ElastiCache

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What is ElastiCache?

AWS ElastiCache

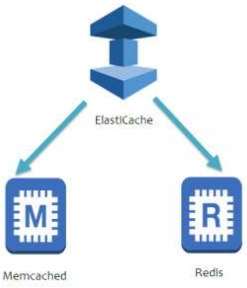
- In-Memory Key-Value Store
- High-Performance, ultra-fast access
- Redis and Mencached
- Hardened by Amazon

redis

MEMCACHED

Background

- Released Date:
  - Mencached on August 2011
  - Redis on September 2013
- Motivations:
  - To make deployment faster and easier



History of ElastiCache

- Added new Redis memory management parameter and enhanced Redis restore.	Mar 2017
- Added support for M4 and R3 node types	2016
- Added support for many US and EU regions Upgraded supports for Redis and Mencached	2015-2016
- Added Multi-AZ with auto failover support for Redis replication groups	Oct 2014
- Offers Redis cache engine	Sep 2013
- Brings cache node auto discovery support to PHP and Java	Jan 2013
- Support Amazon VPC	Dec 2012
- Offers Mencached cache engine	Aug 2011

Key Features

- Object Caching
- Multithreaded
- No Persistence
- Low Maintenance
- Easy to Scale horizontally

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- Single-threaded
- Atomic operations
- Advanced data types
- Persistence
- Pub/sub messaging
- High Replica/ failover

Use Cases

- Caching
- Real-Time Leaderboard
- Chat and Messaging
- Rate Limiting

Caching

"By using RDS we saved on operations cost for our relational databases. Using ElastiCache we could boost the read performance of RDS and offload the massive request rate"

Jeongsang Baek
VP Engineering, IGA Works

igaworks

"With ElastiCache Redis as caching layer, the write throughput on DynamoDB has been set to 3500, down from 35000, reducing the cost by 6x."

Kuldeep Chowhan
Engineering Manager, Expedia

Expedia

Real-Time Leaderboard

```
ZADD "leaderboard" 1201 "Gollum"
ZADD "leaderboard" 963  "Sauron"
ZADD "leaderboard" 1092 "Bilbo"
ZADD "leaderboard" 1383 "Frodo"

ZREVRANGE "leaderboard" 0 -1
1) "Frodo"
2) "Gollum"
3) "Bilbo"
4) "Sauron"
```

gumi

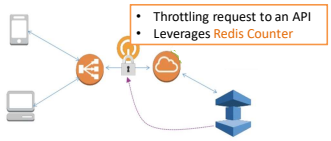
zynga

Chat and Messaging

Chat and Messaging

```
SUBSCRIBE chat_channel:114
PUBLISH chat_channel 114 "Hello all"
>> ["message", "chat_channel:114", "Hello all"]
UNSUBSCRIBE chat_channel:114
```

Rate Limiting

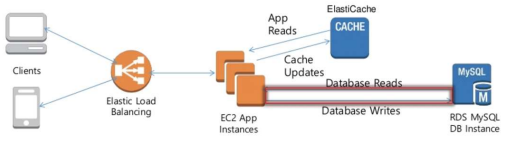


Advantages

AWS ElastiCache

- Real-Time / Fast Access
- Fully Managed
- Easy to Deploy, Use, Scale
- Redis and Memcached Compatible
- Secure and Hardened
- Highly Available and Reliable
- Easy Monitor via CloudWatch

Limitations



- Costly for very large database
- Slow write & update time

Cost Discussion

Node Types:

Node type	Memory	Cores	Hourly Cost *	Nodes Needed	Total Memory	Total Cores	Monthly Cost †
cache.t2.medium	3.22 GB	2	$ 0.068	13	41.86 GB	26	$ 636.48
cache.m3.large	6.05 GB	2	$ 0.182	7	42.35 GB	14	$ 917.28
cache.m4.large	6.42 GB	2	$ 0.156	7	44.94 GB	14	$ 768.24
cache.r3.large	13.50 GB	2	$ 0.228	3	40.50 GB	6	$ 492.48
cache.m4.xlarge	14.28 GB	4	$ 0.311	3	42.84 GB	12	$ 671.76

* Hourly cost per node as of August 4, 2016.

† Monthly cost at 100% usage for 30 days (720 hours).

- Supports different types of cache nodes
- Pay-as-you-go service
- Memcached deployments will have more and smaller nodes
- Redis deployments will use fewer, larger node types.

Possible Alternatives

Amazon RDS

Amazon RDS Read Replicas
- Provides enhanced performance for DB instances
- Pros: great for read-heavy database workloads & distributing data to remote sites or apps
- Cons: Read replicas are not as fast as in-memory caches

amazon cloudfront

Amazon CloudFront Content Delivery Network (CDN)
- Caches web pages, images, and other static data at the edge, as close to end users as possible
- Pros: making data reusable and website scalable
- Cons: Can only cache rendered (static) page output

Amazon EC2

On-Host caching on Amazon EC2
- Stores data on each Amazon EC2 application instance
- Cons: cache invalidation, no efficiency gained,

Bad!!!

Conclusions

- ElastiCache performs better for real time read- and search- heavy applications (such as leadership board and chat room)
- However, do not use ElastiCache for dataset that are too large or write-heavy applications.

Demo#1

- We will show it in class…

Reference

- https://www.slideshare.net/AmazonWebServices/getting-started-with-amazon-elasticache
- https://aws.amazon.com/elasticache/redis/
- https://aws.amazon.com/elasticache/