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Redis : au delà du Cache !...
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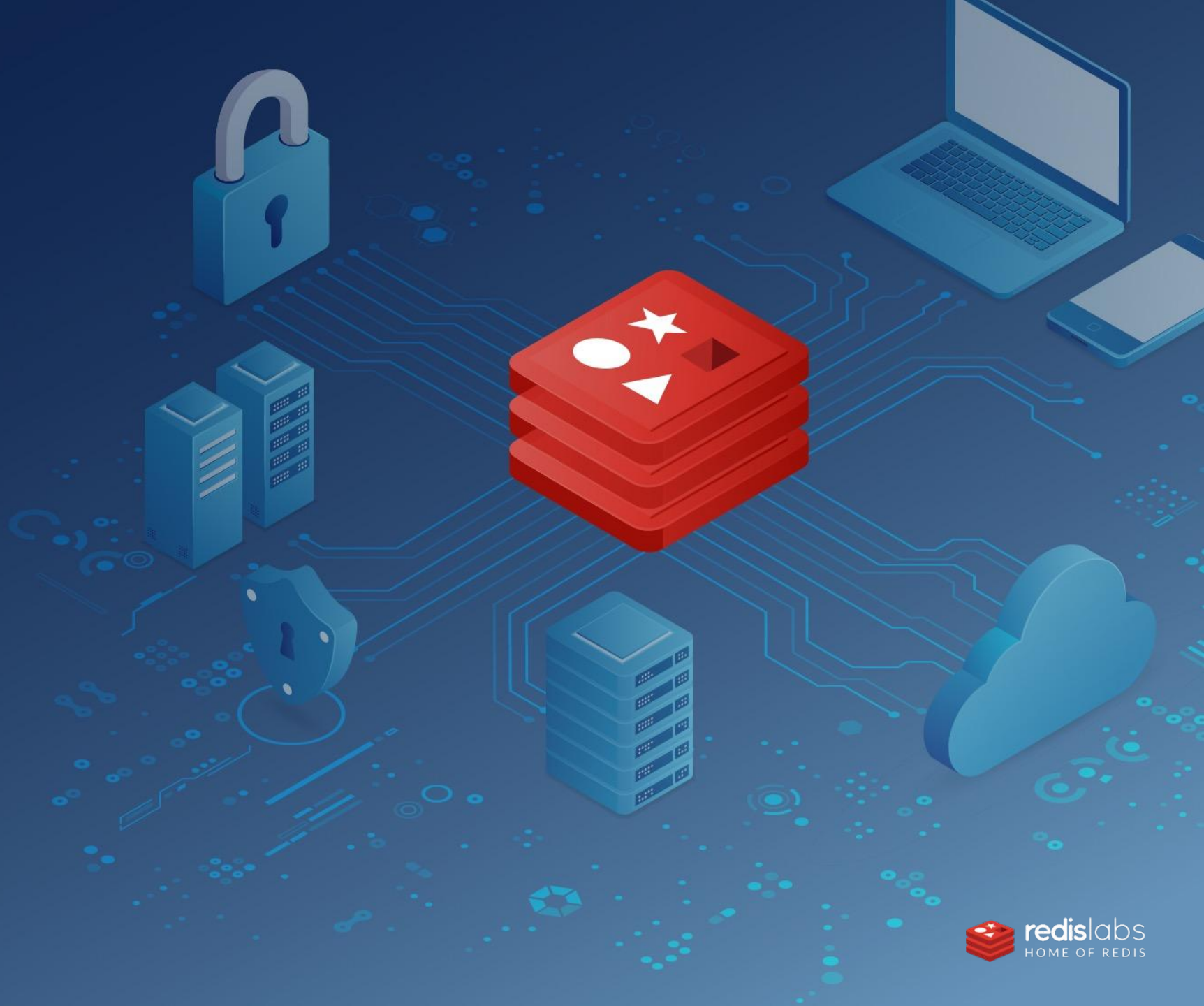
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What is Redis?

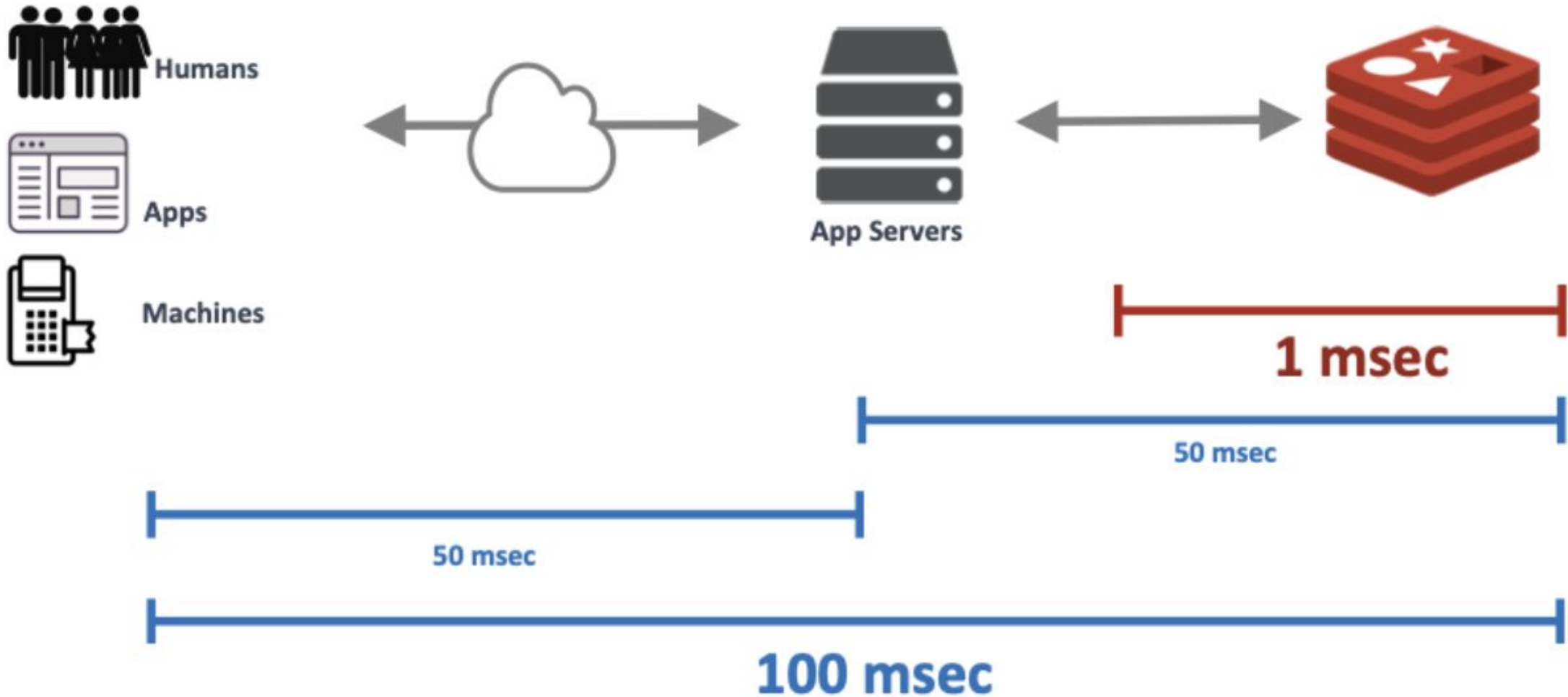# Our roots are in **Open Source**...

redis

An **In-memory open source database**, supporting a variety of high performance operational, analytics or hybrid use cases

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Commercial provider and **home of Redis**

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What problem was Redis **designed to solve?**

Humans

Apps

Machines

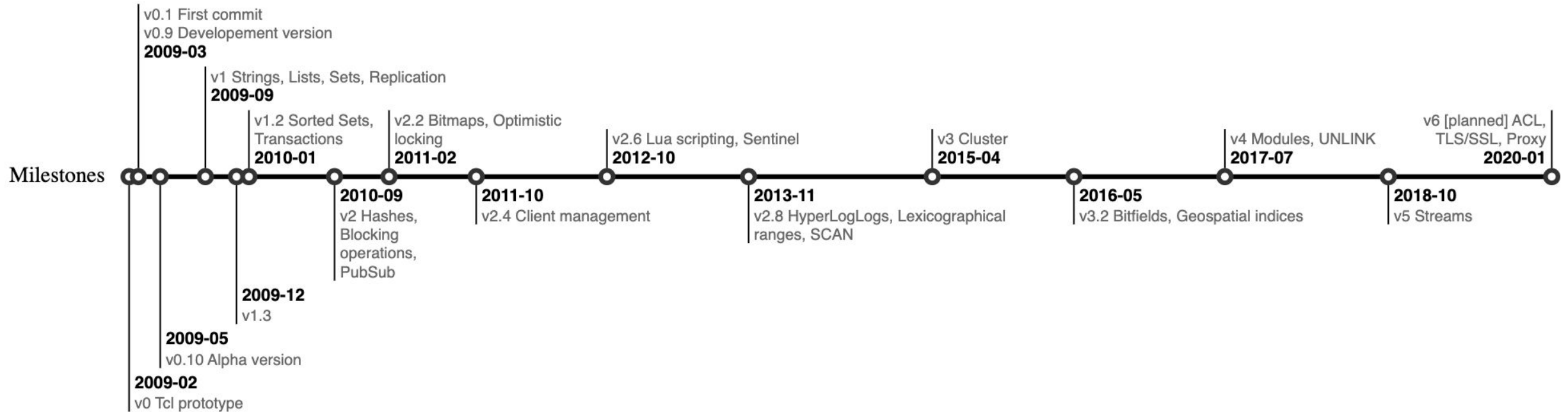App Servers

1 msec

50 msec

50 msec

100 msec

Core Functionality or Benefits
of Redis?

- **Re**mote **Di**ctionary **S**erver - Data, to be used by multiple

  application servers

- Linear Scaling (200,000,000 ops/s @<1mS latency)

- Easy to understand and use the data types

- Simple programming model (text based, single threaded,

  data types mimic programming language types)

Redis Milestones

Milestones

v0.1 First commit
v0.9 Developement version
2009-03

v1 Strings, Lists, Sets, Replication
2009-09

v1.2 Sorted Sets, Transactions
2010-01

v2.2 Bitmaps, Optimistic locking
2011-02

v2.6 Lua scripting, Sentinel
2012-10

v3 Cluster
2015-04

v4 Modules, UNLINK
2017-07

v6 [planned] ACL, TLS/SSL, Proxy
2020-01

2010-09
v2 Hashes, Blocking operations, PubSub

2011-10
v2.4 Client management

2013-11
v2.8 HyperLogLogs, Lexicographical ranges, SCAN

2016-05
v3.2 Bitfields, Geospatial indices

2018-10
v5 Streams

2009-12
v1.3

2009-05
v0.10 Alpha version

2009-02
v0 Tcl prototype

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Redis in **context**

ORACLE

>100 ms

NEEDS CACHE

amazon DynamoDB

Cloud Spanner

Azure Cosmos DB

mongoDB.

DATASTAX

ORACLE AUTONOMOUS DATABASE

10-100 ms

NEEDS CACHE

redis

<1 msc

BUILT FOR SPEED

Redis Is Popular Due to **Speed** and **Scale**

Most Loved
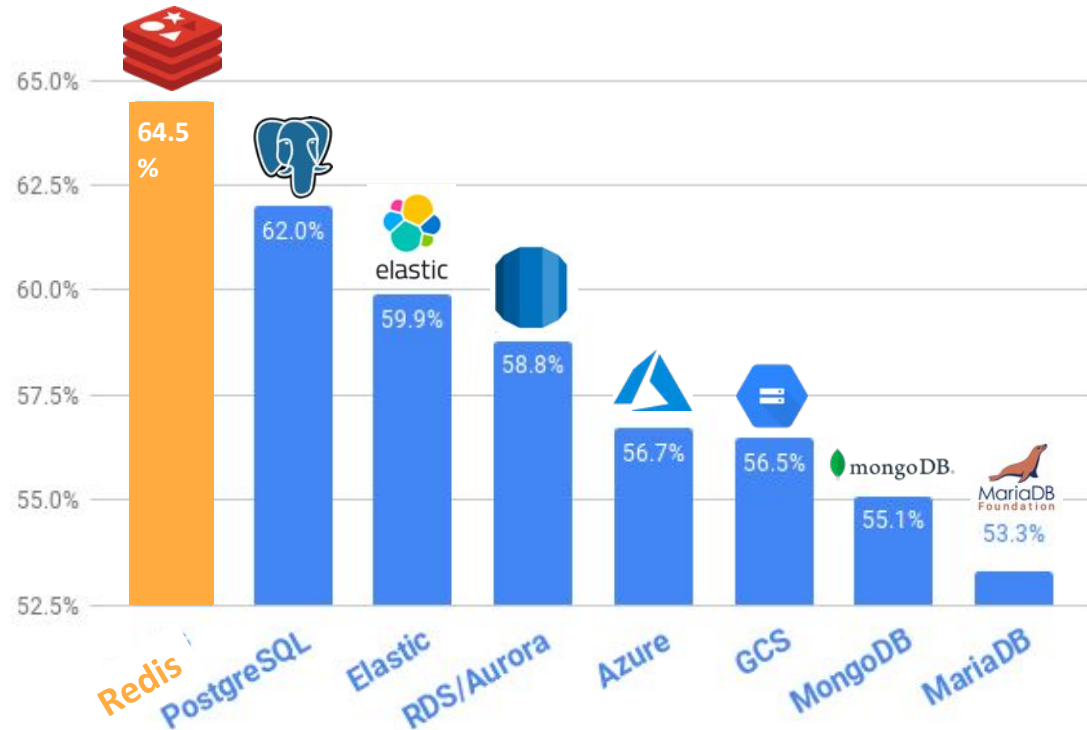
Stack Overflow 2017, 2018, 2019, 2020

Most Used
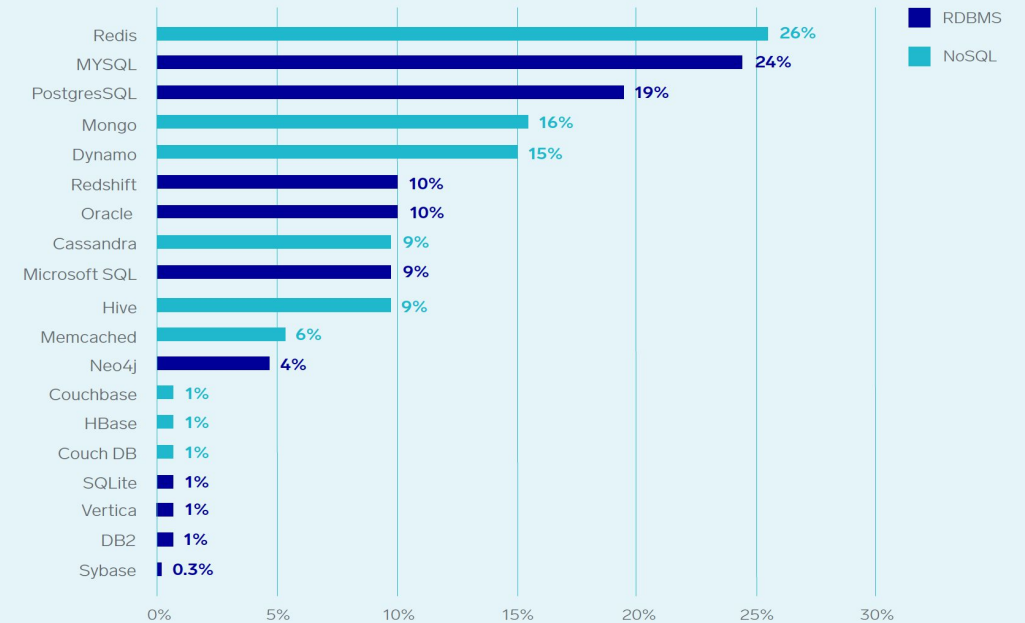
Sumo Logic, June. 2020

Fast Adoption

1M+ Databases Created

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DBaaS
- Available since mid 2013
- 8000+ paying customers

Software
- Available since early 2015
- 500+ paying customers

Customers

- 5 of top Fortune 10 companies
- 5 of top 5 communications companies
- 3 of top 4 credit card issuers
- 2 of top 3 healthcare companies

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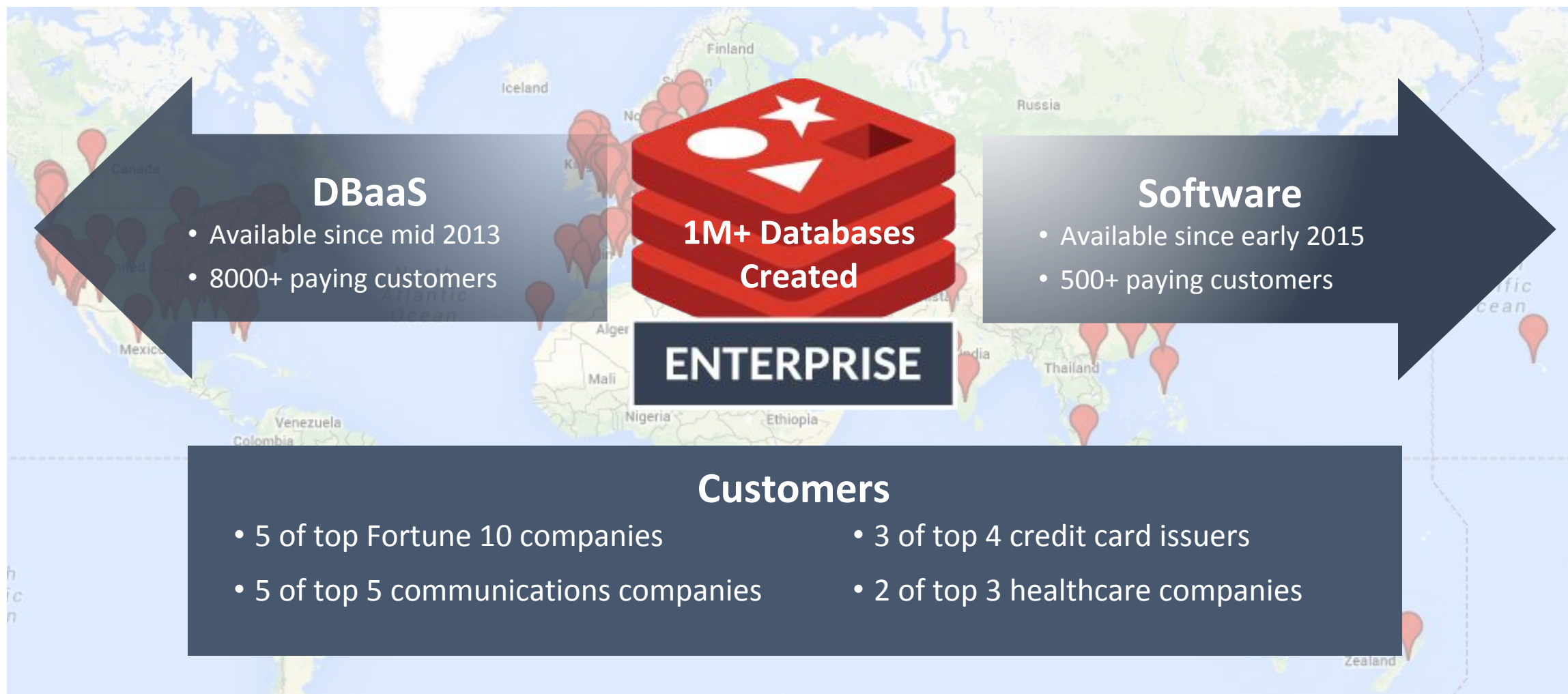
How important is **high performance** and
low latency to *your customers?*

"Latency is the **new downtime**"

LOADING...

- [Amazon](#) found that a page slowdown of **1 second** of page load slowdown can cost them up to **$1.6B in sales/ year**

- A financial broker could lose up to [$4 million in revenue per millisecond](#) if their electronic trading platform is **5 milliseconds behind the competition**

- Google found an **extra .5 seconds** in search page generation time [dropped traffic by 20%](#).

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Functional Use Cases

User Session Store

Content Caching

Real Time Data Ingest
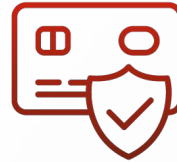
High Speed Transactions

Job & Queue Management

Auto-complete
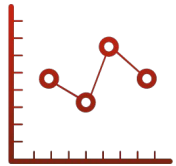
Time Series Data

Complex Statistical Analysis

Notifications

Distributed Lock

Publish/ Subscribe

Fraud Mitigation

Geospatial Data

Streaming Data
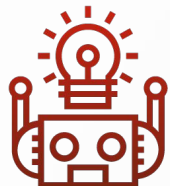
Machine Learning

Search

Rate Limiter

Leaderboards

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Redis Differences

1

Performance
NoSQL Benchmark

Couchbase   cassandra   DATASTAX   AEROSPIKE
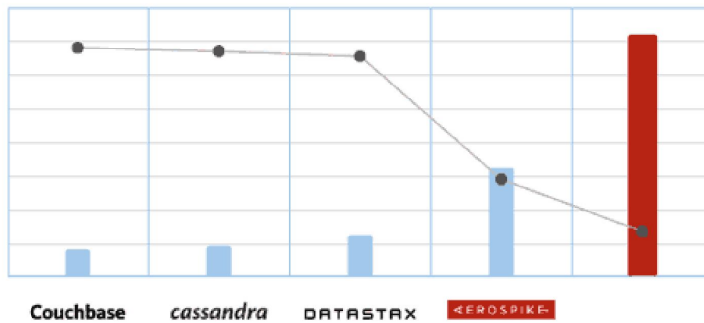
2

Simplicity
Redis Data Structures

Strings	Sets
Bitmaps	Sorted Sets
Bit field	Geospatial Indexes
Hashes	Hyperloglog
Lists	Streams

3

Extensibility
Redis Modules

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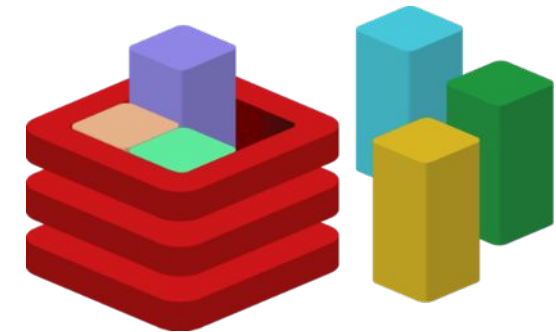
Use-Case Driven Data Structures

<html><body> I'm a web page!</body><html>	**Strings**	**Cache**
{ user:1 "user@gmail.com", user:2: "user@yahoo.com" }	**Hashes**	**User Sessions/Profiles**
[create:order:1 → process:order:1 → fulfill:order:1]	**Lists**	**Order Management Queues | Messaging**
{ basketball , baseball , football , soccer ball }	**Sets**	**Product Classification**
{ sku:1 1000, sku:2 300, sku:3 100, sku4: 1500 }	**Sorted Sets**	**Website Activity Tracking**
{ A: (51.5, 0.12), B: (32.1, 34.7) }	**Geospatial Indexes**	**Store Location Services**
{ id1=time1(A:"create:order"), id2=time2(B:"delete:order") }	**Streams**	**Event Source Storage/Messaging**

Key

Additional Redis Data structures can be found here - https://redis.io/commands

Redis Enterprise

An ***in-memory multi-model database***
built on top of open source Redis

Redis Enterprise

Redis Core

Data Structures

Strings	Sets
Bitmaps	Sorted Sets
Bit field	Geospatial
Hashes	Hyperloglog
Lists	Streams

Redis Modules

Search	JSON	AI
TimeSeries	BloomFilter	Graph
	Gears	
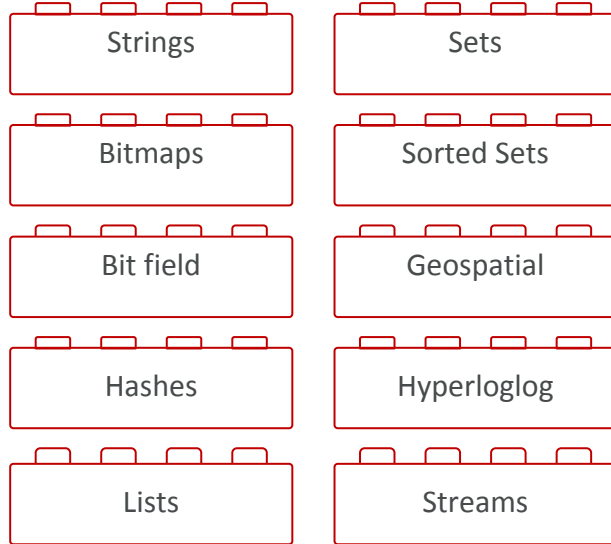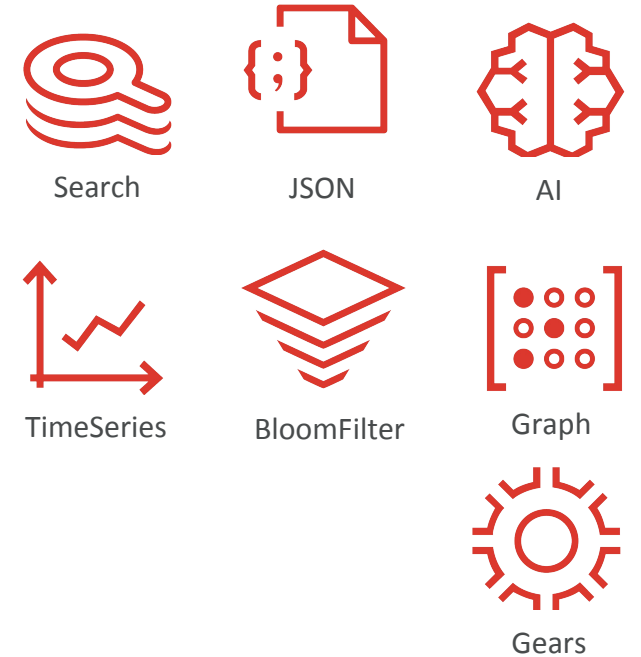
ENTERPRISE
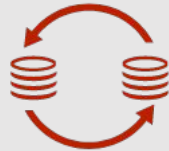
Linear Scalability	HA	Durability	Backup & Restore	Geo-Distribution	Tiered-Memory Access	Multi-Tenant	Security

Redis Enterprise Core

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Multi-Layer Security

- Production data is isolated from administrative access

- Safeguards deployment from Redis buffers overflow

- CPU throttling, blocks Lua script from accessing the host

- SOC2 and HIPAA compliant

6 Availability

5 Encryption

4 Forensics

3 Authorization

2 Authentication

1 Access Control

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ENTERPRISE

Upgraded enterprise version of Redis, turning it into a powerful resilient primary database

1M+

Databases Created

SCALABLE — Linear scalability to 100s of Terabytes and 100s of millions of ops/sec

RELIABLE — HA, persistence, active-active geo distribution, self healing

ECONOMIC — Runs on SSD/Persistent Memory, multi-tenant, minimum dataset copies, automation

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Scalable Architecture

Redis Enterprise Node

Zero Latency Proxy

Cluster Manager

Redis Shards

Secured UI/REST API/CLI
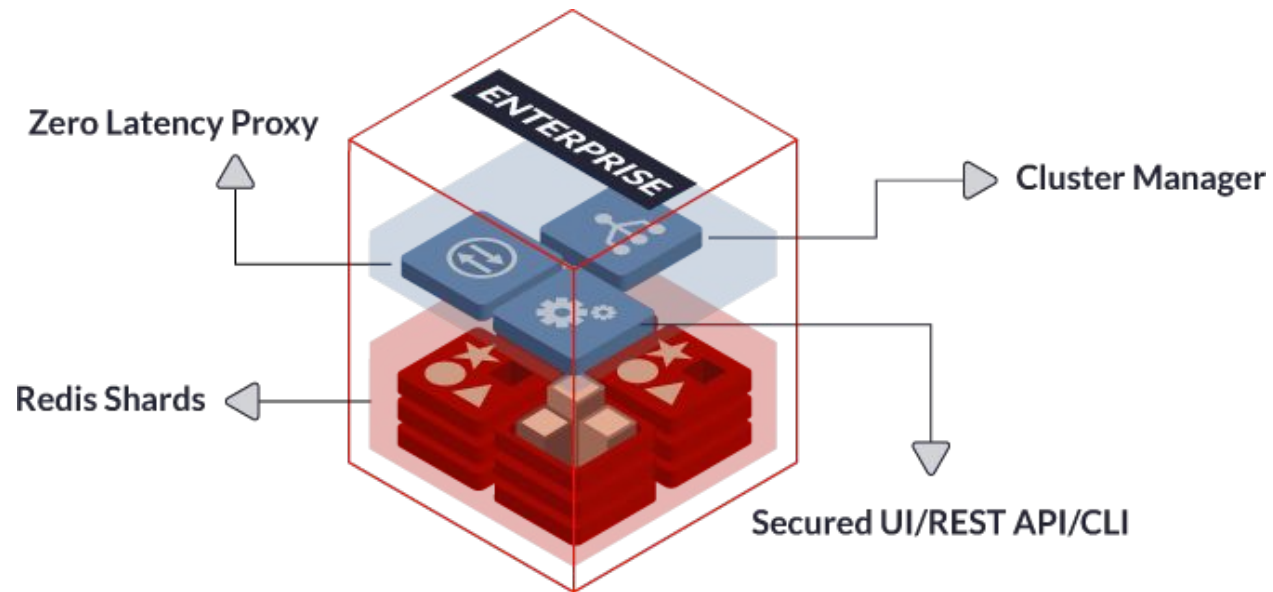
Redis Enterprise Cluster
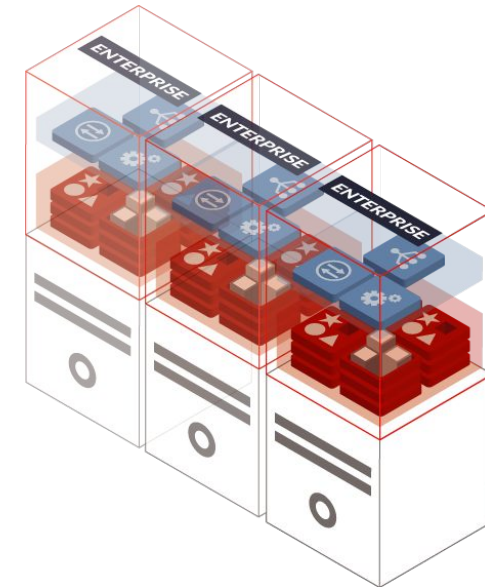
Fully compatible with open source commands & data structures

Capable of Petabytes of Data Processing at Lower Costs

DRAM

Persistent Memory

SSD

GBs

TBs
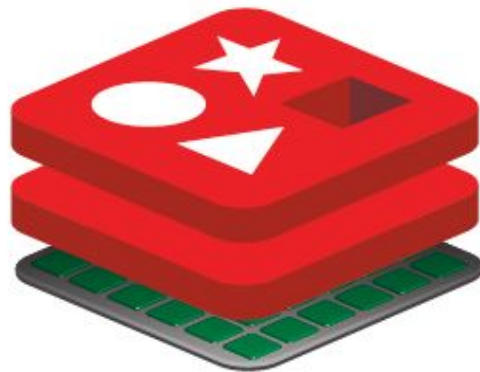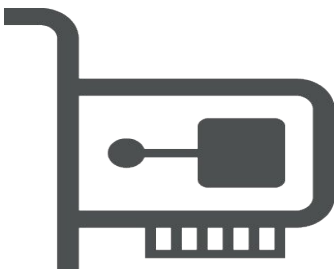
PBs

Multiple Delivery Models

DATABASE-AS-A-SERVICE			SOFTWARE	
Cloud Essentials	**Cloud Pro, Ultimate**		**Downloadable**	**Native Kubernetes**
QA & Dev, Small Prod Workloads	Production, Hosted or in customer's VPC			
			TANZU	**OpenShift over Kubernetes**

ENTERPRISE
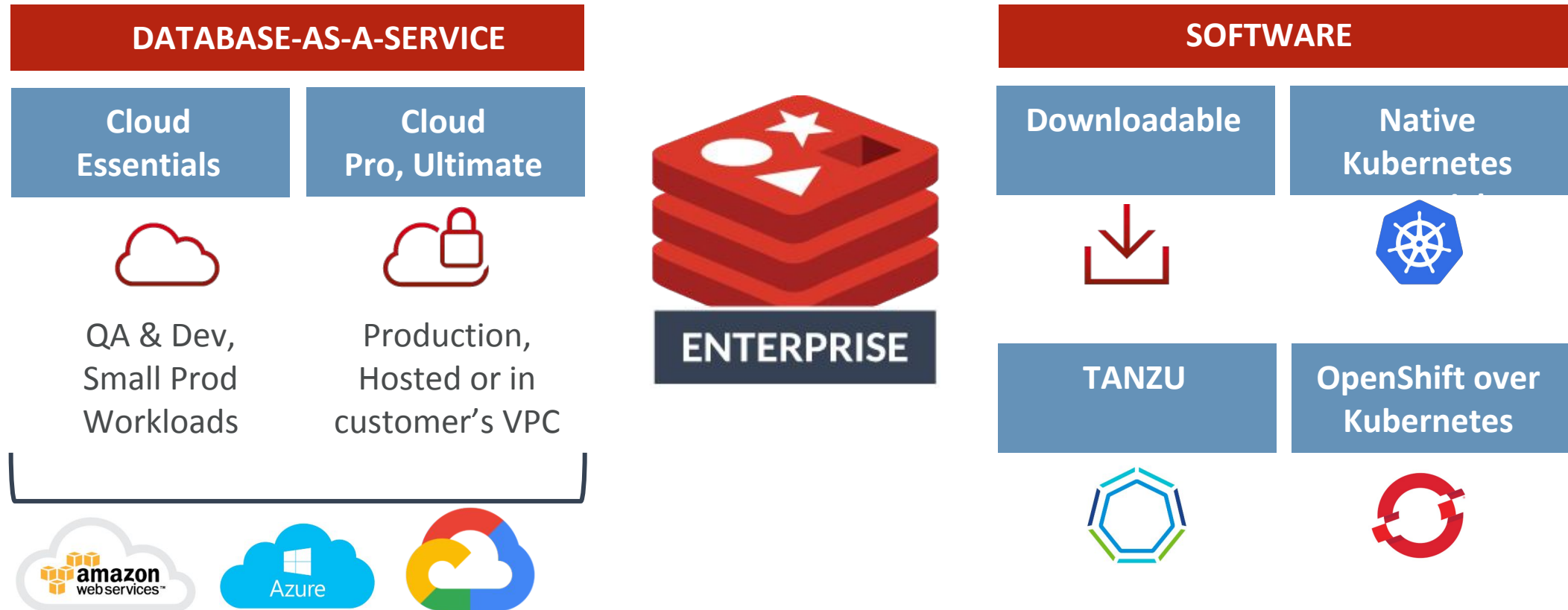
Multi-Cloud and Hybrid Cloud-OnPrem Support

Active-Active or Active-Passive
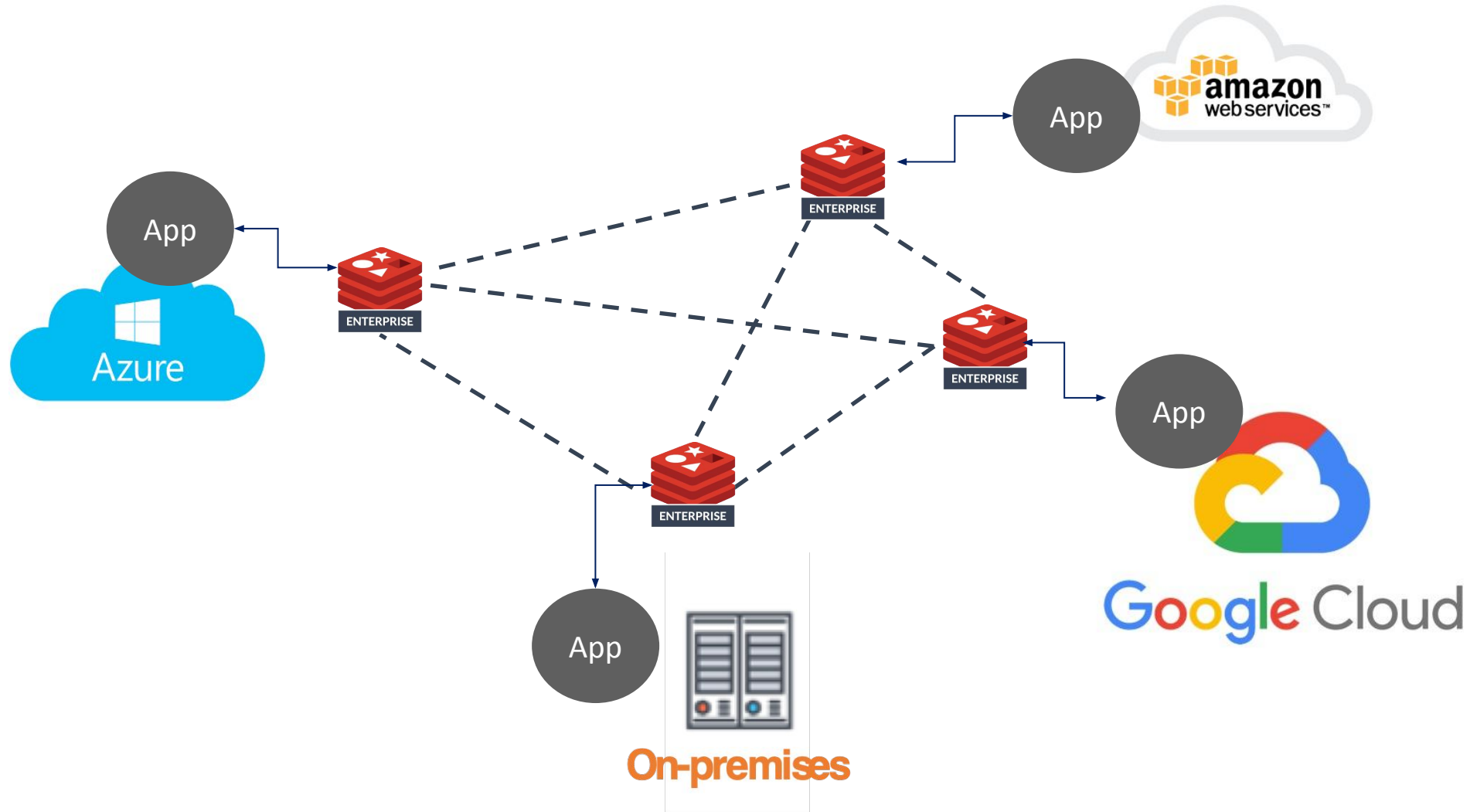
Démonstrations
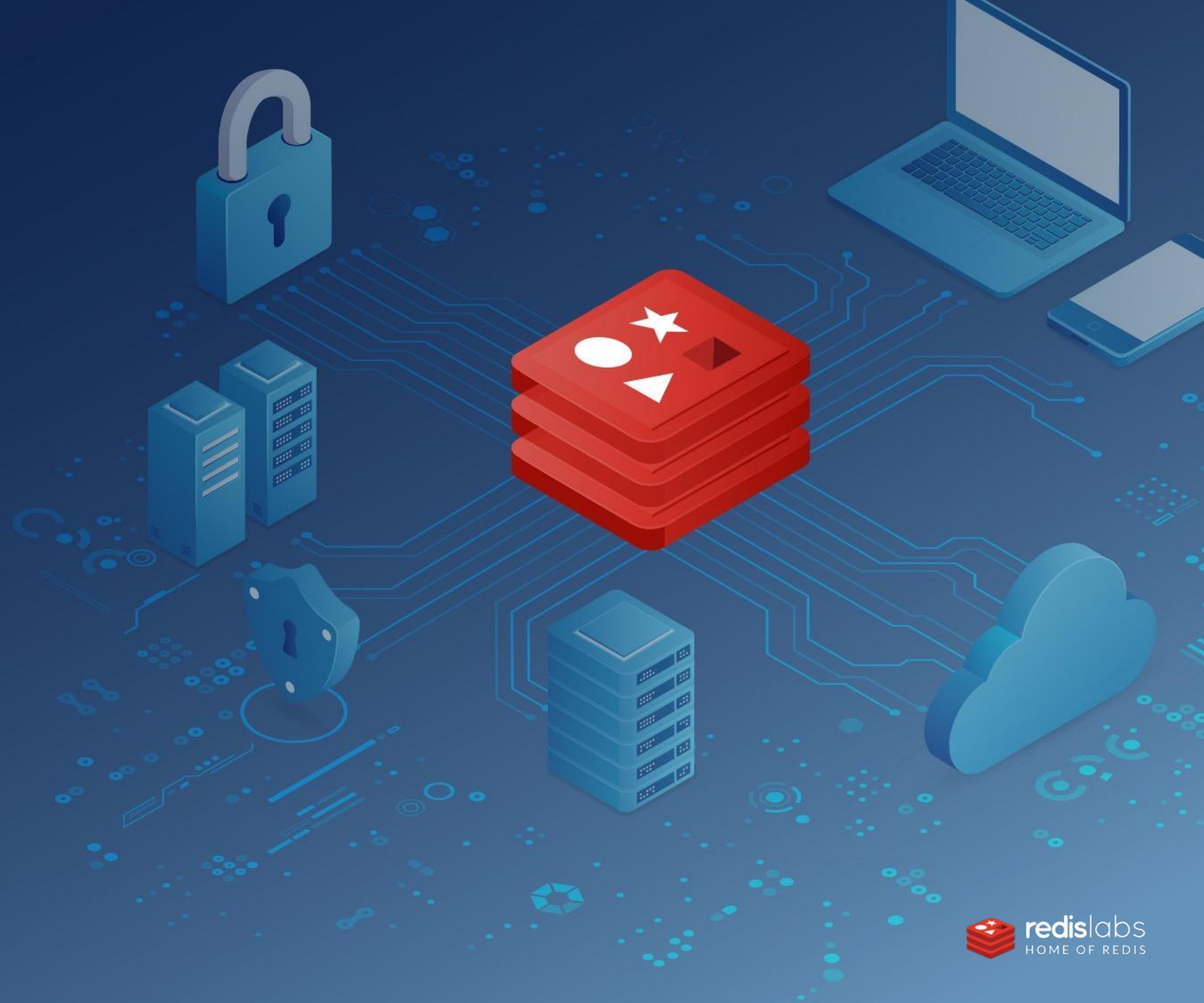
Demo Summary

1. Redis as a simple **Cache & Configuration Store**
2. **Redis Streams** to capture **business events** from legacy app
3. Consume events, and **modernize** your application
   - Store data in Redis for **flexibility** and **speed**
   - Add **Indexes** for complex queries, search and aggregation
   - Use Multi-model (Hash, Search, Graph) to **build new services**

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Resources

- [Demonstration](#)
- [Tutorial RediSearch](#)
- [Redis University](#)
- [Try Redis Cloud & RediSearch](#)
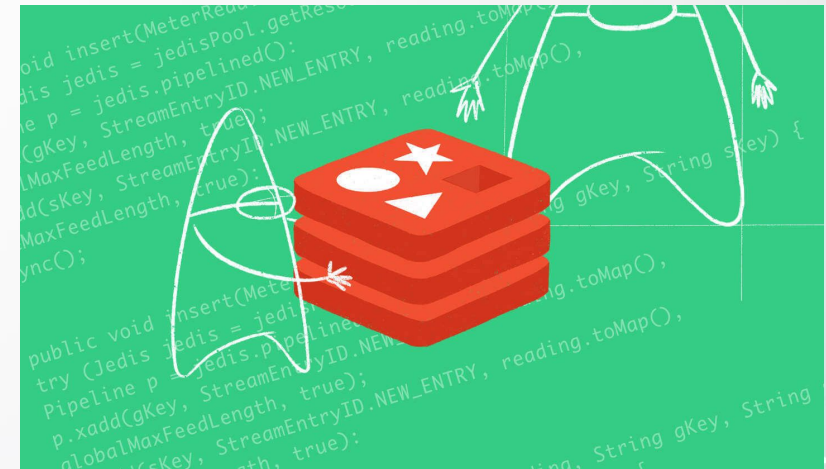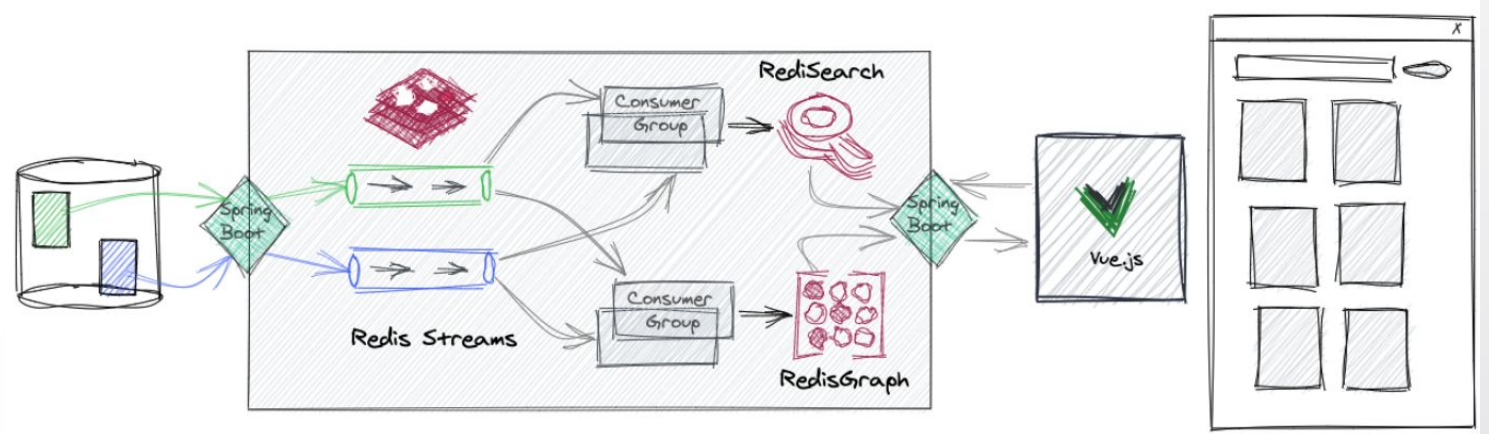
Merci & Questions
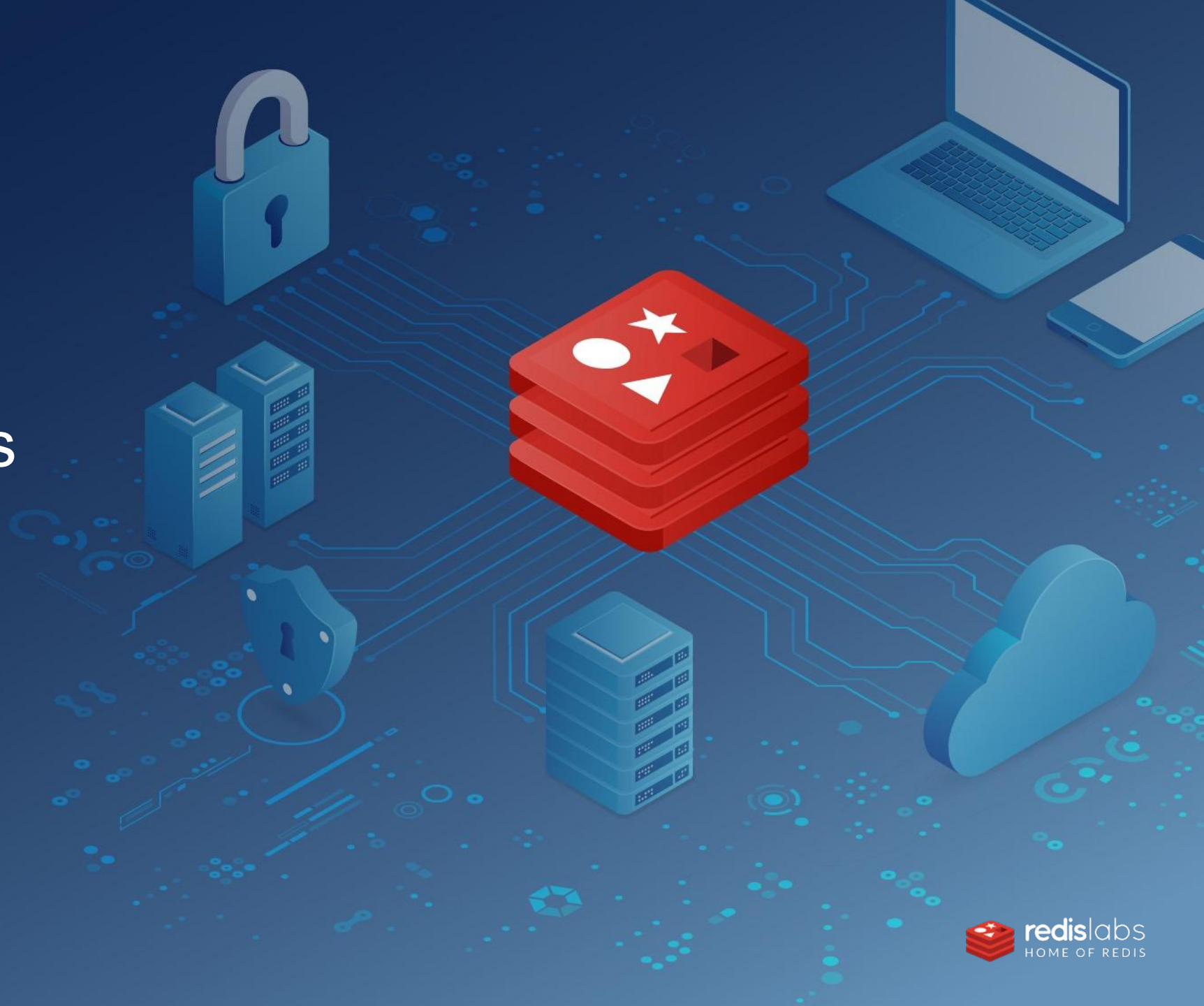
Back-up
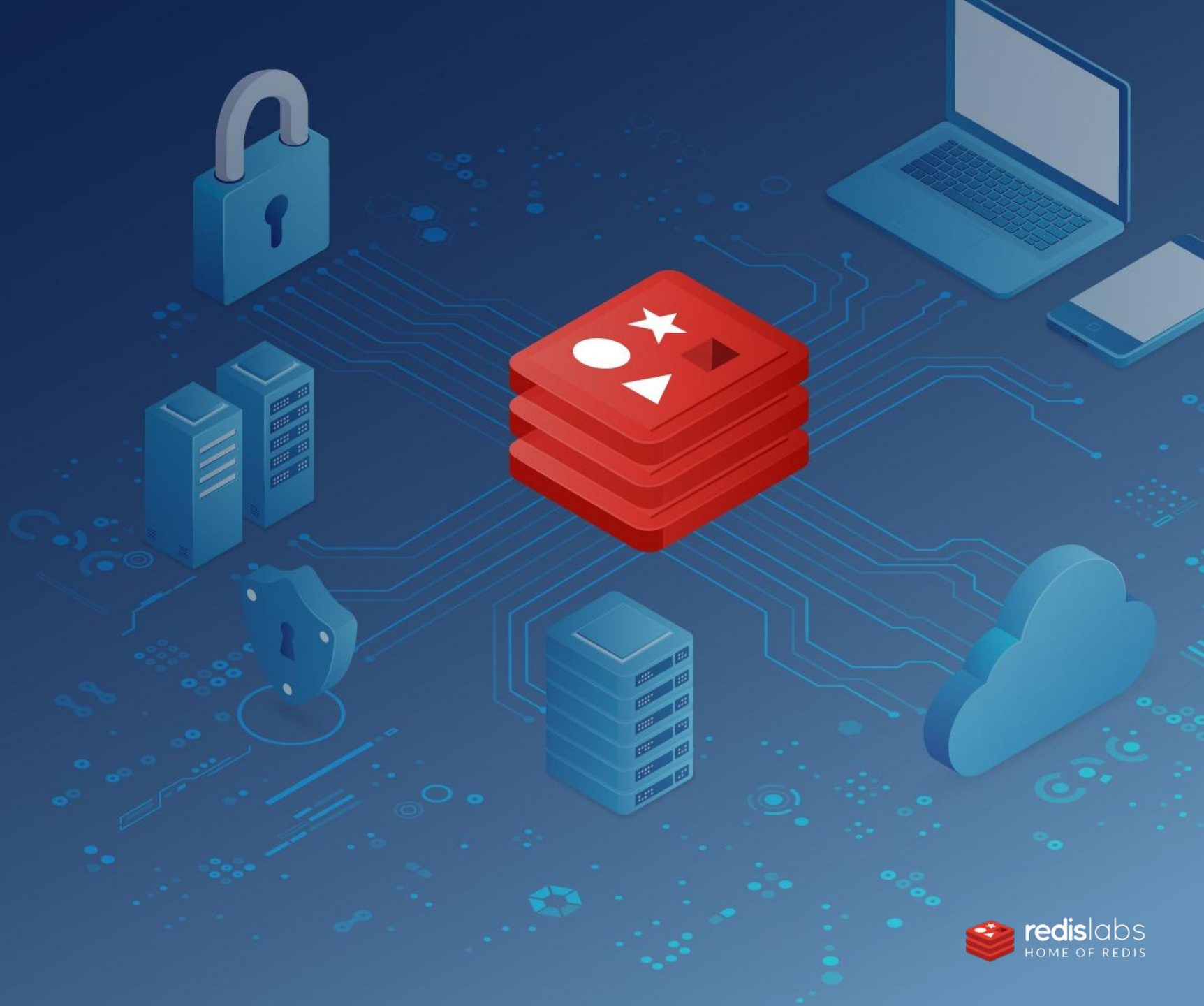
Our Customers Span All Verticals

Powers Critical Modern Apps for Large Enterprises

Use us for managing their Apple Pay transactions

Conduct with us their real time analytics on all mobile fleet operations

We power the flight availability and pricing engine on united.com

Use us for their new Smart Licensing Application

Use us for managing all their video meta data

Use us for running their Masterpass digital wallet transactions

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Product

	OSS Redis	Redis Enterprise
The product	3 products: • Standard Redis (Can be replicated) • HA Redis with Sentinel • Redis cluster	A single platform for running multiple databases from the following types: • Standard Redis • HA Redis • Redis cluster (masters only) • HA Redis cluster (multiple master-slave pairs)
Deployment	DIY	• Serverless cloud service (RC and RV) • On-prem (bare-metal, VMs, K8s, PCF, OS)
Multi-tenancy	No	Yes
Status	• Standard Redis – available since 2010 • Sentinel – V1 in 2014, V2 in 2015 • Cluster – since march 2015 • ~2B downloads	• Redis Cloud – beta 06/2012, GA 02/2013 • Redis SW – 03/2015 • RV – manual 2015, zero-touch 06/2017 • ~750K databases under management

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Redis Enterprise vs. OSS Redis (highlights)

	Standard Redis	Sentinel (HA Redis)	Redis Cluster	Redis Enterprise
Scalability	None	None	Yes. Manual Activation. Limited supported commands	Yes. Fully automated
High-availability	None	Yes. Can take minutes. Not consistent	Yes. May select the wrong slave. Manual intervention might be required	Yes. Fully automated
Performance	Base. Sensitive to noisy environment	Base. Sensitive to noisy environment	Lower than base (per shard). Sensitive …	Up to 2x base. Stable
Data-persistence performance	Standard	Standard	Standard	Enhanced

Redis Enterprise vs. OSS Redis (highlights)

	Standard Redis	Sentinel (HA Redis)	Redis Cluster	Redis Enterprise
Multi-az/rack deployment	No	No	No	Yes
Multi-region replication	No	No	No	Yes
Multi-master (active-active) deployment	No	No	No	Yes, Redis CRDT
Multi-tenancy	No	No	No	Yes

Redis Enterprise vs. OSS Redis (highlights)

	Standard Redis	Sentinel (HA Redis)	Redis Cluster	Redis Enterprise
Security	Minimal	Minimal	Minimal	Enhanced
Redis on Flash	No	No	No	Yes
Modules	Single shard	Single shard	Single shard	• Single shard • cluster with inter-shard communication • Soon inter-module communication
Ops	Standard, Manual	Complex, Manual	Complex+, Manual	Minimal, Automated

Architecture

OSS Redis		Redis Enterprise
Data-path	1. Standard Redis: • Standard clients • Single master, multiple slaves 2. HA Redis: • Sentinel supported clients • Single master, multiple slaves 3. Redis cluster • Smart client • Multiple shards, each includes master with multiple slaves • Shards are aware which hash slot they are serving	A single architecture for all deployments: 1. Supports standard clients, sentinel clients and smart cluster clients 2. Includes integrated zero-latency proxy 3. Multiple shards, based on master-slave pairs 4. Shared nothing – shards are not aware of each other

Architecture (2)

OSS Redis	Redis Enterprise
Cluster Manager 1. Standard Redis – not available 2. HA Redis – only for HA function, based on Sentinel and deployed separately 3. Redis cluster: • HA is based on a new logic inside Redis • A separate Trib entity is used for cluster configuration	1. The same cluster management technology for all deployments 2. Cluster-manager is completely decoupled from the data-path, main benefits: (a) speed – shared nothing architecture; (b) easy to maintain, e.g. SW upgrade 3. Cluster Manager main functions: • Distributed components: (1) State Machine controller; (2) Common Cluster Storage (CCS); (3) node and cluster watchdogs; (4) Resource Manager • Functionalities: (1) Database provisioning/deprovisioning; (2) Auto-failover; (3) Shard migration; (4) Resharding; (5) Rebalancing; (6) Rate and memory limiters

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