RACS: a case for cloud storage diversity

Conference Paper · September 2010

DOI: 10.1145/1807128.1807165 · Source: DBLP

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RACS: A Case for Cloud Storage Diversity

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ABSTRACT

Categories and Subject Descriptors

General Terms

Keywords

1. INTRODUCTION

vendor lock-in

SoCC'10,

(put, get, delete, list

2. WHY SHOULD WE DIVERSIFY?

do

Outages A

Economic Failures

economic failure

2.1 Avoiding Storage Vendor Lock-in

2.2 Incentives for Redundant Striping

n > m,

Tolerating Outages.

Tolerating Data Loss.

Adapting to Price Changes.

Adapting to New Providers.

Control Monetary Spending.

Choice in Data Recovery.

put	bucket, key, object	
get	bucket, key	
delete	bucket, key	
create	bucket	
delete	bucket	
list		bucket
list		

Table 1: Amazon S3 operations

3. DESIGN

buckets

keys

objects

repositories,

put

get

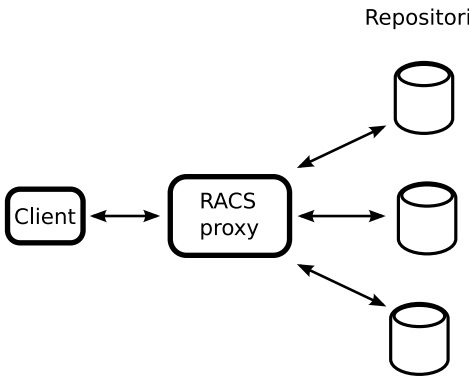


Figure 1: RACS single-proxy architecture

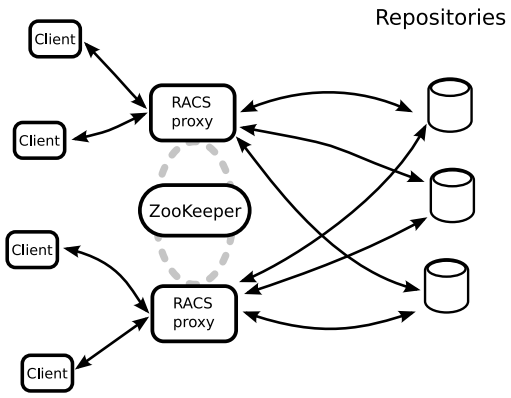


Figure 2: Multiple RACS proxies coordinate their actions using ZooKeeper

3.2 Failure Recovery

3.3 Policy Hints

3.4 Repository Adapters

3.5 Performance Overhead

Bandwidth

Latency

put

get

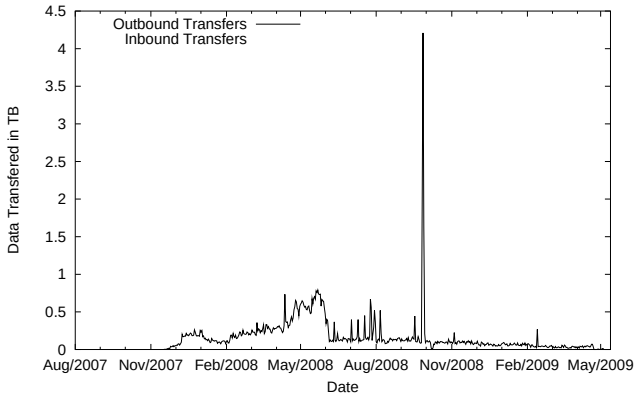
list

3.6 RACS Prototype Implementation

4. AN INTERNET ARCHIVE IN THE CLOUD

4.1 Trace Characteristics

4.2 Cost of Moving to The Cloud


Outbound Transfers
Inbound Transfers
Data Transfered in TB
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Aug/2007
Nov/2007
Feb/2008
May/2008
Aug/2008
Nov/2008
Feb/2009
May/2009
Date

put	list		*			
get						

Table 2: Simpli ed pricing schemes of different cloud storage providers.

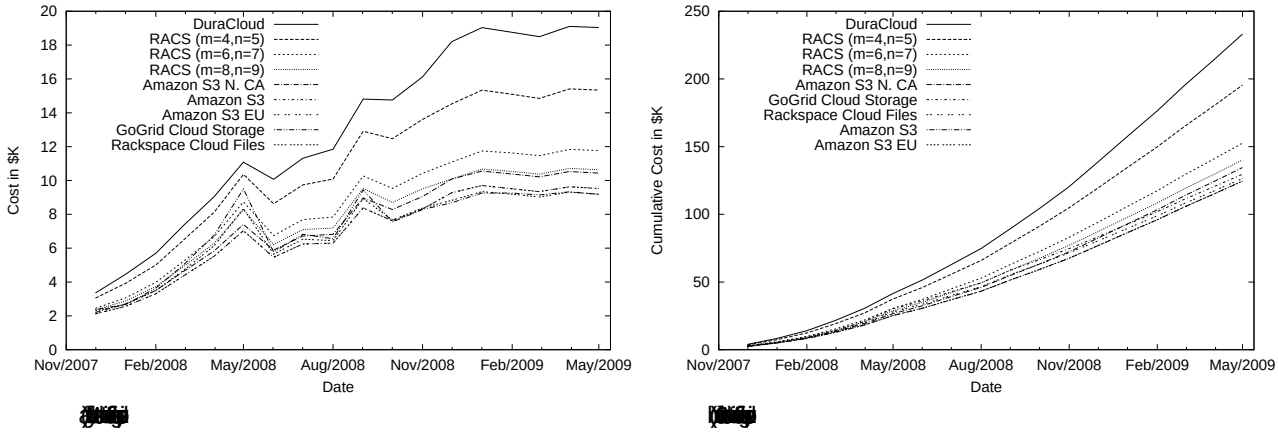


Figure 5: Estimated monthly and cumulative costs of hostingon the cloud

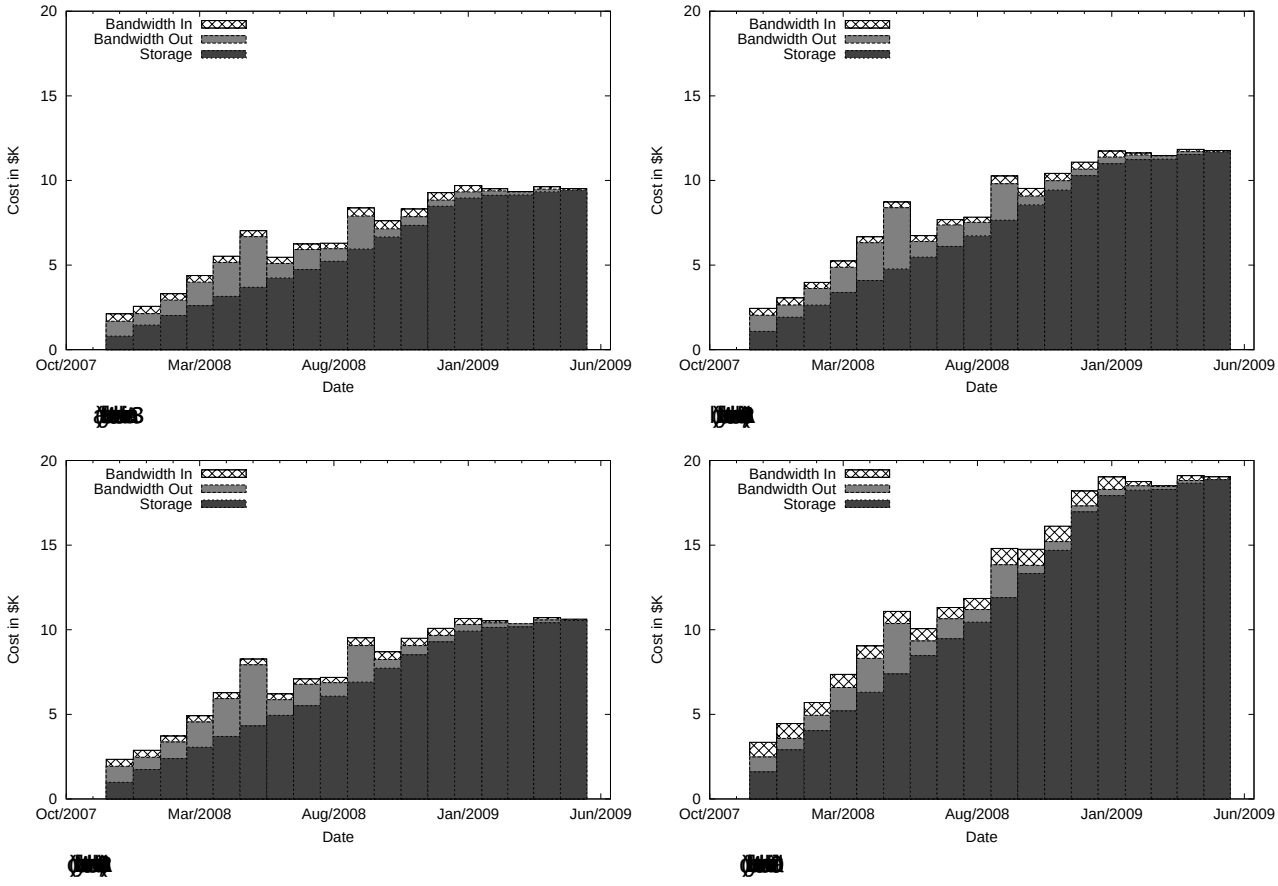


Figure 6: Breakdown of cloud storage costs

Table 3: Upload Snapshot Benchmark. Amazon S3 and estimated Rackspace (RS) costs. Monthly cost is the same for both

Table 4: Restore Snapshot Benchmark. Amazon S3 and estimated Rackspace (RS) costs.

Table 5: Vendor Migration Benchmark. Amazon S3 and estimated Rackspace (RS) costs.

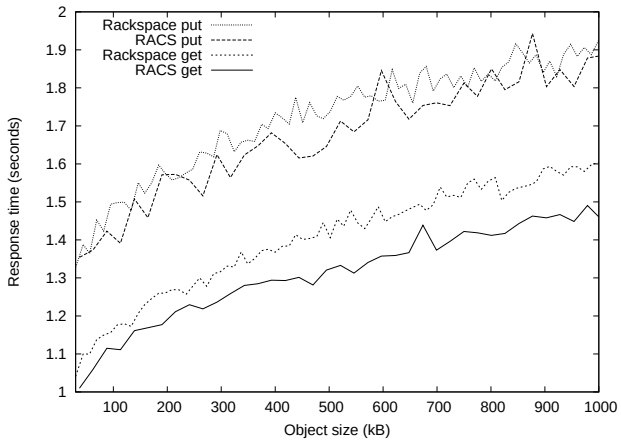


Figure 9: How long it takes RACS and Rackspace to handle object put and get requests, as a function of object size. Alesponse times averaged over four runs.

5.2 Performance

(m; n)

6. RELATED WORK

7. CONCLUSIONS

economic

8. FUTURE WORK

9. AVAILABILITY

10. ACKNOWLEDGMENTS

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