Home of Redis

April 24, 2017

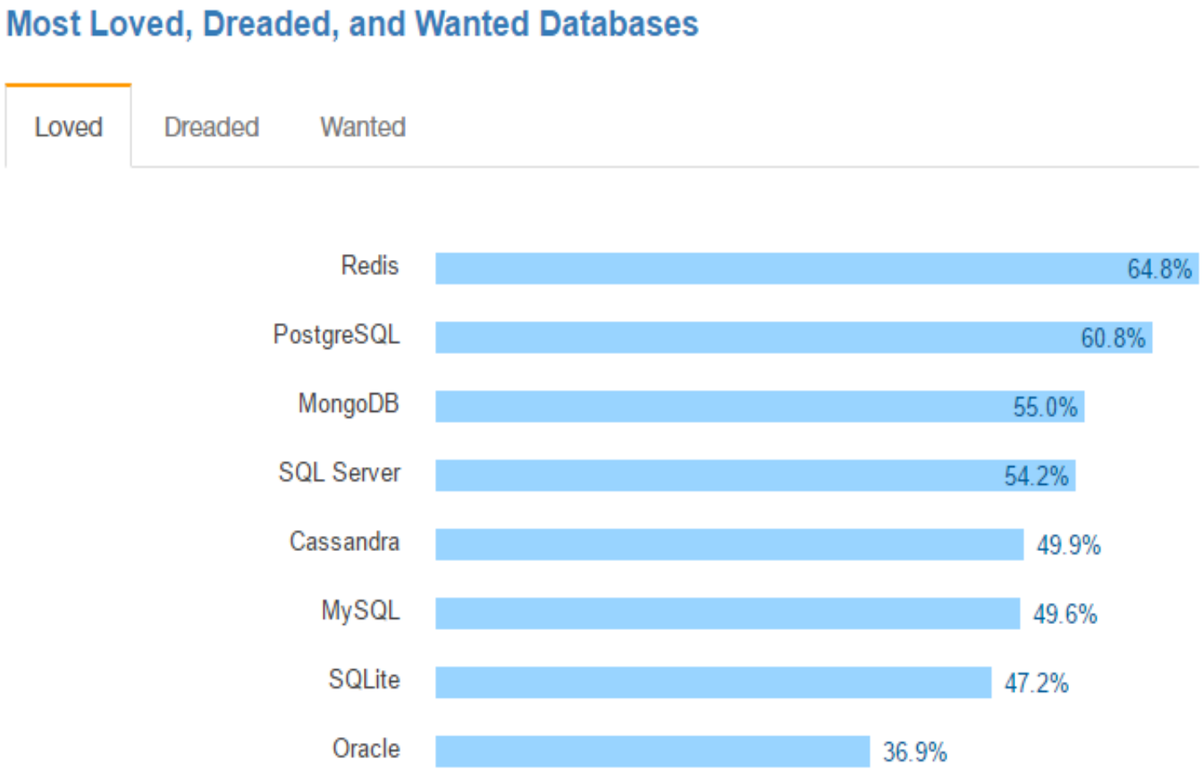
- Introduction to Redis and Redis Labs
- Redis with MySQL
- Data Structures in Redis
- Benefits of Redis[e]

Redis and Redis Labs

Open source. The leading **in-memory database platform**, supporting any high performance operational, analytics or hybrid use case.

The open source home and commercial provider of **Redis Enterprise (Redis^{e})** technology, platform, products & services.

Redis Tops Database Popularity Rankings



Stack Overflow Survey of 64,000 Developers:
“Redis is the MOST LOVED Database”

Redis Tops Database Popularity Rankings

.....#1 database technology on AWS

.....#1 database used by Node.js developers

.....#1 database in Top Paying Technologies

.....#1 NoSQL among Top 10 Data Stores

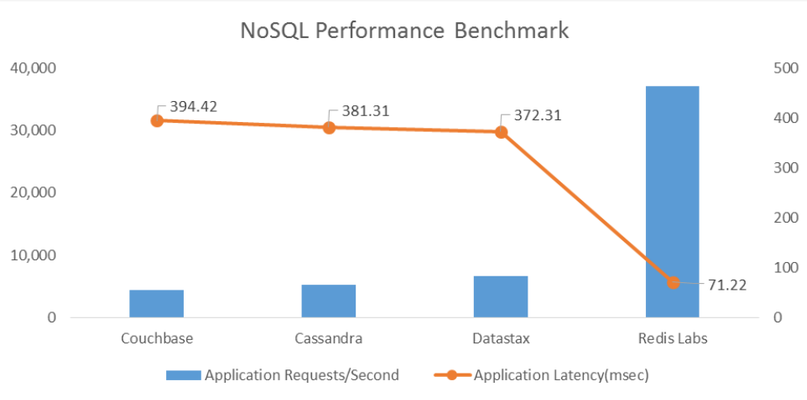
.....#1 database on Docker

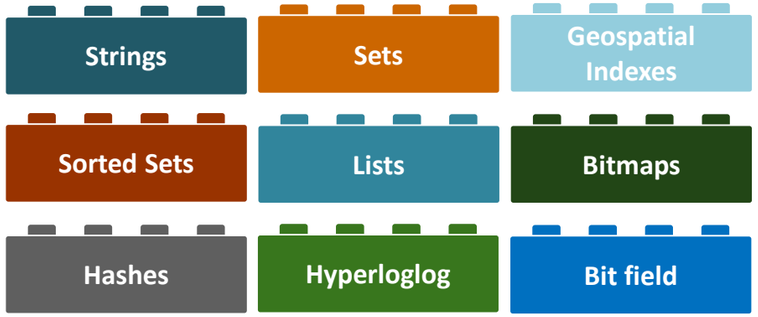
.....#1 NoSQL in User Satisfaction

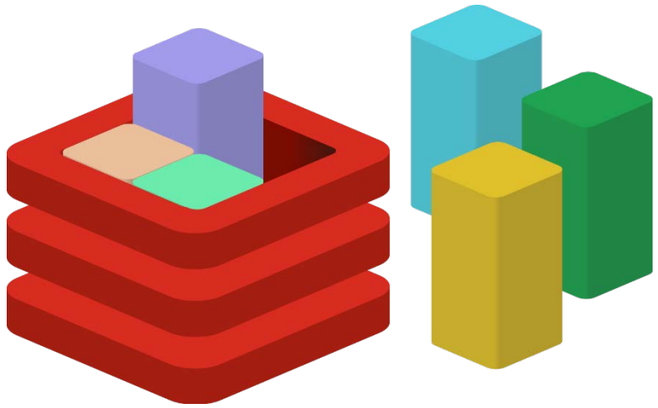
.....#1 in growth among top 3 NoSQL databases

.....#1 database in skill demand

Redis Top Differentiators







NoSQL Benchmark

Redis Data Structures

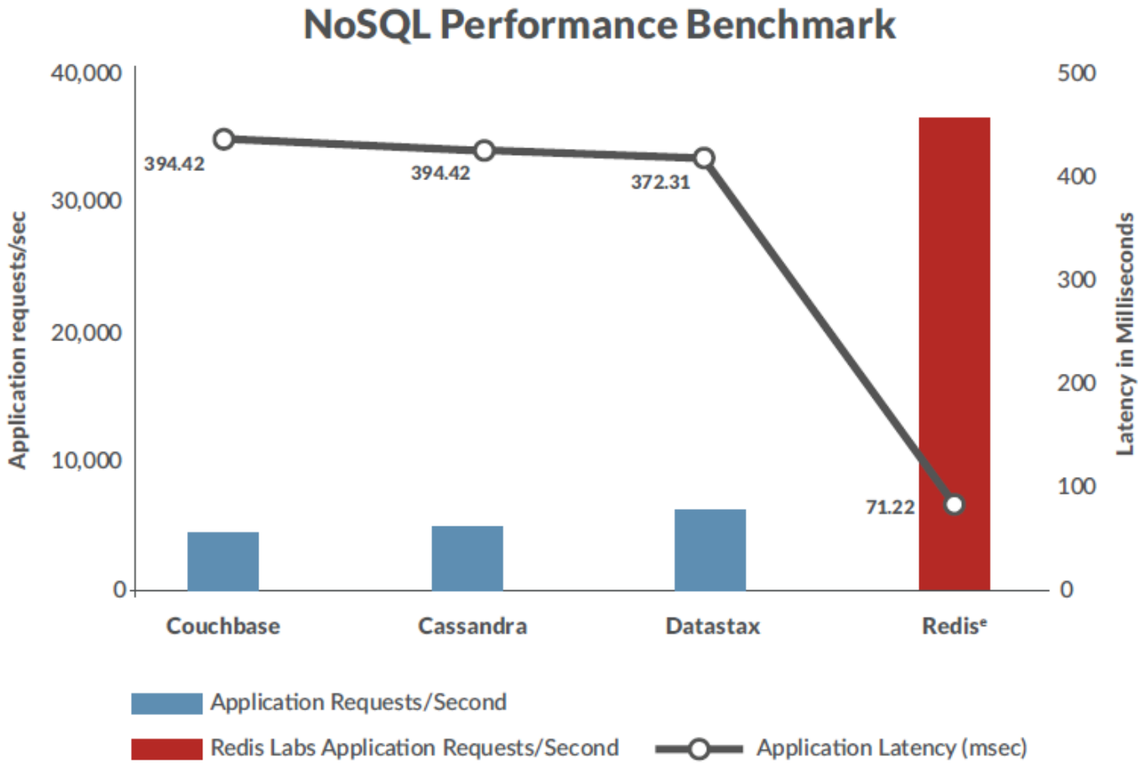
Redis Modules

Performance

Simplicity

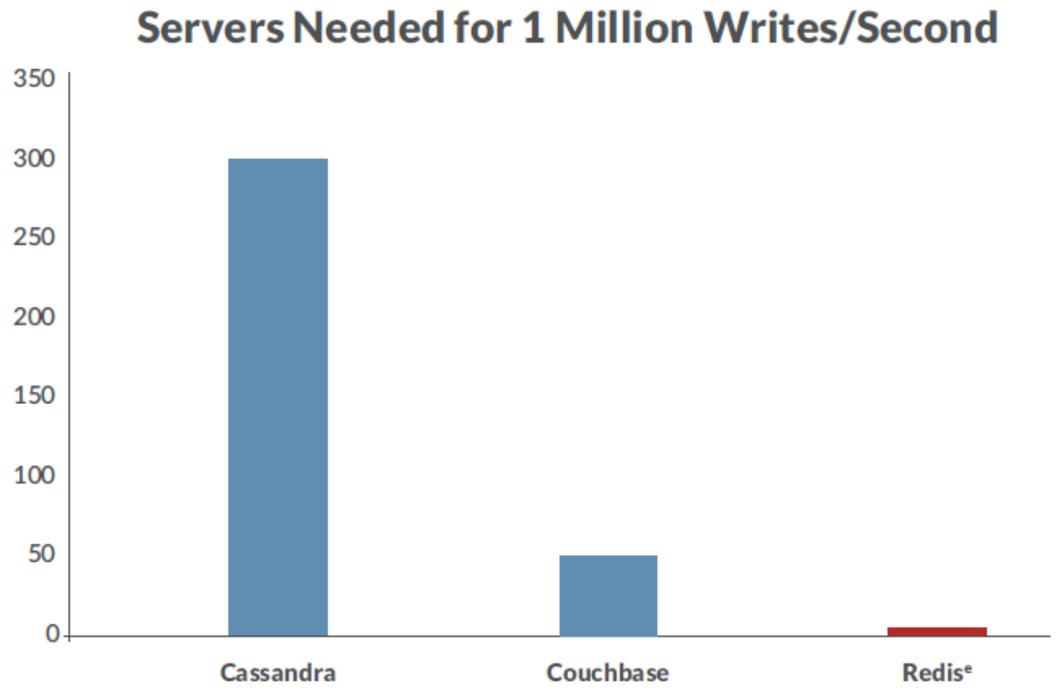
Extensibility

Performance: the Most Powerful Database



Highest Throughput at Lowest Latency in High Volume of Writes Scenario

Benchmarks performed by Avalon Consulting Group



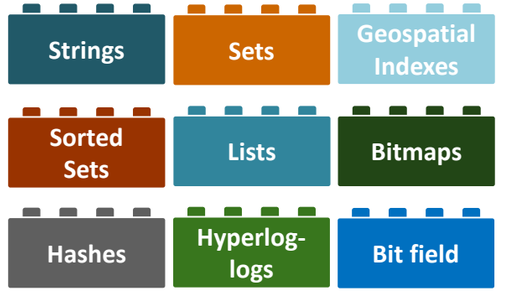
Lowest number of servers needed to deliver 1 Million writes/second

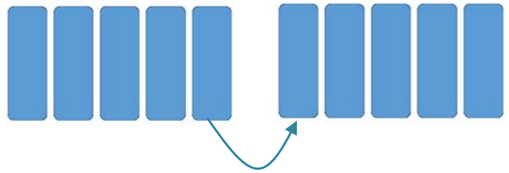
Benchmarks published in the Google blog

Simplicity: Data Structures - Redis' Building Blocks

- Data Structures like programmer's "Lego" blocks
- Simple commands for complex operations

Examples:





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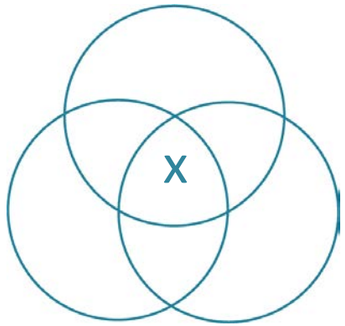

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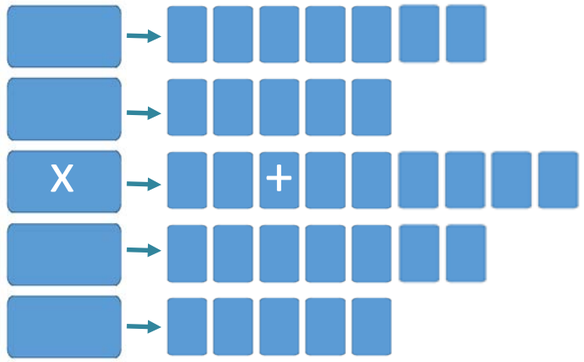
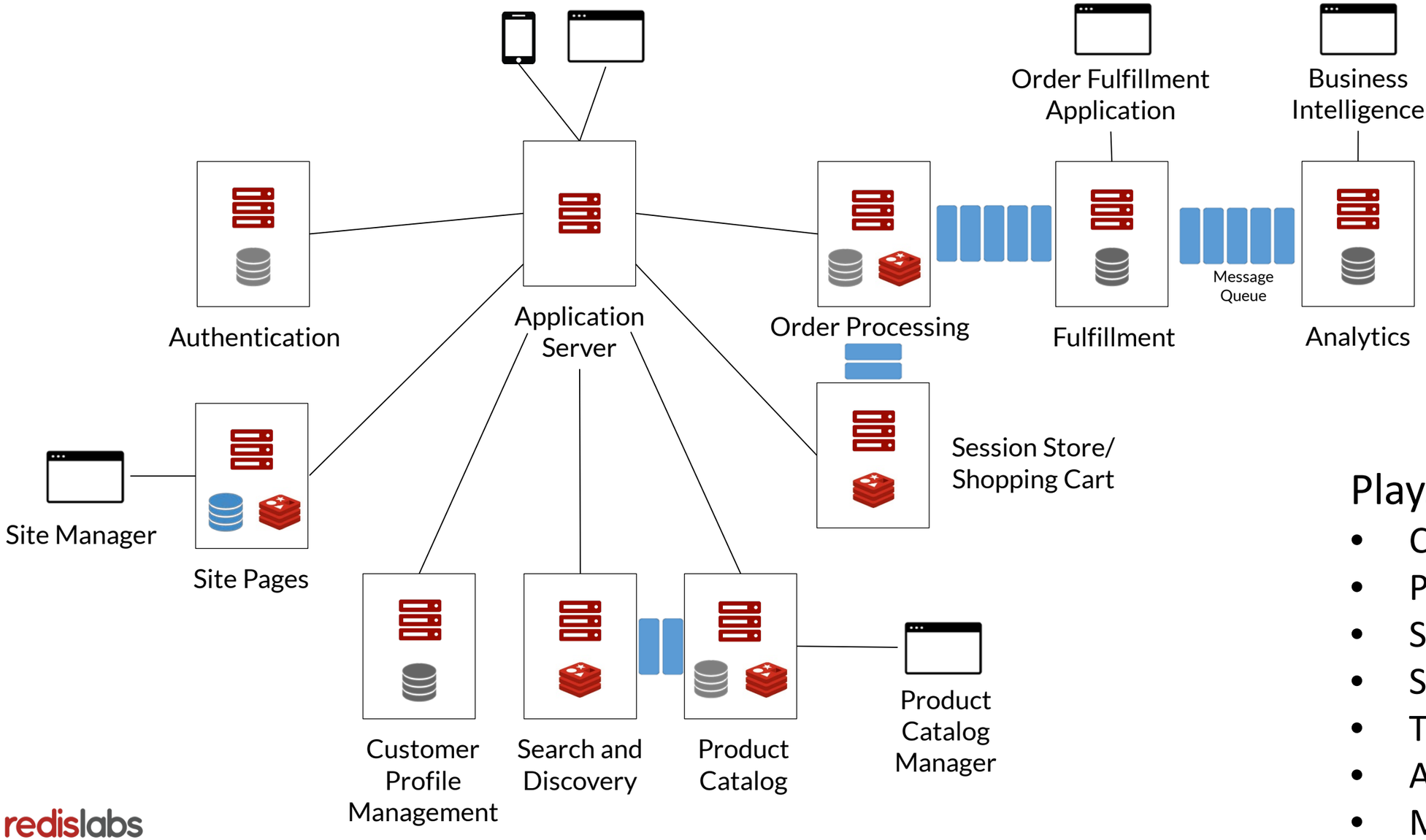


HINCRBY

While we say Redis is like Lego, some say it is like a…..

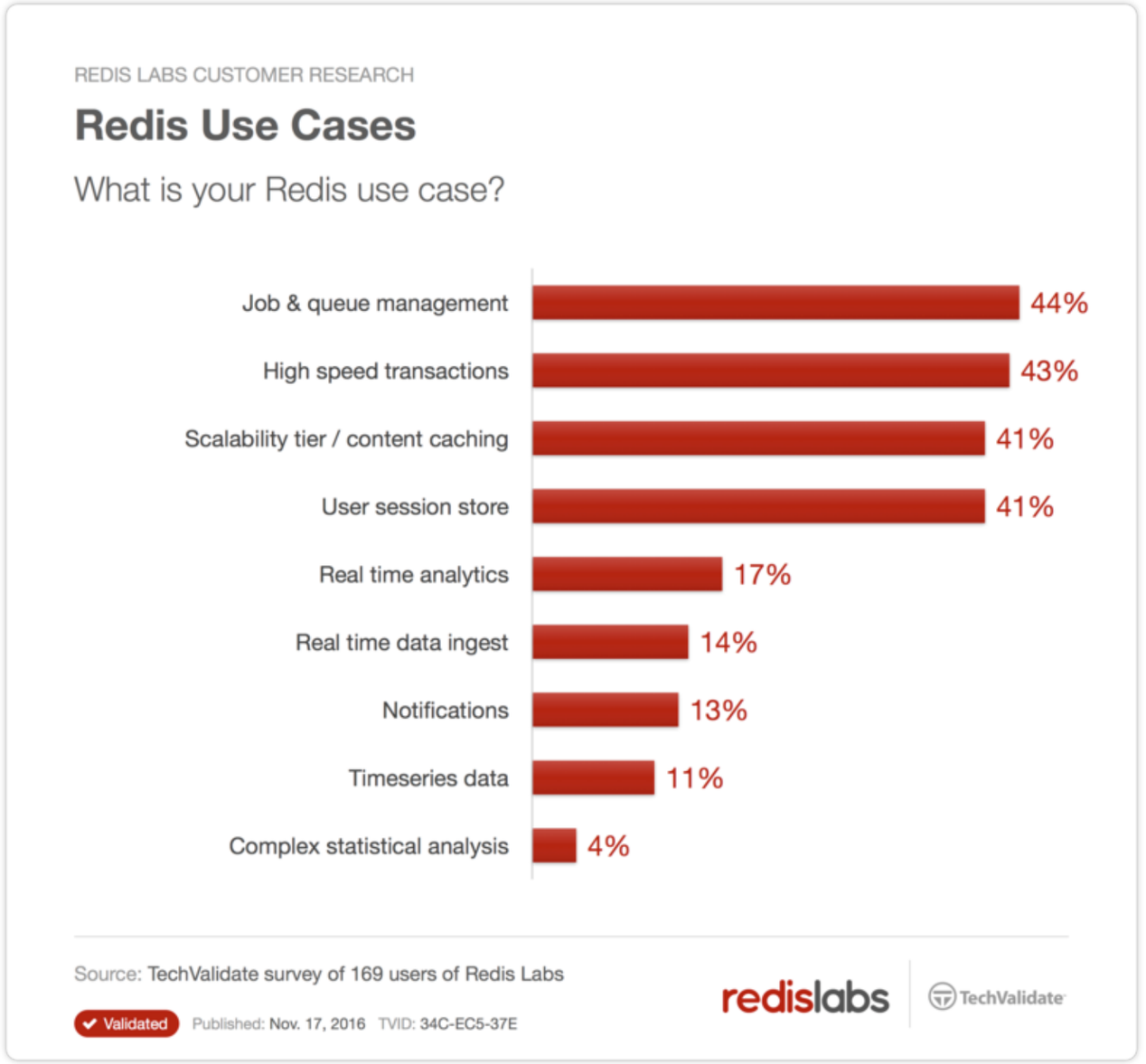
Redis^{e} - Swiss Army Knife of Microservices Architecture



Plays different roles

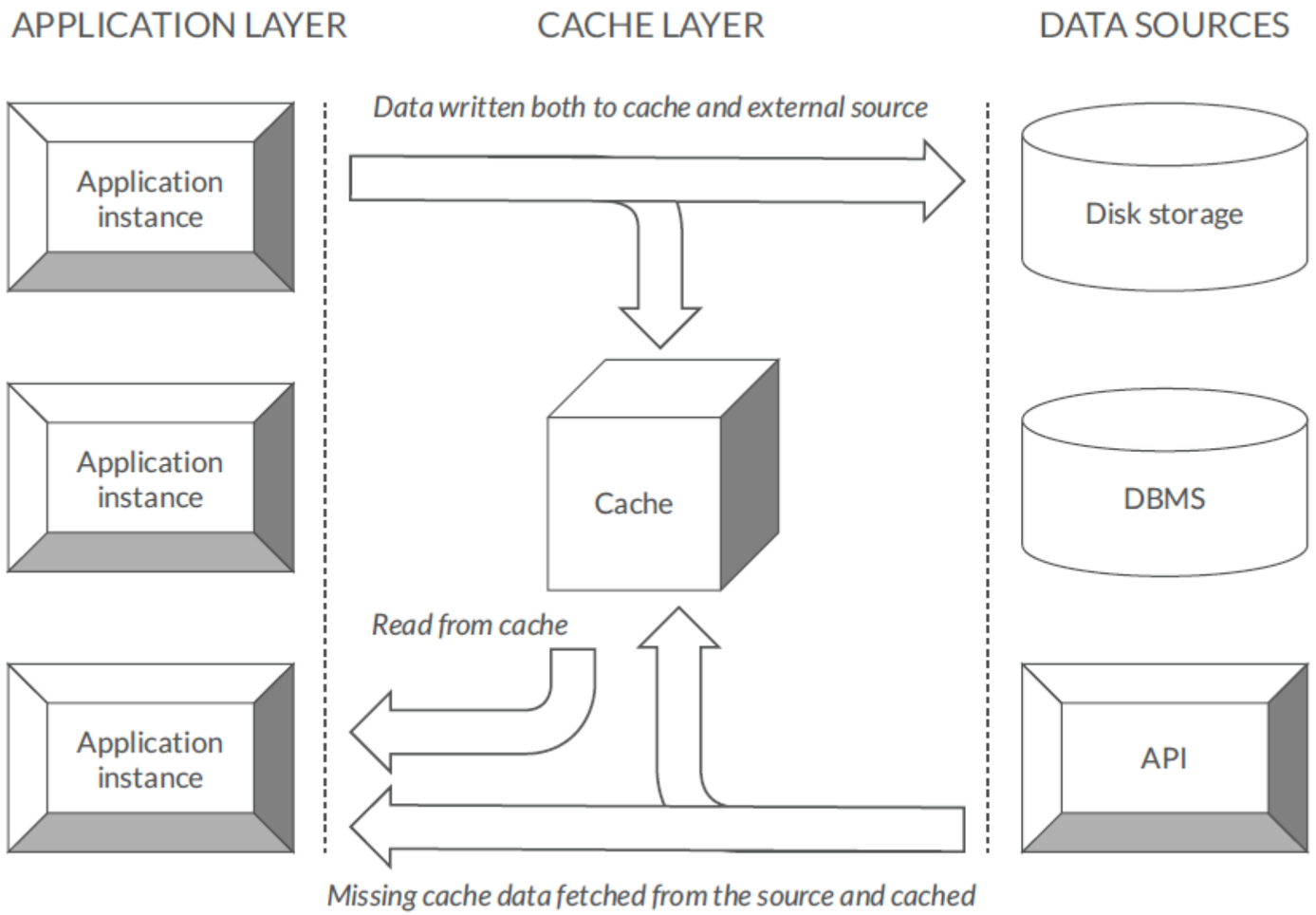
- Cache server
- Primary database
- Session store
- Search engine
- Time-series database
- Analytics database
- Message Broker

Popular Use Cases



Redis[e] with MySQL

Common Cache Use Case



A Simple Get/Set Program

```
import redis


r = redis.StrictRedis(\
          host='redis-10854.c11.us-east-1-2.ec2.cloud.redislabs.com ',\
          port=10854,\
          password='mypassword')

r.set('key1', '123')
print(r.get('key1'))
```

A Simple Get/Set Program

```
import redis.clients.jedis.Jedis;

public class RedisTest
{
      public static void main(String[] args) throws Exception{
            private static final String URL =
                        "redis-10854.c11.us-east-1-2.ec2.cloud.redislabs.com";
            private static final int PORT = 10854;
            private static final String PASSWORD = "mypassword";

            jedis = new Jedis(URL, PORT);
            jedis.auth(PASSWORD);

            jedis.set(“key1",“123");
            System.out.println(jedis.get(“key1"));
      }
}
```

Get creative with your keys

```
Select * from student_list
Where course = “Redis” and location = “Santa Clara”
```

How would you cache the results?

```
SET “student_list:Redis:Santa Clara” [Results]
```

Get creative with your keys

The advantage of separating attributes

1. Get students enlisted to Redis course at all locations

```
KEYS “student_list:Redis:*”
MGET “student_list:Redis:Santa Clara” “student_list:Redis:New York”…
```

2. Get students enlisted to all the courses in Santa Clara

```
KEYS “student_list:*:Santa Clara”
MGET “student_list:Redis:Santa Clara” “student_list:MySQL:Santa Clara”…
```

Why Redis is the best Cache Server?

- In-memory store – fast access time
- Implemented in C, optimized for best performance
- Pipelining

Why Redis is the best Cache Server?

- Is binary safe
- Value can be as large as .5GB
- You can even have a JPEG as a key
- Operations are atomic

Why Redis is the best Cache Server?

Wide variety of eviction policies to suit your application needs

- noeviction
- allkeys-lru
- volatile-lru
- allkeys-random
- volatile-random
- volatile-ttl

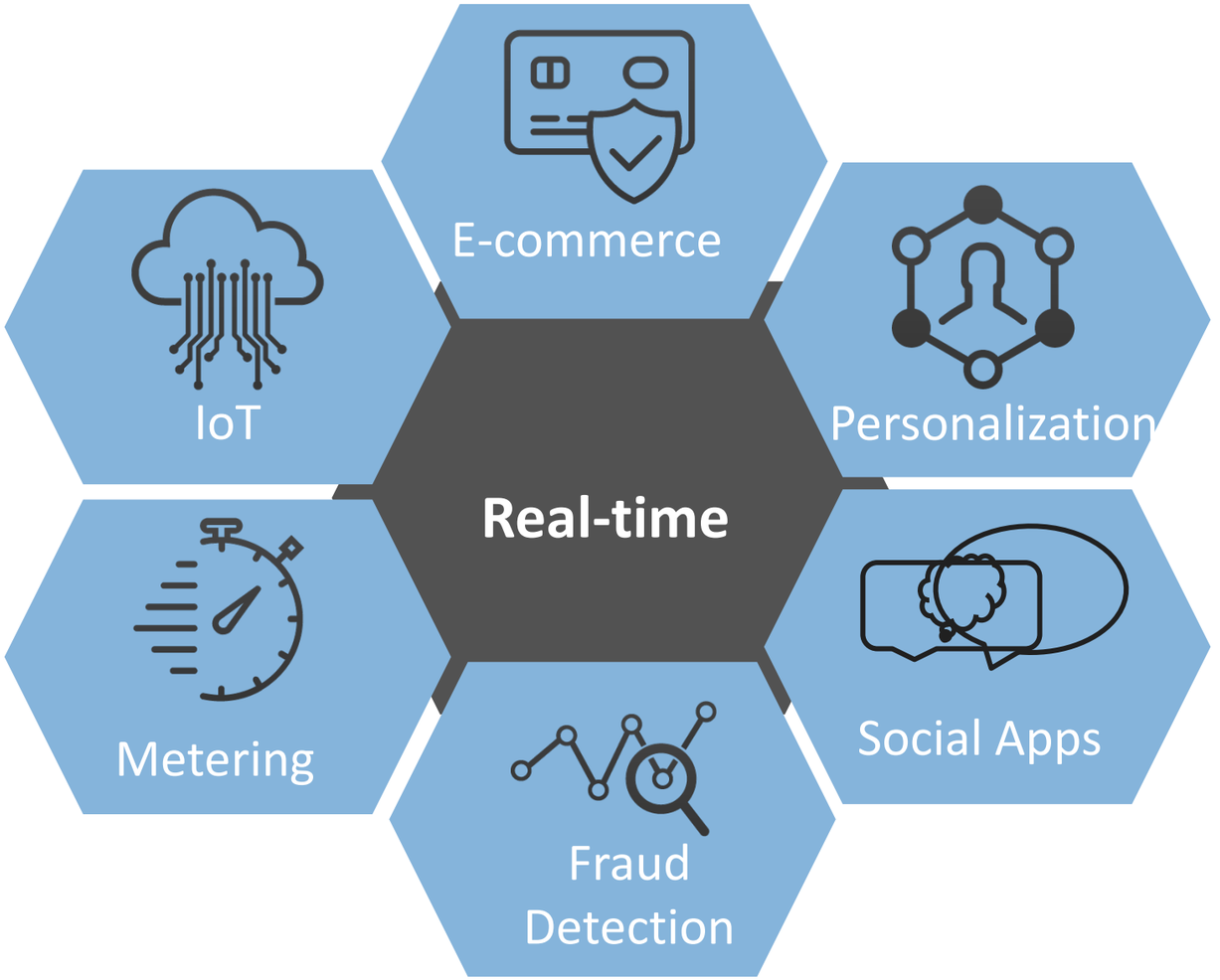
Why Redis is the best Cache Server?

- High Availability with instant, in-memory replication
- Persistence – snapshots, AOF (every second or every write)
- Scalable shared-nothing clustering

Redis is not just a caching layer

Redis offers a full range of capabilities that simplify and accelerate next generation applications

Redis Powers a Range of Solutions



…AND MANY MORE

Introduction to Data Structures in Redis

Redis Enterprise

Redis Labs Products

Redis^e Cloud

Fully managed Redis^e service on hosted servers within AWS, MS Azure, GCP, IBM Softlayer, Heroku, CF & OpenShift

RAM

Redis^e Cloud Private

Fully managed Redis^e service in VPCs within AWS, MS Azure, GCP & IBM Softlayer

RAM or Flash

Redis^e Pack

Downloadable Redis^e software for any enterprise datacenter or cloud environment

RAM or Flash

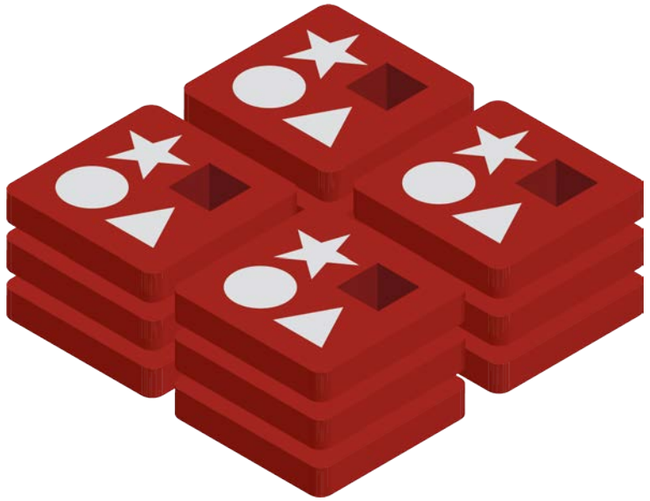
Redis^e Pack Managed

Fully managed Redis^e Pack in private data centers

RAM or Flash

Redis^{e} Technology

Redis Database Instances

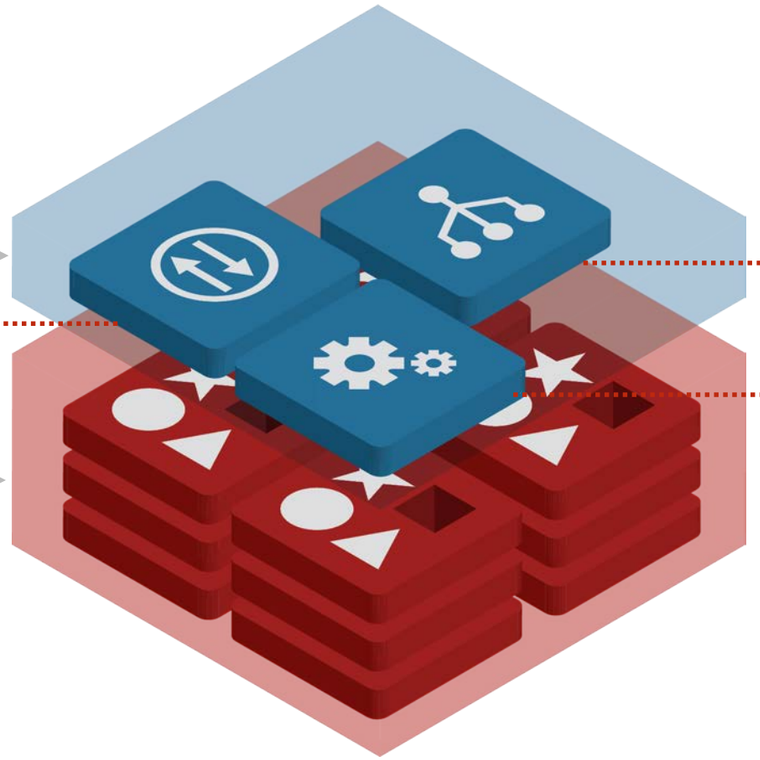


Redis^{e} Technology

Enterprise Layer

Zero latency proxy

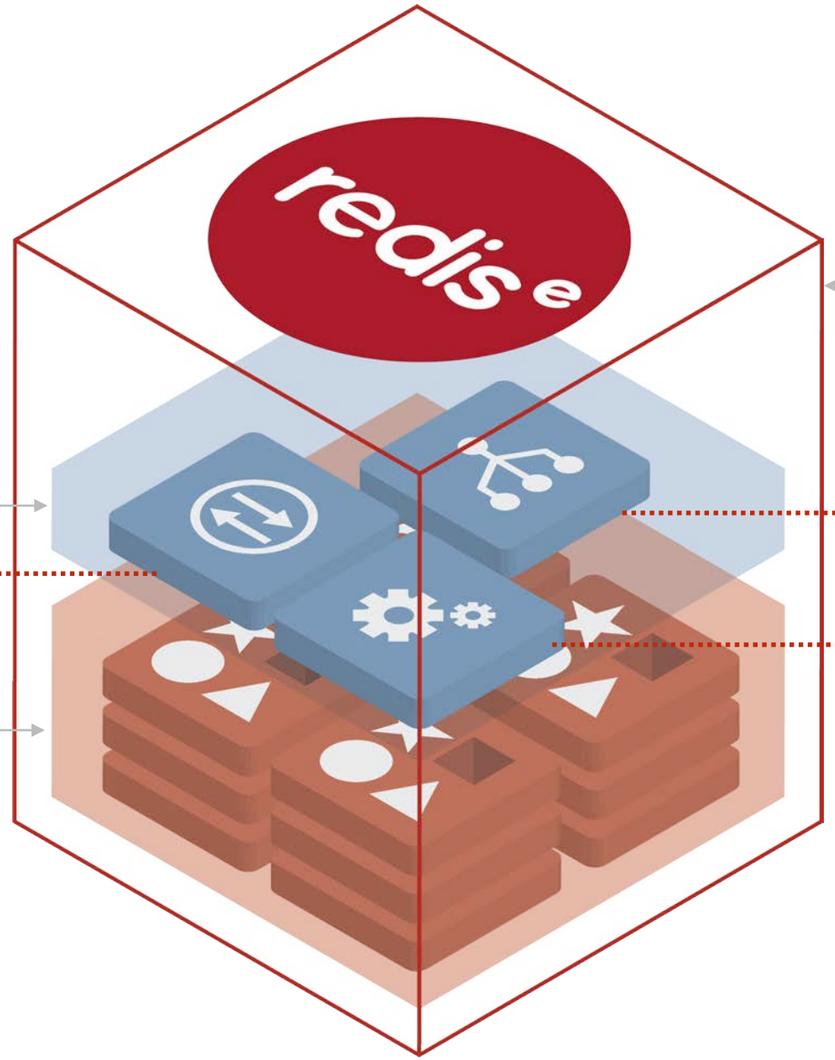
Open Source Layer



Cluster Manager

REST API

Redis^{e} Technology



Redis^{e} Node

Enterprise Layer

Zero latency proxy

Cluster Manager

REST API

Open Source Layer

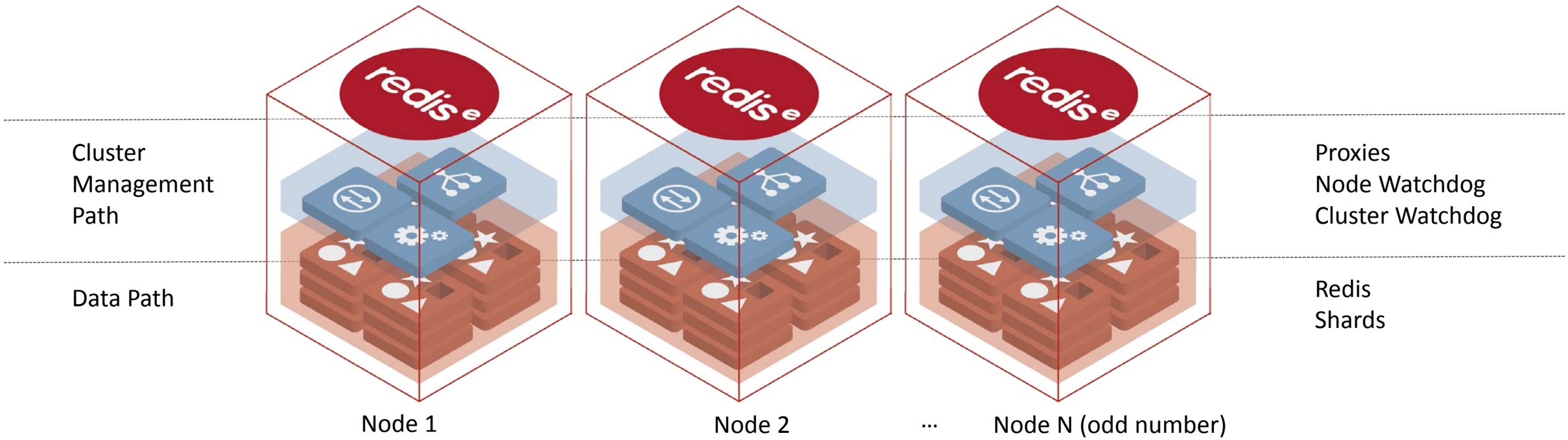
Redis^{e} Technology

Redis^{e} Cluster

- Shared nothing cluster architecture
- Fully compatible with open source commands & data structures

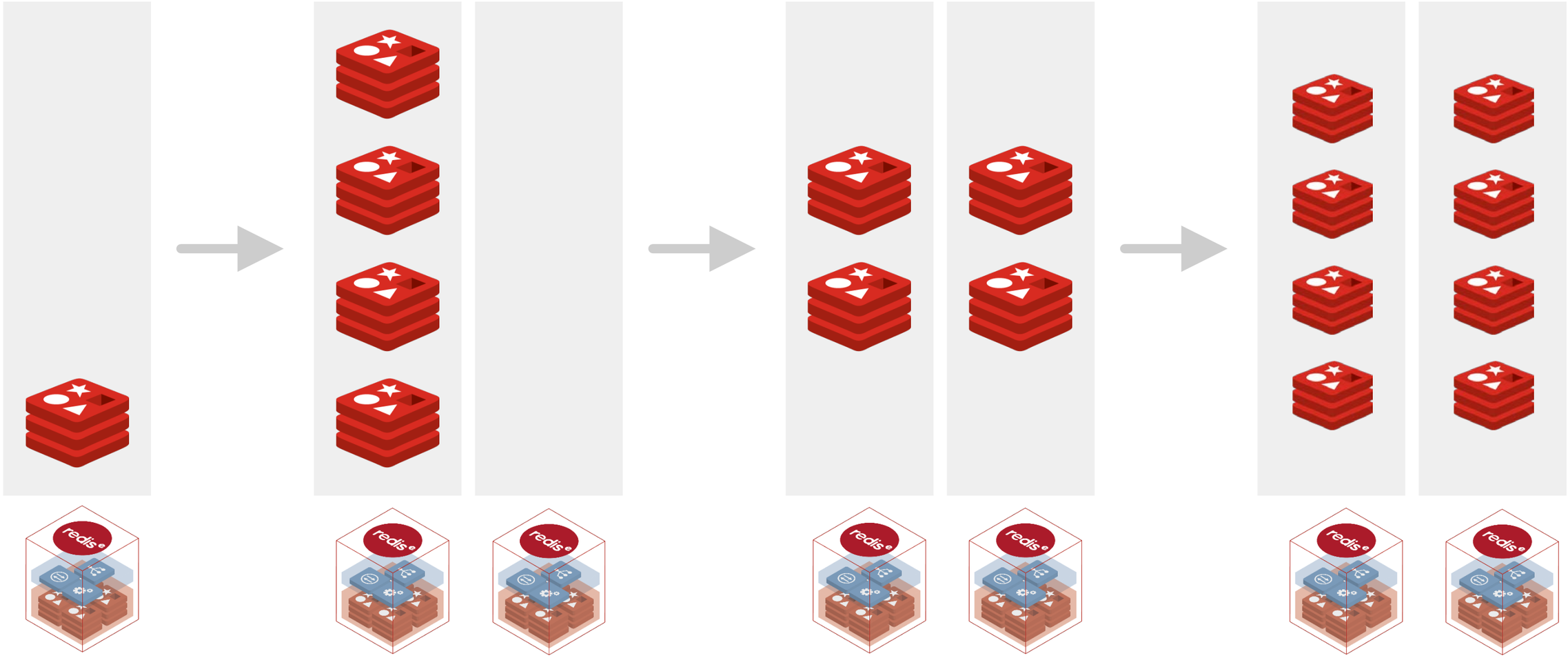
Redis^{e} - Shared Nothing Symmetric Architecture

Distributed Proxies
Single or Multiple Endpoints



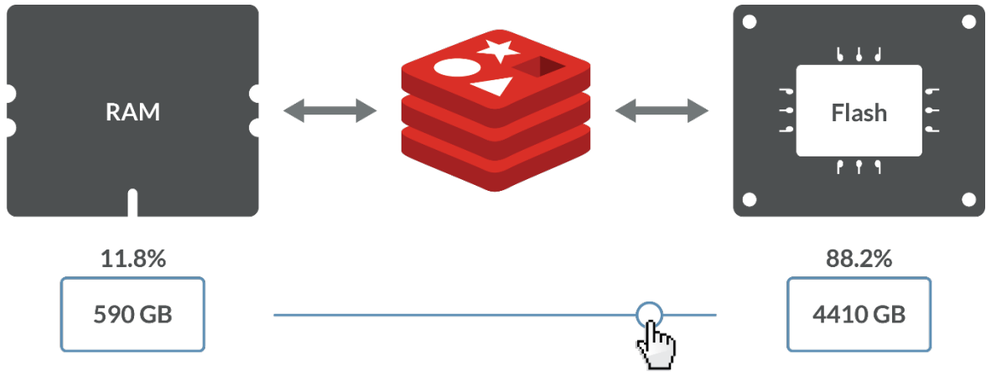
Unique multi-tenant “Docker” like architecture enables running hundreds of databases over a single, average cloud instance without performance degradation and with maximum security provisions

Scale Out with Rebalancing & Resharding



Redis^{e} Flash

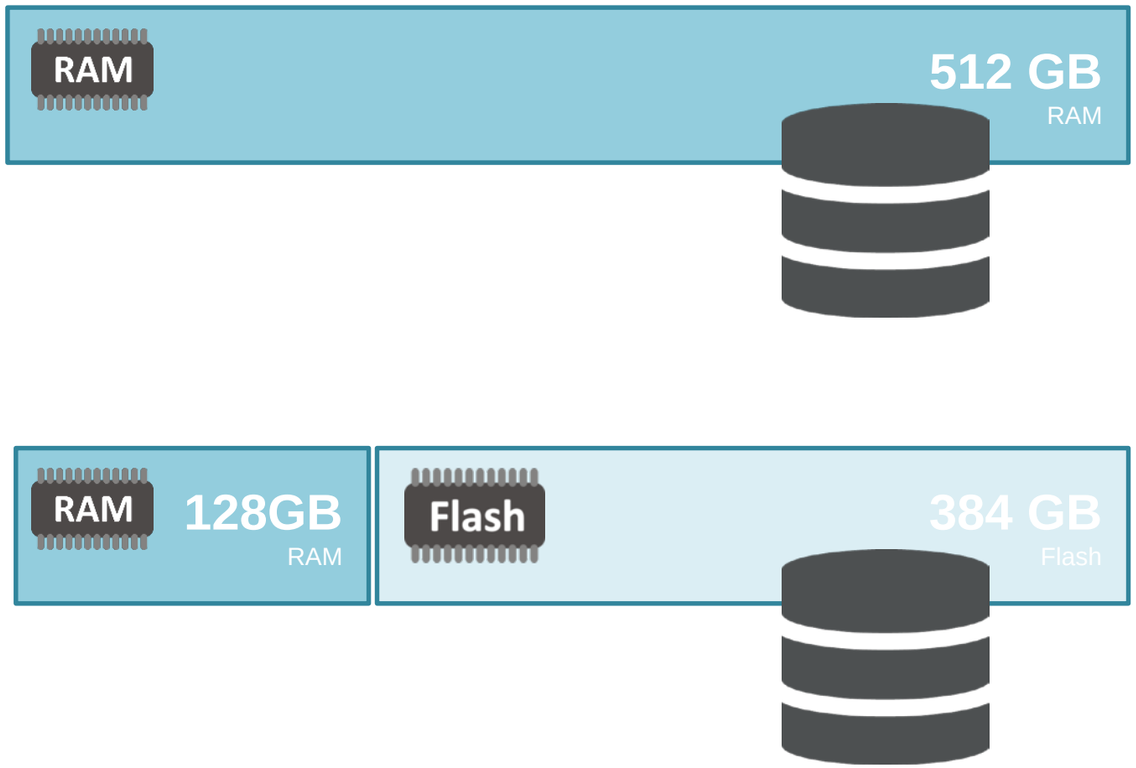
Large Datasets with **Near RAM Latency** at a **Lower Cost**



- Optimize read/writes with RAM-Extension
- Gain speed with smart caching between RAM and Flash
- Available on Redis^{e} Pack and Redis^{e} Cloud Private

Why Redis^{e} Flash?

Serve large datasets at a much lower cost



>70%

Lower Cost with RAM+Flash

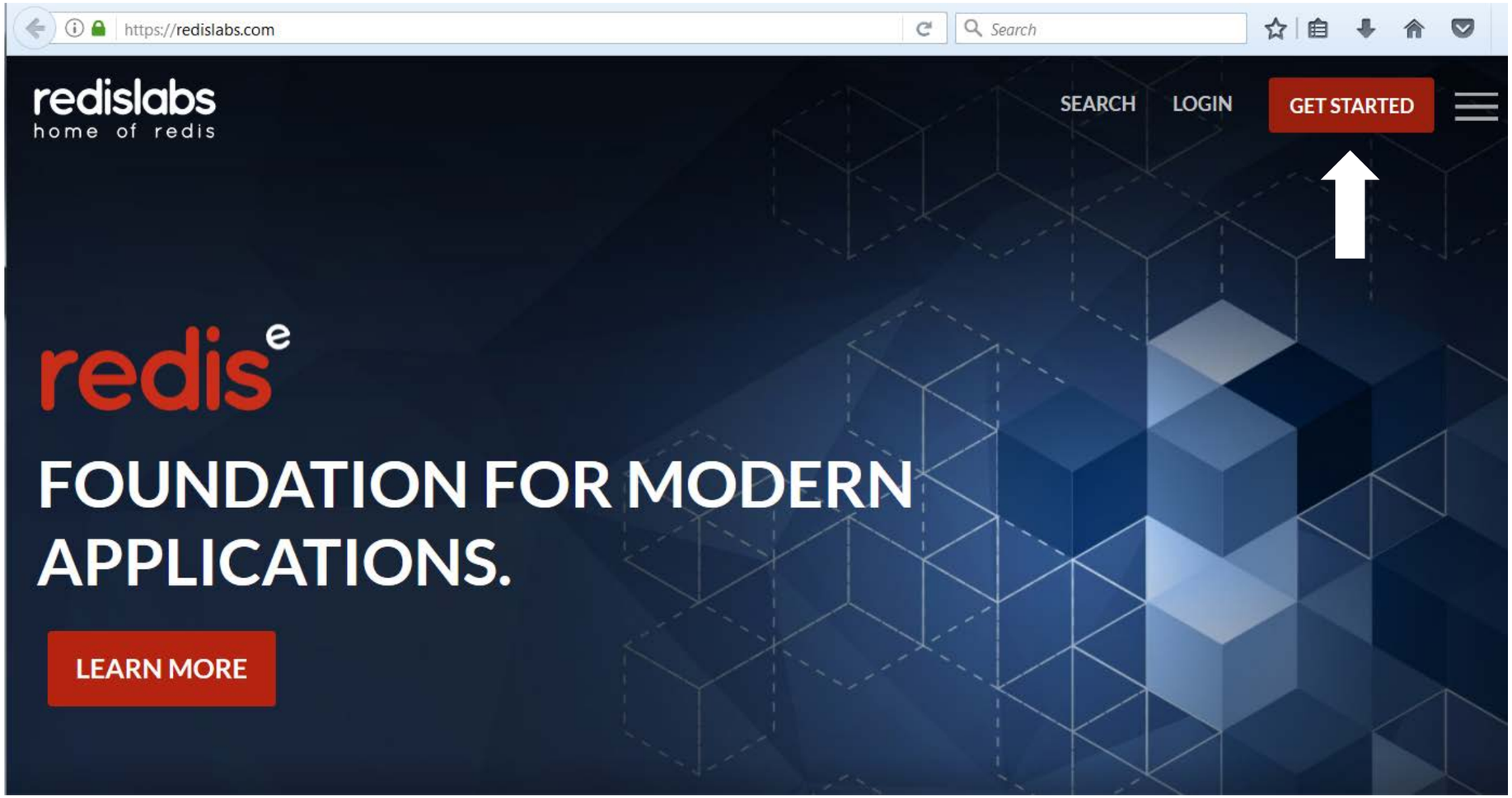
Compared to all-in-RAM

Cost Comparison of RAM vs Flash on AWS

	Redis on RAM	Redis^{e} Flash
Dataset size	10 TB	10 TB
Database size with replication	30 TB	20 TB*
AWS instance type	x1.32xlarge	i3.16xlarge
Actual instance size (RAM, and RAM+Flash)	1.46 TB	3.66 TB
# of instances needed	21	6+1
Persistent Storage (EBS)	154 TB	110 TB
1 year cost (reserved instances)	$1,595,643	$298,896
Savings	-	81.27%

* Redis^{e} handles quorum issues at the node level and needs only two copies of data for high availability

How?



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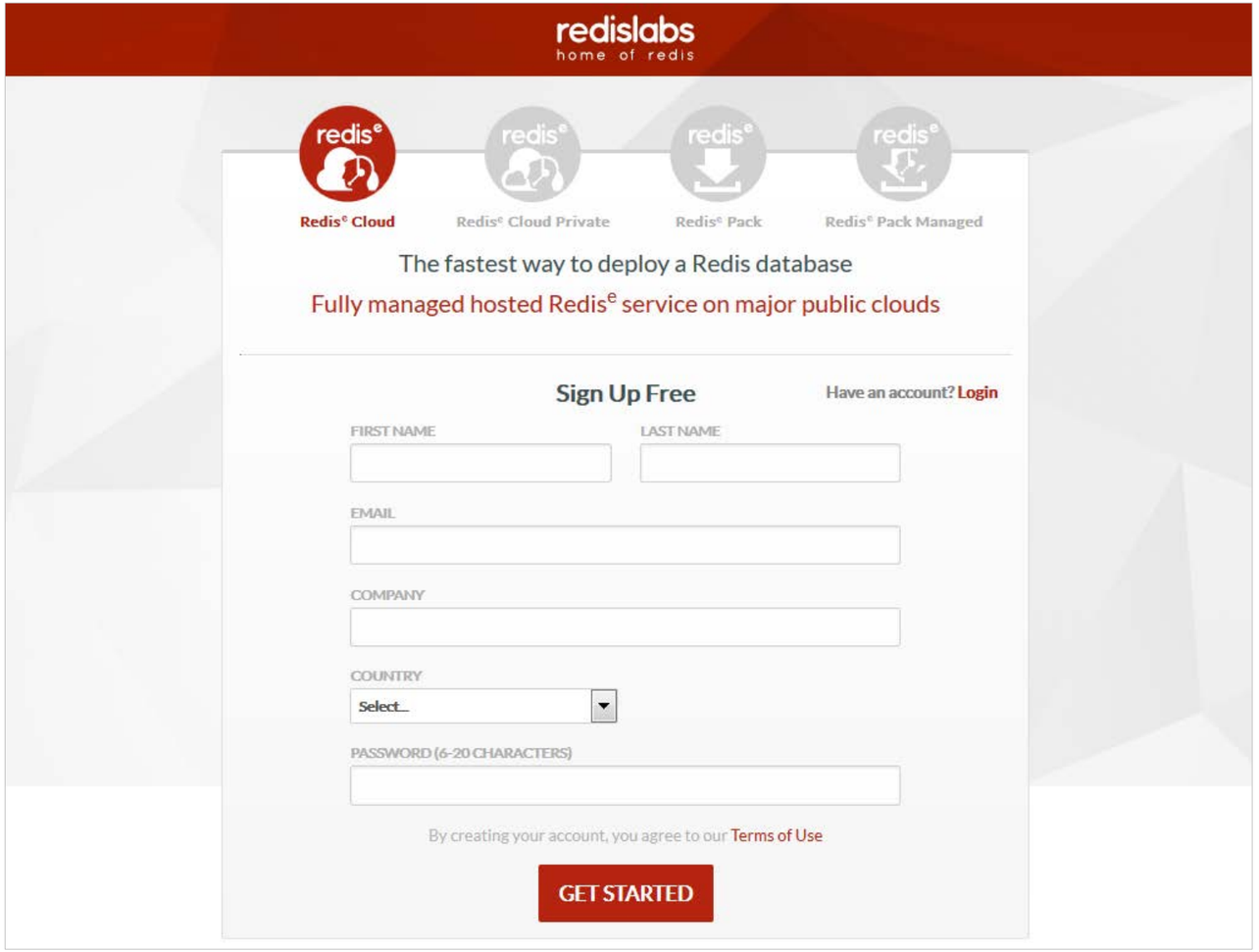
How?



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Code: RedisHero2017