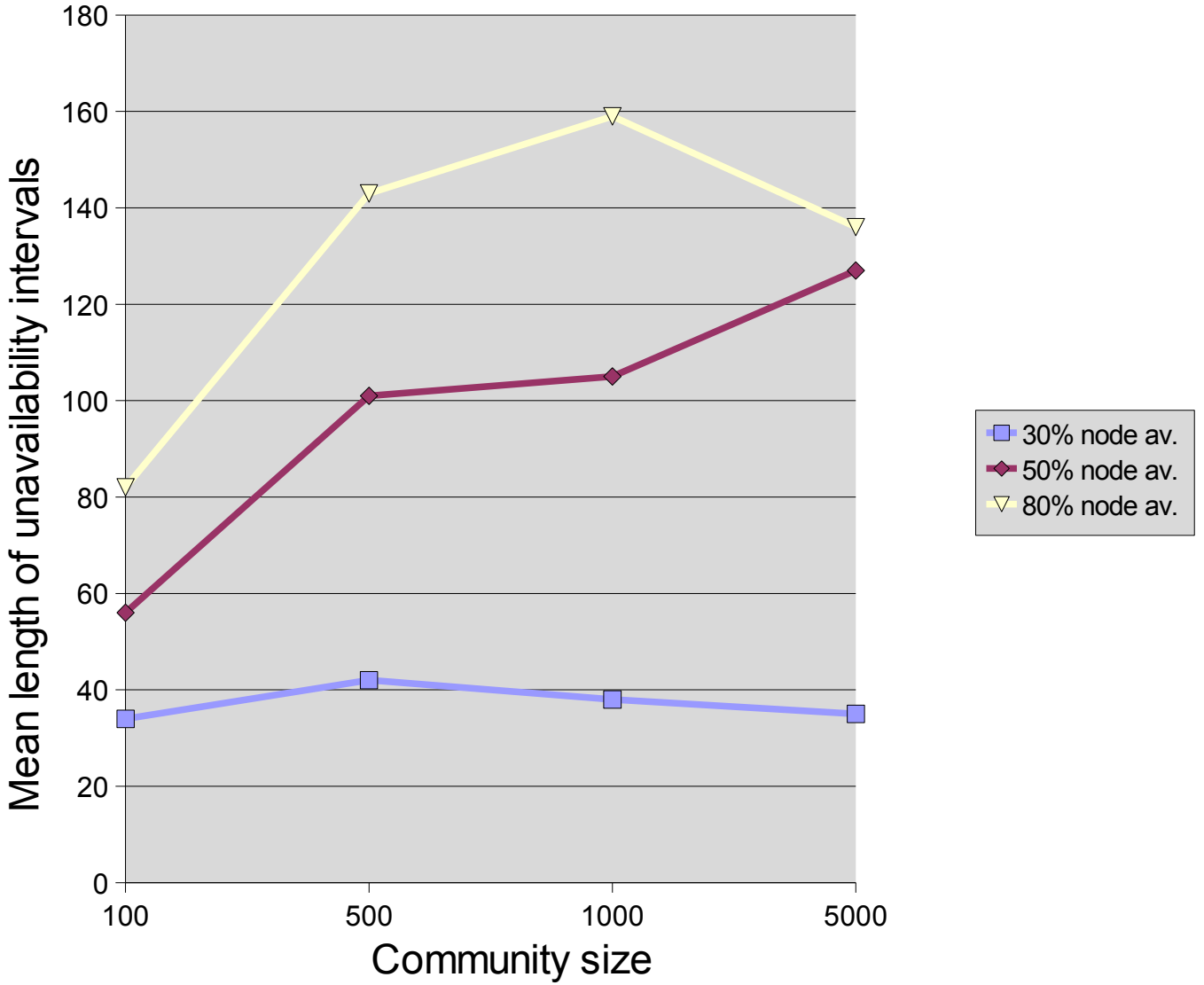
Validation


100
90
80
70
60
50
40
30
20
10
0
Service Availability
100
500
1000
5000
Community size
30% node av.
50% node av.
80% node av.

Validation


8000
7000
6000
5000
4000
3000
2000
1000
0
Mean length of availability intervals
100
500
1000
5000
Community size
30% node av.
50% node av.
80% node av.

Validation


180
160
140
120
100
80
60
40
20
0
Mean length of unavailability intervals
100
500
1000
5000
Community size
30% node av.
50% node av.
80% node av.

Conclusions

- We have presented a best effort mechanism for service deployment.
- Offer good availability for services from multiple low-availability resources.
- Future work:
  - Test its performance with a variety of requirements and resources.
  - Choose an scalable mechanism for resource discovery.

Thanks for your attention