



Adaptive Replica Management for Large-scale Object-based Storage Devices

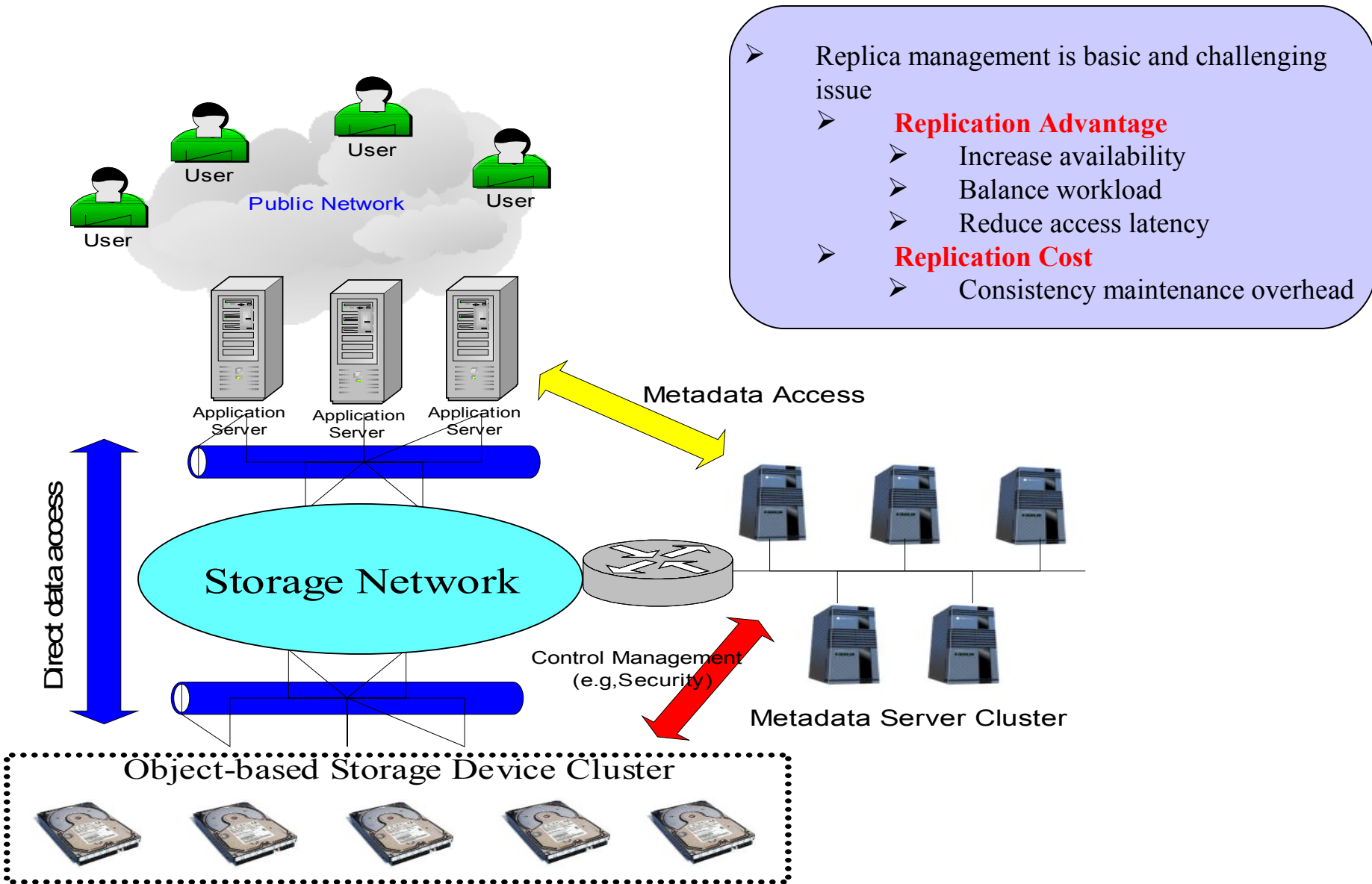
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Outline

1. Introduction
2. Issues of Object Replication Scheme
3. Adaptive Replica Management Model
4. Implementation
5. Evaluation
6. Conclusion

1. Introduction



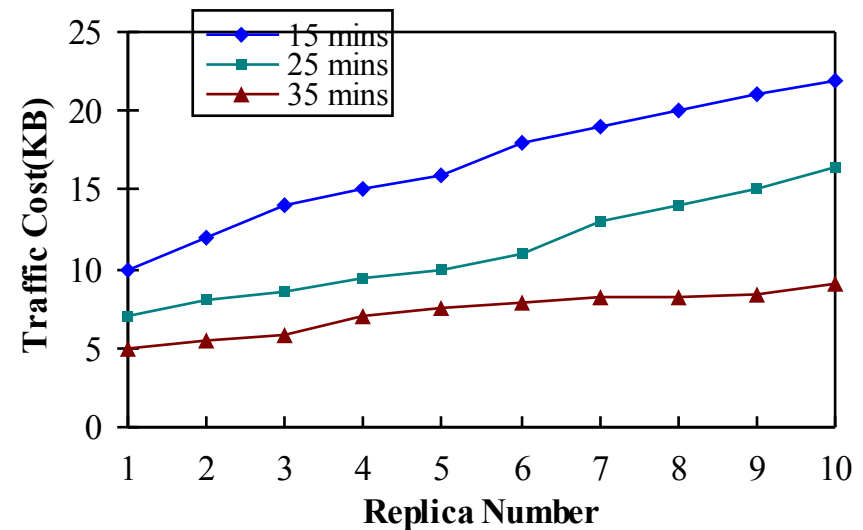
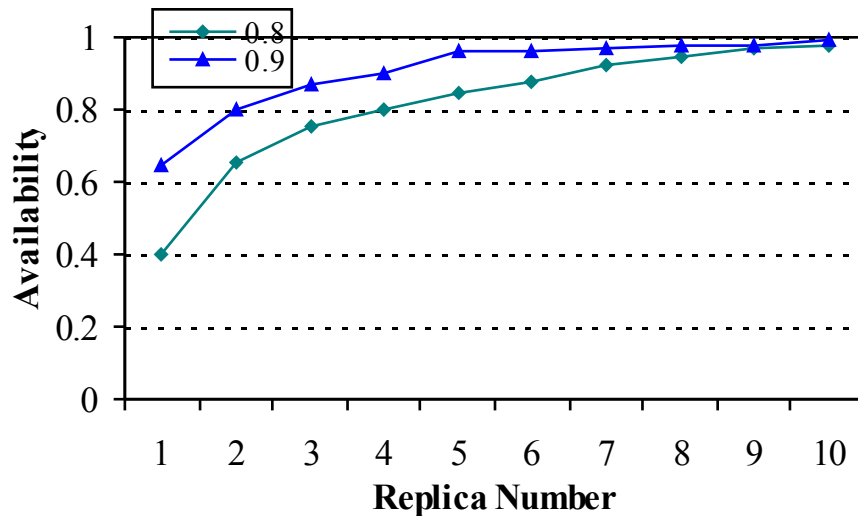
2. Issues of Object Replication Scheme

Availability

- Minimum replica can be maintain to ensure the given availability

Consistence Maintenance overhead

- More replicas consumes more network resource to maintain consistency



3. Adaptive Replica Management Model

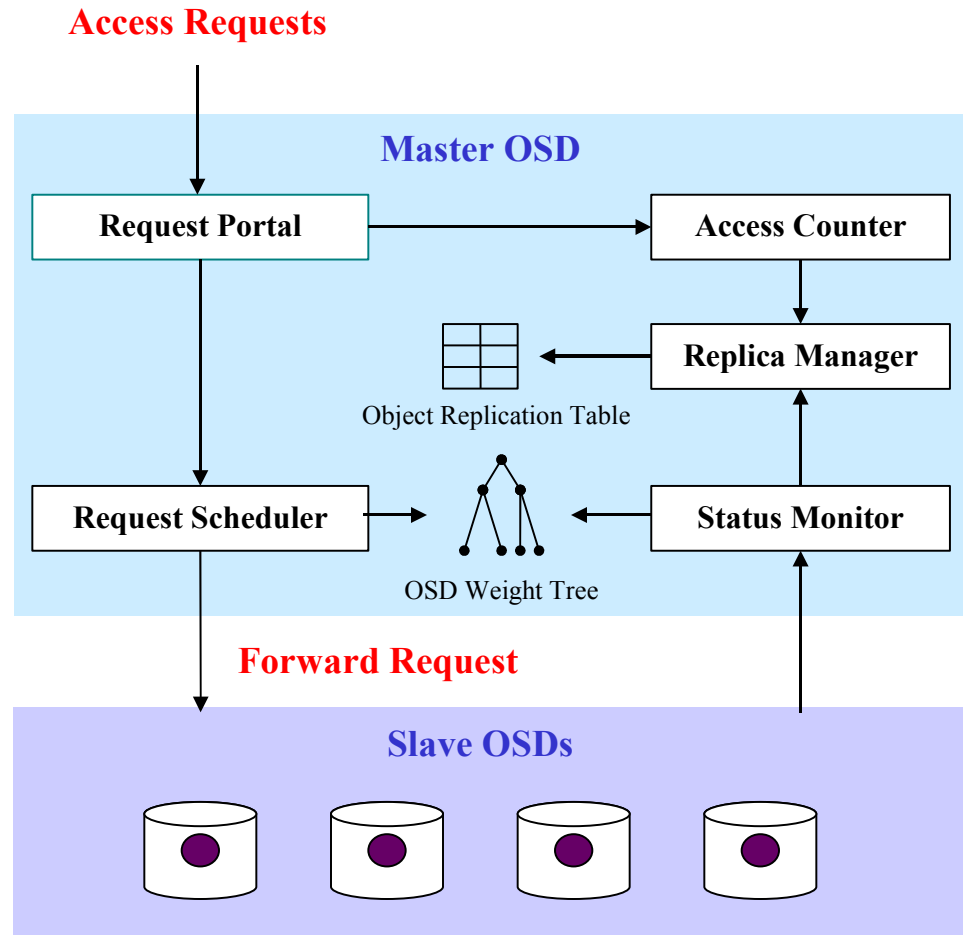
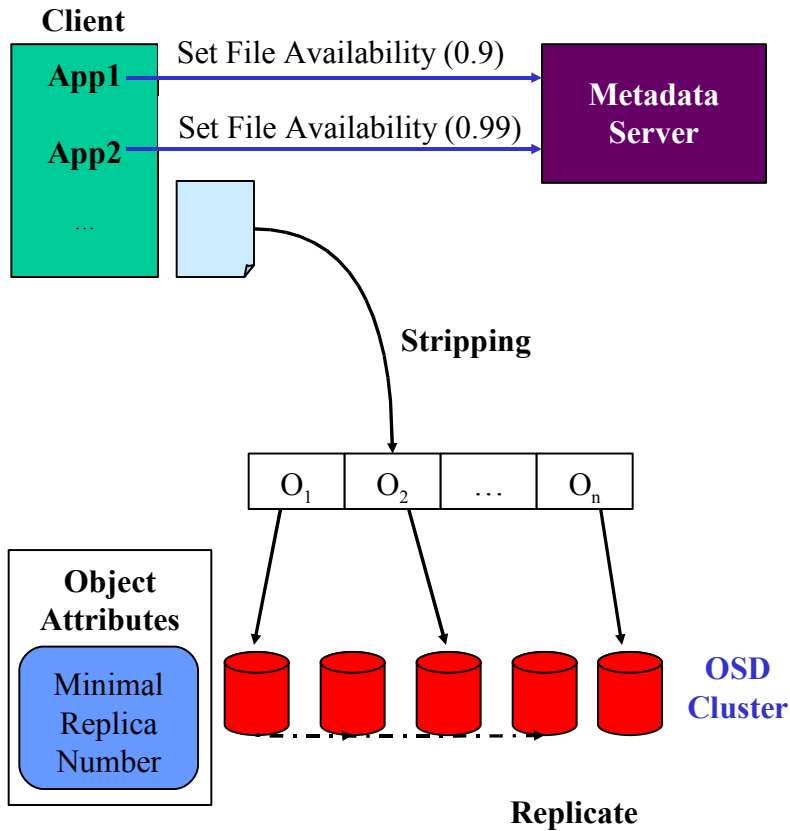
□ Motivation

- How many replicas the system should keep **at least** to maintain certain object availability?
- How many replicas the system can support **at most** to maintain object consistency under a certain network environment?

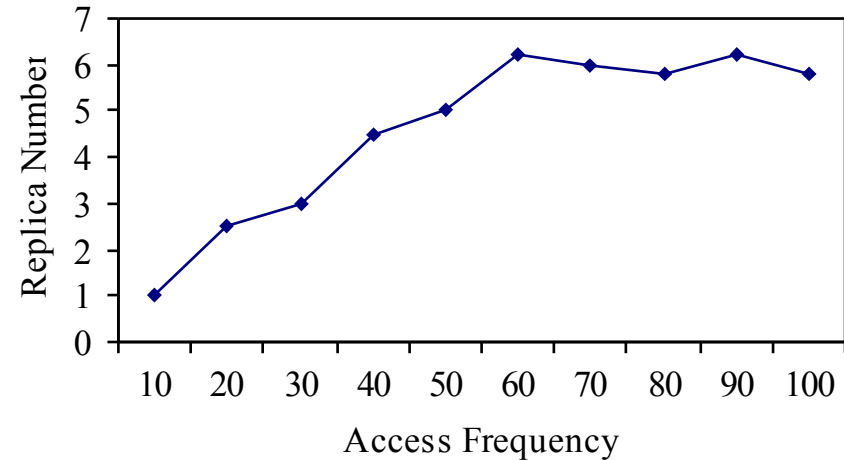
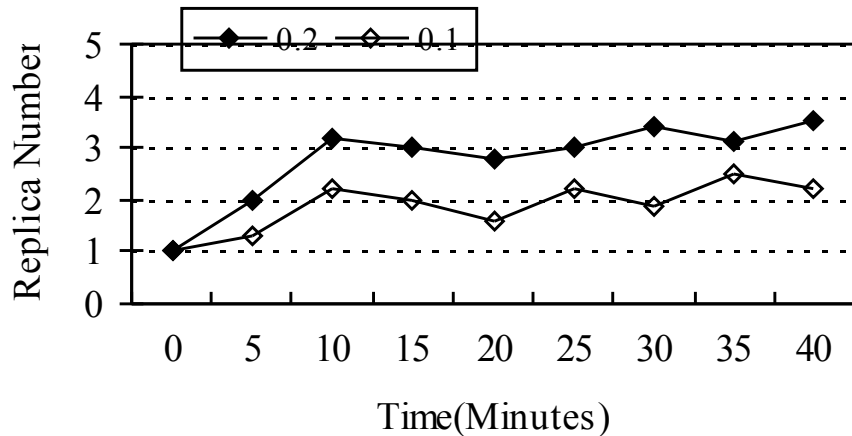
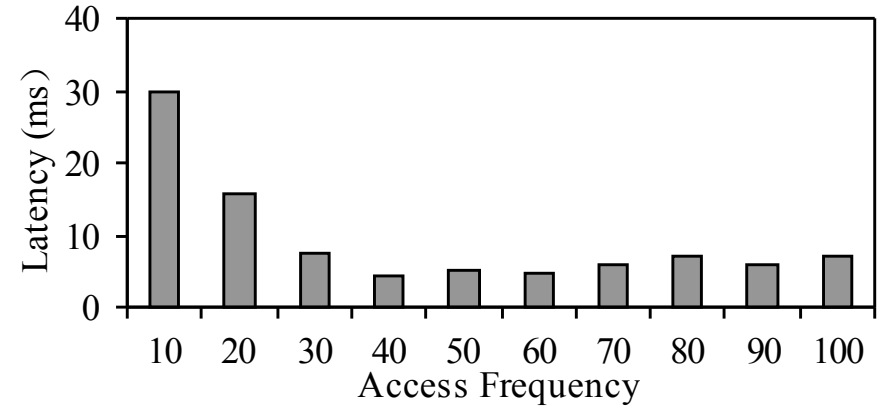
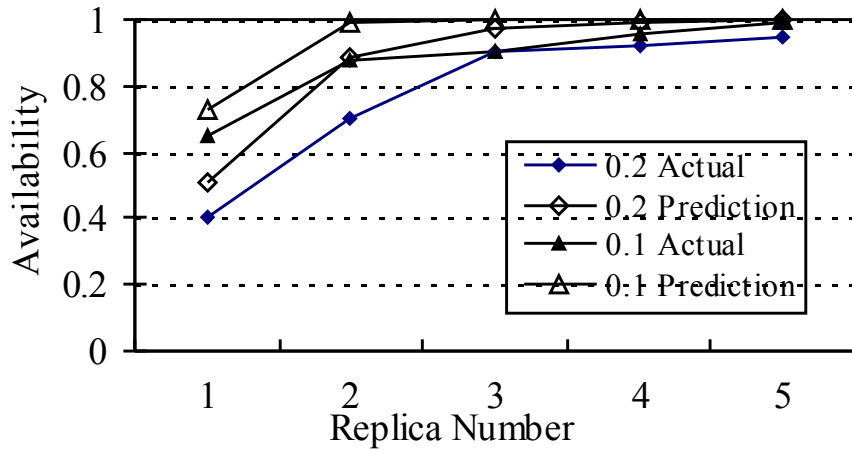
$$\left\{ \begin{array}{l} [1 - p^k]^m \geq A_{except} \\ (S_{obj} + L_{msg}) \times F_u \times k \leq \alpha B_{sys} \end{array} \right.$$

- From the above model, the minimal replica number and maximum replica number can be calculated for any given availability under certain network environment. Each OSD runs the model and dynamically adjusts the number of object replica.

4. Implementation



5. Evaluation



6. Conclusion

- ❑ This paper builds up a dynamic model to adapt to the changes of OSD clusters and satisfy file availability in reasonable cost.
- ❑ In the future work, we will introduce more object attributes to design OSD Qos model according to object-based storage requirements such as availability, access delay, I/O speed and workload.

Thank You!