



iTMO

Study of Memchached

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Pinterest is an American image sharing and social media service designed to enable saving and discovery of information.

Pinterest

- over 5,000 EC2 instances AWS
- 180 million requests p/s
- 220 GB/s of network throughput
- ~460TB of Data

One configuration change reduced latency by up to 40% and smoothed over performance overall.



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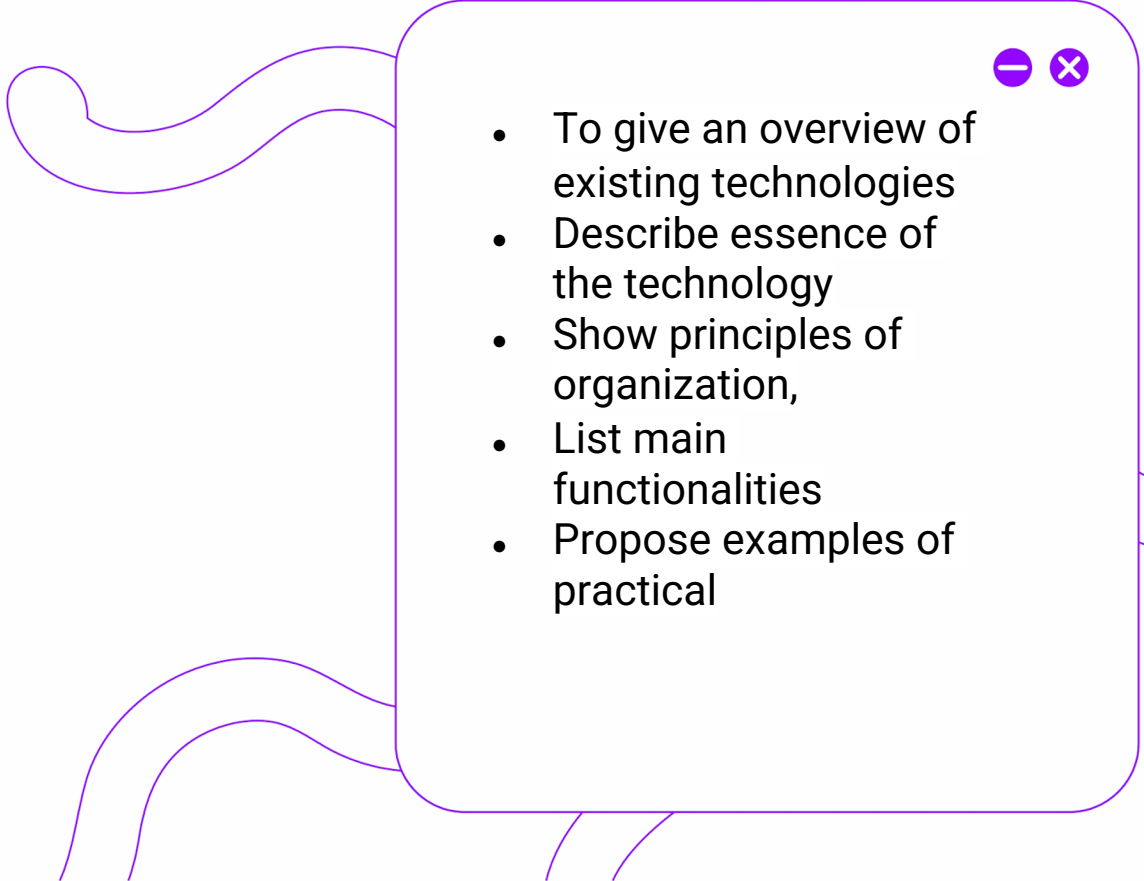
Pinterest

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Database Caching

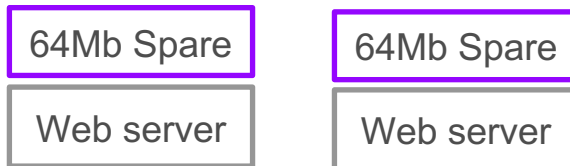
Plan

- 
- To give an overview of existing technologies
 - Describe essence of the technology
 - Show principles of organization,
 - List main functionalities
 - Propose examples of practical

What is caching?

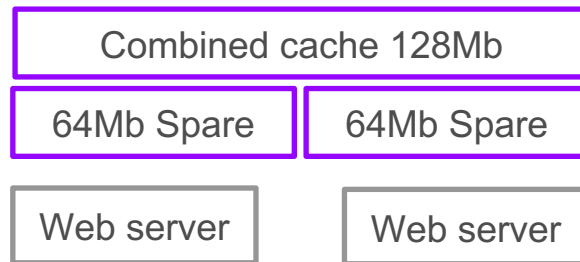
It is **mediator** that allows us to get our data very quickly.

Without Memcached



Used Separately | Cache 64Mb

With Memcached



Logically Combined | Cache 128Mb

Caching Technologies

itmo



Memcached



Redis



Ignite



Couchbase



Hazelcast

	Memcached	Redis	Ignite	Couchbase	Hazelcast
Multithreaded	Yes	Since v6	Yes	No	No
Data Model	Key/Value	Key/Value	Key/Value	Key/Value, XML	Key/Value
Data Types	Strings only	native data types	subset of SQL	subset of N1QL	subset of SQL
Programming languages	open-source clients available		Java, C++, .NET, Python, Node, PHP	Go, Java, .NET, Python, Node, PHP, Ruby, C	Go, Java, C++, .NET, Node
OS	Cross-platform	Unix-like	Cross-platform	Cross-platform	Cross-platform

Memcached is an in-memory key-value store caching system.



- Free & open source
- High-performance
- Distributed memory
- Best choice for reading Strings



Memcached

Principles of organization

iTMO

Memory Management



Threading

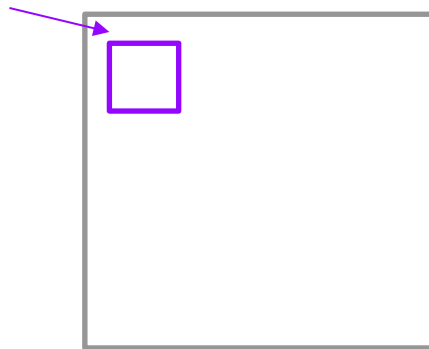
LRU

Read/Writes

Collisions

Distributed Cache

Chunk



Page (up to 1 MB)

Memcached allocates pages

Principles of organization

itMO

Memory Management

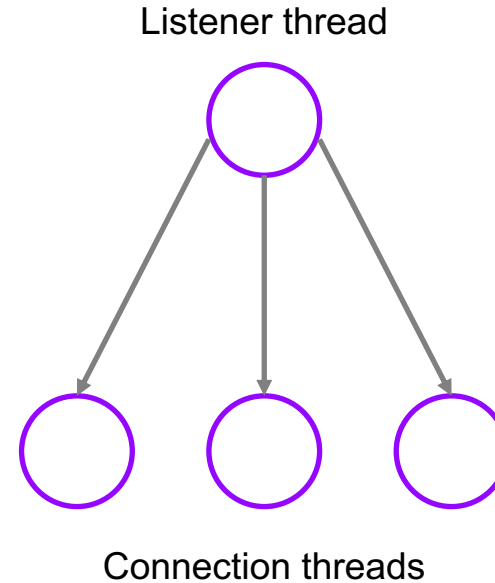
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Principles of organization

iTMO

Memory Management

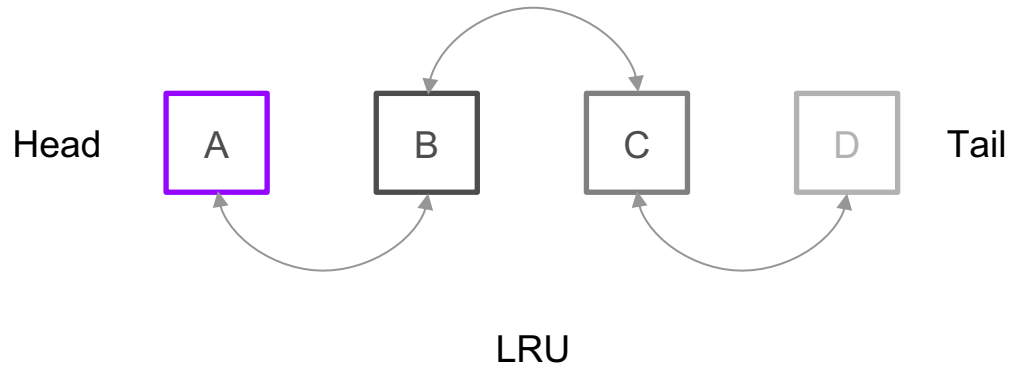
Threading

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The main functionalities



Fast, regardless of the quantity of data

Simple interface

Atomic operations are supported

Length of the keys is 250 bytes

Stored data under one key is limited to 1 MB

Loss of keys by lifetime, memory limit, or server crash

Examples of usage

E-commerce

Parametric search

Social Networks

Microservices

Google Cloud

```
package main

import (
    "github.com/bradfitz/gomemcache/memcache"
)

func main() {
    mc := memcache.New(
        "10.0.0.1:11211",
        "10.0.0.2:11211",
        "10.0.0.3:11212"
    )
    mc.Set(&memcache.Item{
        Key: "foo",
        Value: []byte("my value")
    })

    it, err := mc.Get("foo")
    ...
}
```

Example <https://github.com/bradfitz/gomemcache>

Conclusion

Caching helps to get data swiftly

Caching of relatively small and static data

Memcached is the best choice for data reading and small projects

Memcached is multi-threaded so it is easy to scale

References



[1] What is Memcached? // <https://memcached.org/>

[2] Instacluster “Redis™ vs Memcached” February 25, 2021 By Shane Ducksbury // <https://www.instacluster.com/blog/redis-vs-memcached/#h-what-is-memcached>

[3] mariocarrion “MICROSERVICES IN GO: CACHING USING MEMCACHED” January 30, 2021 By Mario Carrion // <https://mariocarrion.com/2021/01/30/tips-building-microservices-in-go-golang-caching-memcached.html>

[4] Google Cloud “Using Memcache” // <https://cloud.google.com/appengine/docs/legacy/standard/python/memcache/using>

**THANK YOU
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