

# Adding Redis Caching

To Your .NET Web API

Jonathan "J." Tower









# Speed Up Your .NET Application with Redis Caching

# Hi, I'm J.

Jonathan "J." Tower

Principal Consultant & Partner

Trailhead Technology Partners

🏆 Microsoft MVP in .NET

📅 Organizer of Beer City Code



**TRAILHEAD**  
TECHNOLOGY PARTNERS

trailheadtechnology.com

✉ jtower@trailheadtechnology.com

🌐 trailheadtechnology.com/blog

🐦 jtowermi

<https://github.com/jonathantower/redis-aspnet-core>

# Overview

## Definitions

- Caching
- Redis

## Why Use Caching

## Getting Started in ASP.NET Core

- StackExchange.Redis
- ServiceStack.Redis

## The Redis Command Line Interface

## ASP.NET Core Redis Demo

- ConnectionMultiplexer
- IDistributedCache

## Common Mistakes

BUT FIRST...If You Give \$200, So Will I!

**bit.ly/???-water**

*"charity:water is a non-profit organization that provides clean and safe drinking water to people in developing nations. The organization was founded in 2006 and has helped fund 35,000 projects in 27 countries, benefiting over 9.5 million people.."*

- Wikipedia

*"4/4 Stars"*

- CharityNavigator.org



charity: water

# What is Caching?











## What is Caching?

**Temporarily** storing  
**frequently accessed** data to  
**fast storage** that's located  
**close** to the application



What is Caching?

**Temporarily** storing  
**frequently accessed** data to  
**fast storage** that's located  
**close** to the application

What is Caching?

**Temporarily** storing  
**frequently accessed** data to  
**fast storage** that's located  
**close** to the application

What is Caching?

**Temporarily** storing  
**frequently accessed** data to  
**fast storage** that's located  
**close** to the application



What is Caching?

**Temporarily** storing  
**frequently accessed** data to  
**fast storage** that's located  
**close** to the application

# What is Redis?

# What is Redis?

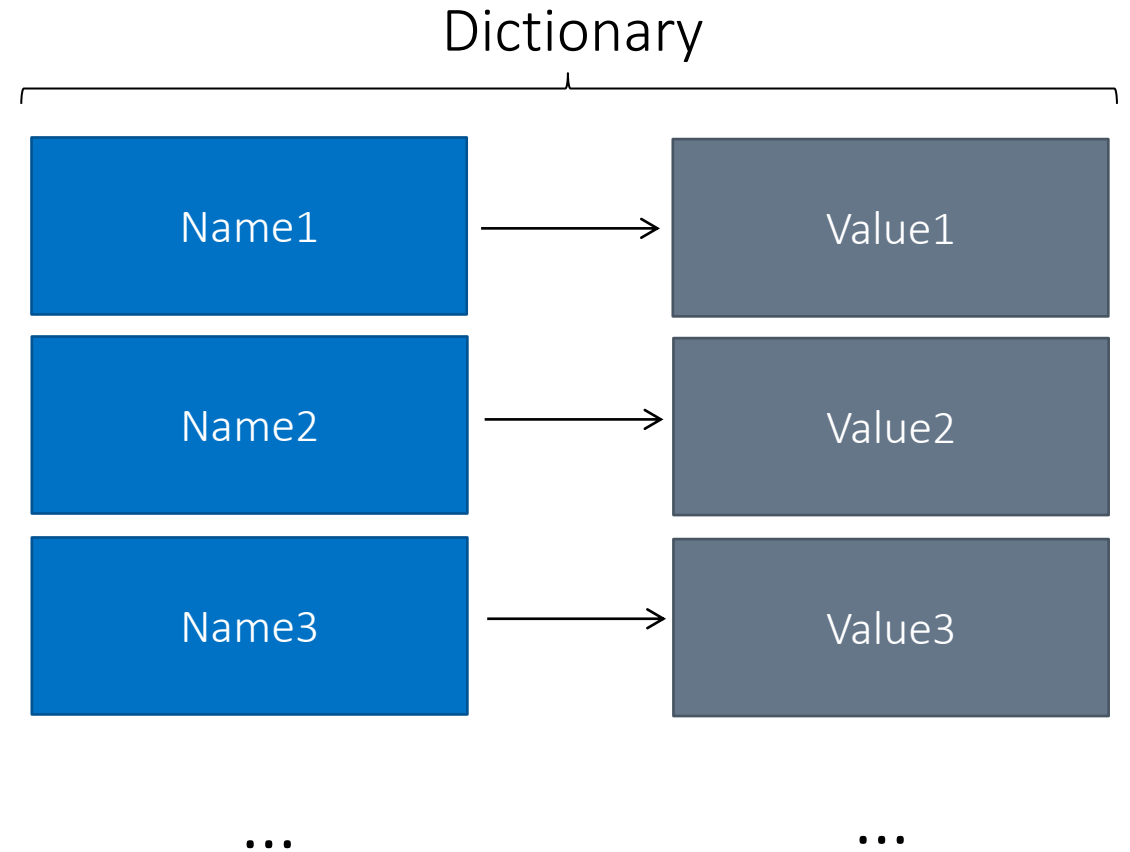


- The **open source, in-memory data store** used by millions of developers as a database, cache, streaming engine, and message broker.
- **RE**mote **D**ictionary **S**erver



# Redis: An In-Memory Dictionary

- Dictionary:  
An **unordered collection** of data represented by a set of **key-value pairs**



# Redis is Not a Relational DB

- Key/Value pairs
- Size limit
- In-memory
- Invalidation/expiration



# Redis Hosting Options

Self-Host



WSL2



Host in Managed Cloud



Google Cloud

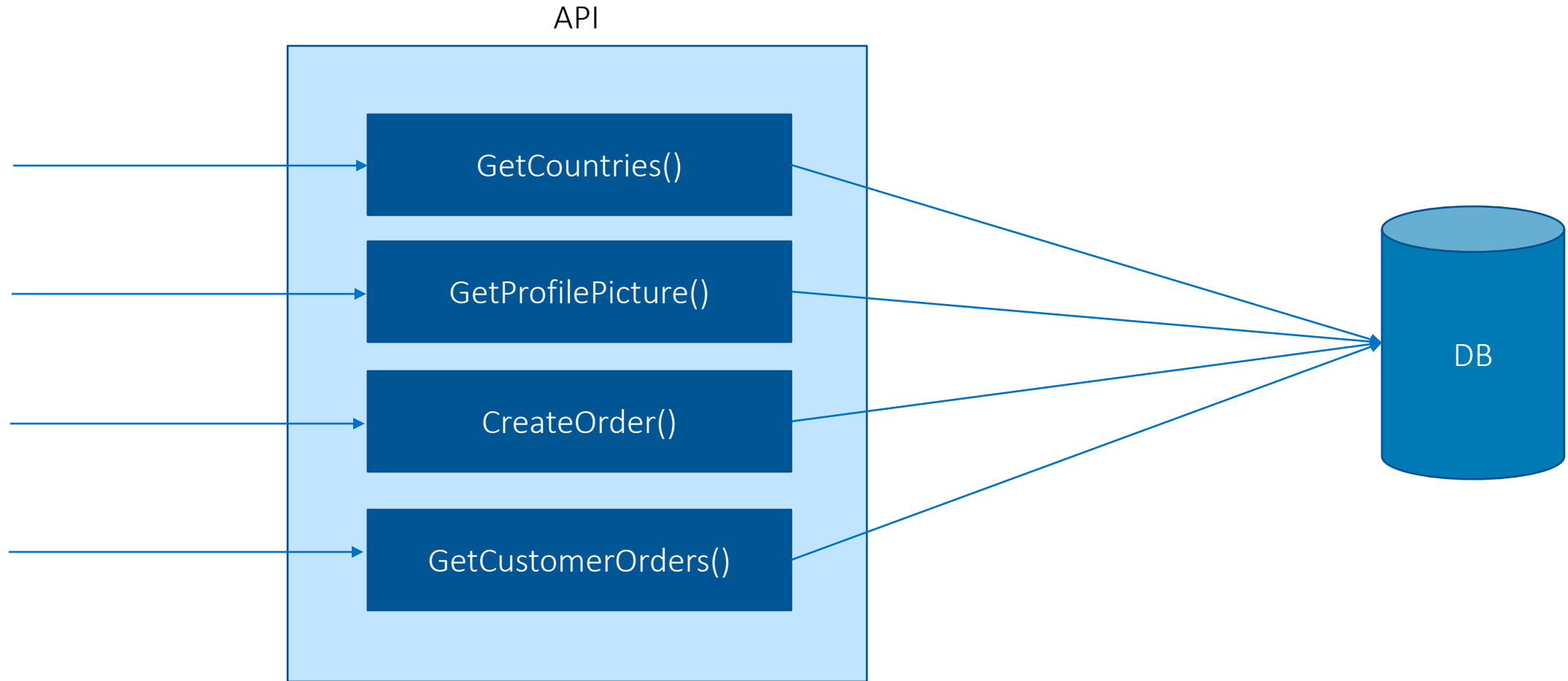


# Redis SKUs

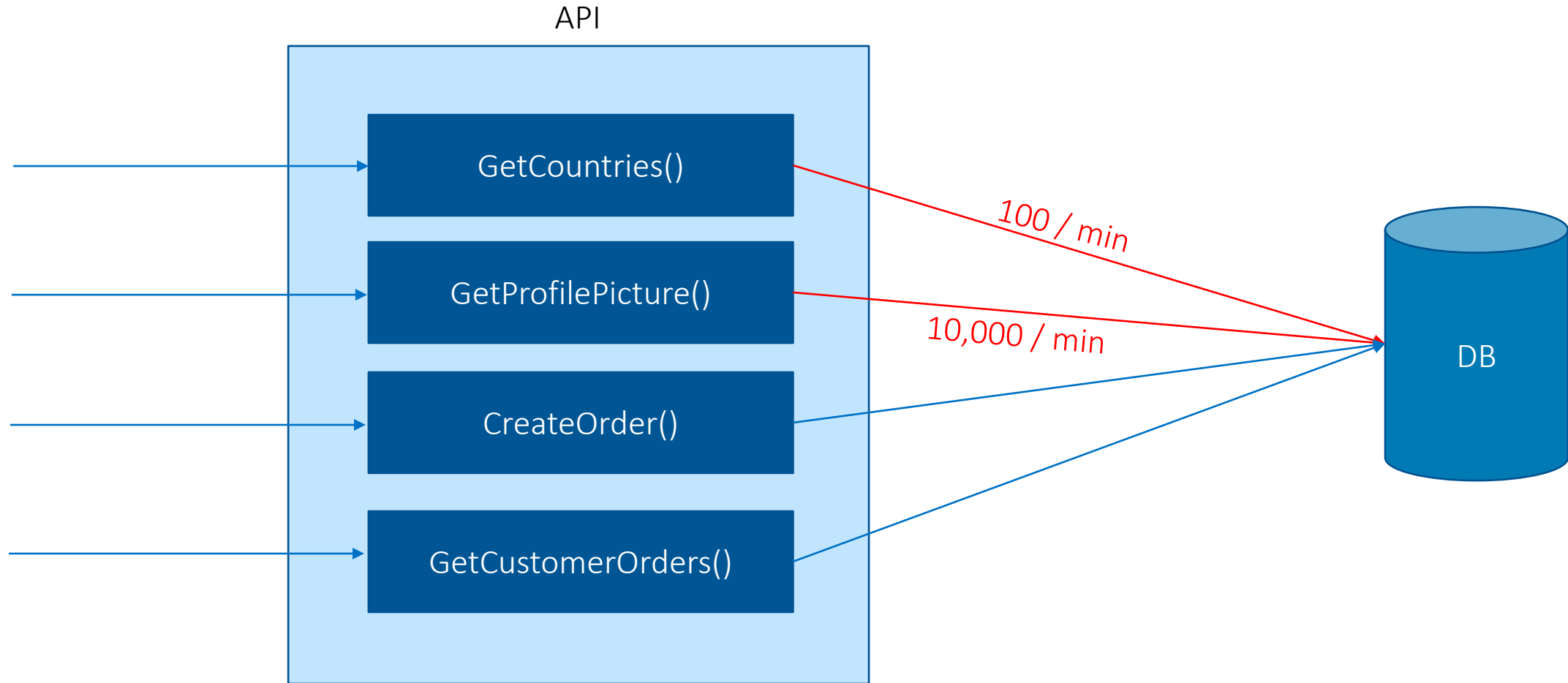
		Redis Open Source	Redis Enterprise
Build	Boost app performance with Redis cache	●	●
	Support enterprise caching (read replica, write-behind, write-through)		●
	Build any real-time app on Redis with extended data model and processing engines support (JSON, search, time series, graph)		●
	Rapid development with out-of-the-box object mapping libraries for Spring, ASP.NET Core, FastAPI, and Express		●
	Redis GUI with predefined developer guides and tools	●	●
Deploy	Fully supported deployment on-premise or hybrid cloud		●
	Automated deployment on any cloud or multicloud		●
	Ingest data from external data sources with RedisConnect		●
Run	Deliver consistent real-time customer experience globally with geo-distributed Redis		●
	Automated database and cluster management (scaling, re-sharding, rebalancing)		●
	Built-in high-availability and disaster recovery management		●
	Enterprise-grade customer support from the creators of Redis		●

# Why Use Caching?

# Caching Sample

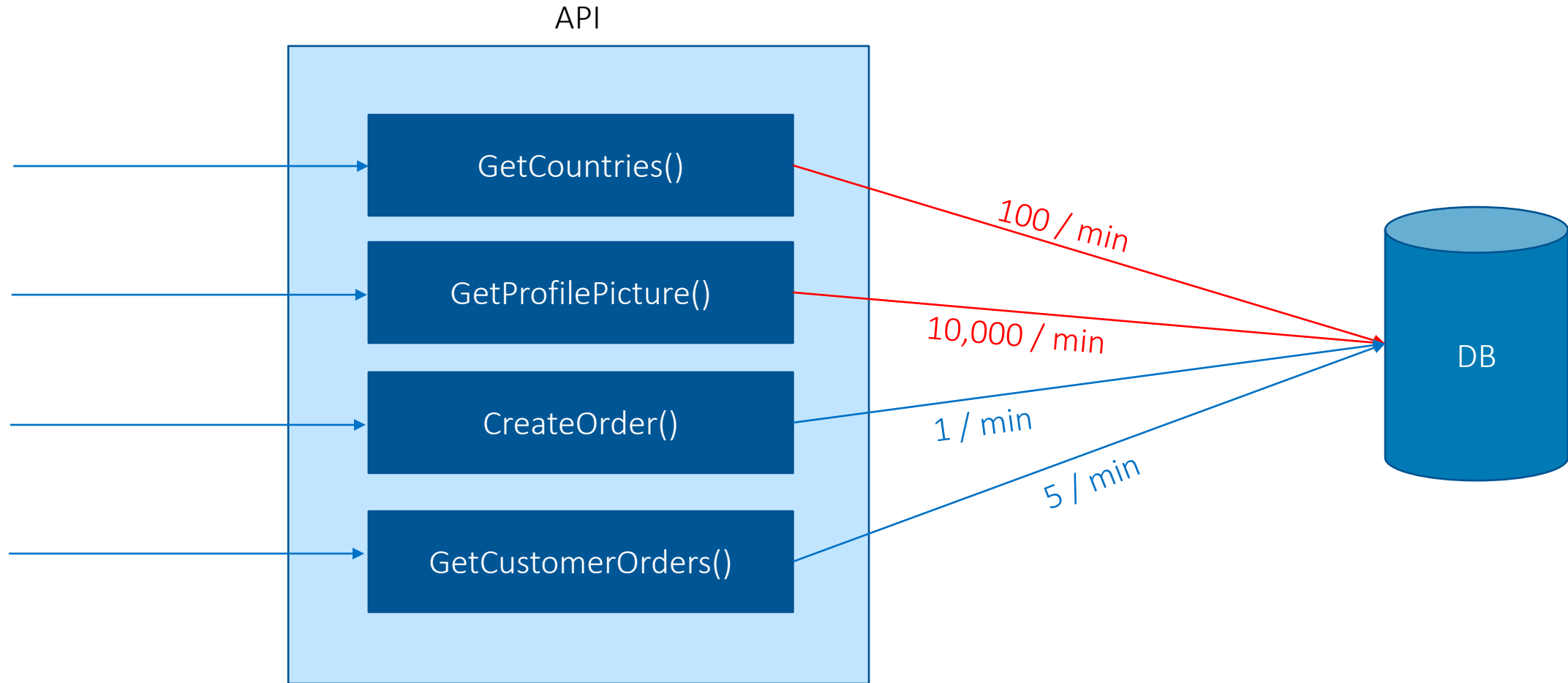


# Caching Sample

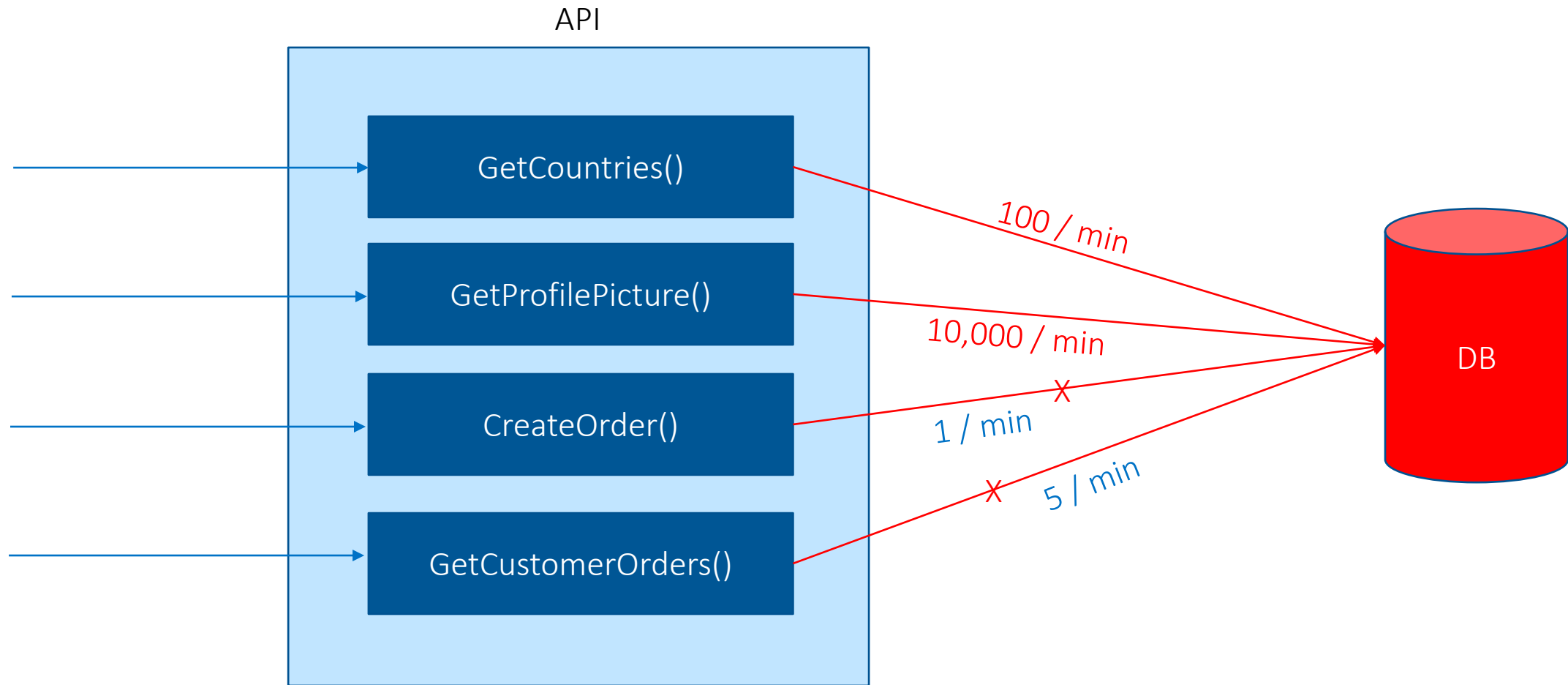




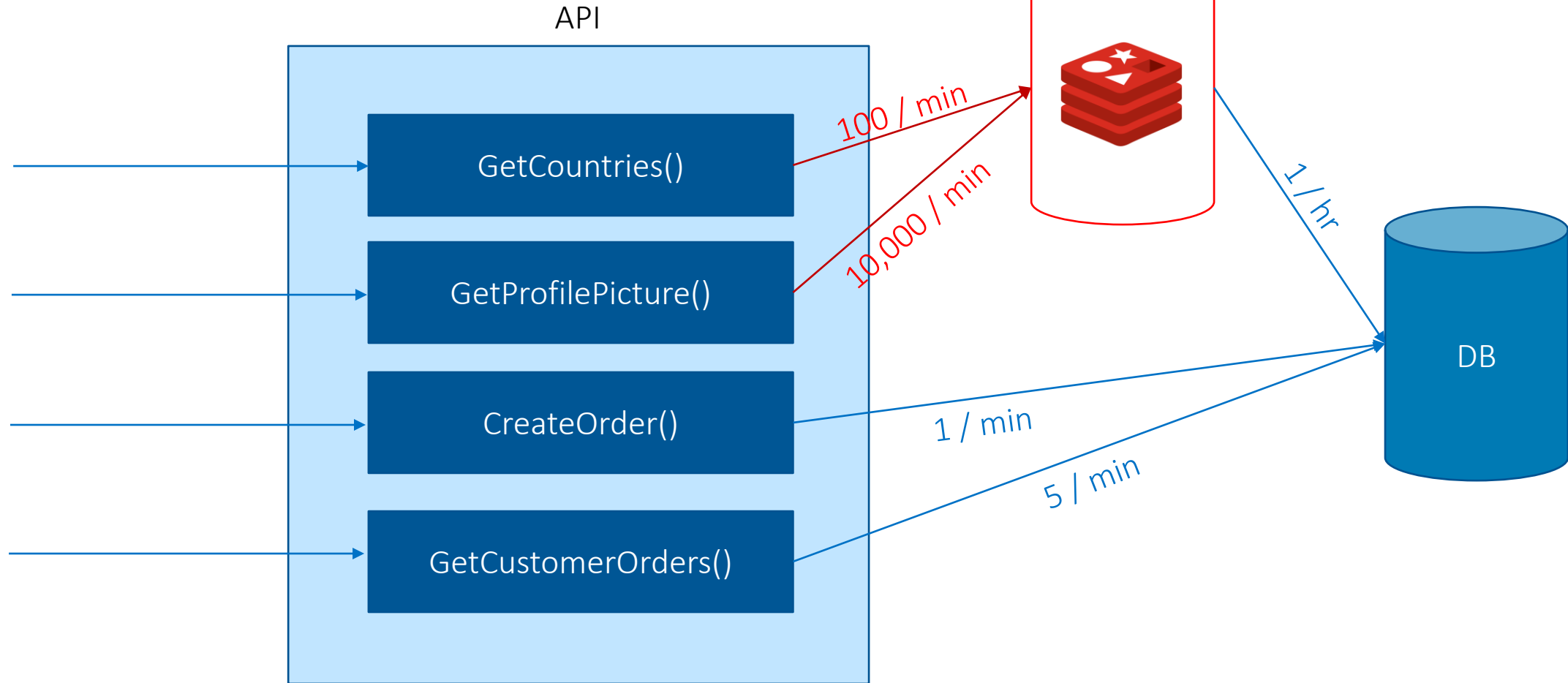
# Caching Sample



# Caching Sample



# Caching Sample



# Getting Started

Adding Redis to Your ASP.NET Core Project

# ASP.NET vs ASP.NET Core

- Possible in both ASP.NET and ASP.NET Core\*

*\*We'll focus on ASP.NET Core*

- For more, see:

<https://docs.microsoft.com/en-us/azure/azure-cache-for-redis/cache-web-app-howto>

<https://docs.microsoft.com/en-us/azure/azure-cache-for-redis/cache-web-app-aspnet-core-howto>



# Redis Setup for Development on Windows

- Install WSL2 on Windows

- Install Docker Desktop on Windows

```
docker run --name dev-redis -p 6379:6379 -d redis
```

- Install redis-cli on WSL2

<https://redis.io/docs/getting-started/installation/install-redis-on-windows/>

# Adding Redis to ASP.NET Core

- Add StackExchange.Redis nuget package
- Either:
  - Wrapper for SINGLE instance of ConnectionMultiplexer
  - IDistributedCache through `builder.Services.AddStackExchangeRedisCache(...)`

# StackExchange.Redis vs ServiceStack.Redis

	StackExchange.Redis	ServiceStack.Redis
<b>Cost</b>	Free	\$300 - \$1,000 / dev
<b>Support</b>	None	Commercial Support

# DEMO

Redis Command Line Interface (CLI)

# DEMO

User Profile Images



# Redis API vs IDistributedCache

- Microsoft.Extensions.Caching.StackExchangeRedis nuget package

```
builder.Services.AddStackExchangeRedisCache(options =>
{
    options.Configuration = "127.0.0.1:6379,allowAdmin=true";
    options.InstanceName = "dev-redis";
});
```

# Common Mistakes

With Redis Caching

# Common Redis Mistakes

- One request per connection
  - Too many ConnectionMultiplexer instances (StackExchange.Redis)
- Not using a password
- Not expecting cache misses
- Updating data too often
- Caching infrequently-accessed data
- Redis too far from application
- Not having a key naming convention

# Key Naming Convention

- Use colon (:) to separate items  
`namespace:object-type:id:field`
- Examples:
  - *user:1000:password*
  - *comment:1234:reply.to*
- Another suggestion (# for ids)
  - *logistics:building#23*

# Summing Up

1. Using Redis correctly can speed up your application and take load off your database
2. Host Redis wherever you want (on-prem, cloud, etc)
3. Use StackExchange SDK for free or ServiceStack for commercial support
4. ConnectionMultiplexer or IDistributedCache



# Recap

## Definitions

- Caching
- Redis

## Why Use Caching

## Getting Started in ASP.NET Core

- StackExchange.Redis
- ServiceStack.Redis

## The Redis Command Line Interface

## ASP.NET Core Redis Demo

- ConnectionMultiplexer
- IDistributedCache

## Common Mistakes



Last Chance...If You Give \$200, So Will I!

**bit.ly/???-water**

*"charity:water is a non-profit organization that provides clean and safe drinking water to people in developing nations. The organization was founded in 2006 and has helped fund 35,000 projects in 27 countries, benefiting over 9.5 million people.."*

- Wikipedia

*"4/4 Stars"*

- CharityNavigator.org



charity: water

# Thank You! Questions?

- Jonathan "J." Tower
- Principal Consultant & Partner
- Trailhead Technology Partners

🏆 Microsoft MVP in .NET  
📅 Organizer of Beer City Code



✉ jtower@trailheadtechnology.com  
🌐 trailheadtechnology.com/blog  
🐦 jtowermi

<https://github.com/jonathantower/redis-aspnet-core>