



# Serverless mit Go



# Go App Engine Cold Start

```
2023-01-13 07:59:32.654 MEZ 2023/01/13 06:59:32 "GET http://baralga-app.tack.dev/"
```

```
2023-01-13 07:59:32.513 MEZ [pid1-nginx] Starting nginx (pid 10)
```

```
2023-01-13 07:59:32.510 MEZ [pid1-nginx] Success
```

```
2023-01-13 07:59:32.500 MEZ 2023/01/13 06:59:32 "GET http://baralga-app.tack.dev/"
```

```
2023-01-13 07:59:32.498 MEZ [pid1] Using app start info from /srv/.googleconfig/app_start.json: &main.appStart{Entrypoint:struct { Type string "json:\\"type\\\""; UnparsedValue
```

```
2023-01-13 07:59:32.498 MEZ [pid1] started [session:0L0J1RC]
```

Up and running in 500ms! 



# Serverless Booster



Schnell



Einfach



Zuverlässig



# 5 Fakten zu Go

1. statisches Typsystem
2. Garbage Collection
3. keine Vererbung
4. Concurrency eingebaut
5. native Ausführung

Linux, Win, z/OS, 386, amd64, ARM, WebAssembly, ...





# Serverless Computing



# Serverless Computing

# Dynamische Skalierung (0 bis x)

# Pay per Use

# Ereignis getrieben (HTTP, Message, Storage, ...)

# Ausführung auf verwalteter Infrastruktur

# Cloud Anbieter übernimmt Logs, Metriken, ...



# Serverless Tarifrechner DogOp

## Function-as-a-Service

1. Google Cloud Run Function
2. Azure Function App

## Serverless Containers

3. Google Cloud Run
4. Azure Container Apps



# Quote Google Cloud Run Function



# Quote Cloud Run Function

# API die Hunde OP Versicherung berechnet

# Bereitstellung als Google Cloud Run Function



# Quote API für Rechner

Request

```
POST /quote  
Content-Type: application/json
```

```
{  
  "age": 8,  
  "breed": "chow"  
}
```

Response

```
HTTP/1.1 200 OK  
Content-Type: application/json
```

```
{  
  "age": 8,  
  "breed": "chow",  
  "tariffs": [  
    {  
      "name": "Dog OP _ Basic",  
      "rate": 12.4  
    }  
  ]  
}
```



# Quote Function aufsetzen

```
// Go Modul initialisieren  
go mod init crossnative.com/dogop-serverless
```

```
// Google Cloud Functions Framework einbinden  
go get github.com/GoogleCloudPlatform/functions-framework-go
```

## Projektstruktur

```
go.mod // Modul Deskriptor mit Dependencies  
go.sum // Checksummen der Dependencies
```



# Quote Function aufsetzen

```
1 package dogop
2
3 import (
4     "net/http"
5     "github.com/GoogleCloudPlatform/functions-framework-go/functions"
6 )
7
8 // Package Init Function
9 func init() {
10     functions.HTTP("HandleQuote", func(w http.ResponseWriter, req *http.Request) {
11         w.Write([]byte("Hello Quote!"))
12     })
13 }
```

# Quote Function erstellen



Google Cloud dogop-serverless Nach Ressourcen, Dokumenten, Produkten und mehr suchen (..) Suche

Cloud Run-Funktionen Funktion erstellen LERNEN

1 Konfiguration — 2 Code

### Grundlagen

Umgebung  
Cloud Run function

Funktionsname \*  
dogop-quote

Region \*  
europe-west10 (Berlin)

### Trigger

Triggertyp  
HTTPS

URL  
<https://europe-west10-dogop-serverless.cloudfunctions.net/dogop-quote>

Authentifizierung ?

Nicht authentifizierte Aufrufe zulassen  
Klicken Sie dieses Kästchen an, wenn Sie eine öffentliche API oder eine Website erstellen.

Authentifizierung erforderlich  
Verwalten Sie autorisierte Nutzer mit Cloud IAM.

WEITER ABBRECHEN

# Quote Function erstellen



Google Cloud dogop-serverless Nach Ressourcen, Dokumenten, Produkten und mehr suchen (..) Suche

Cloud Run-Funktionen Funktion bearbeiten LERNEN

Konfiguration — **Code**

Laufzeit Go 1.22 Einstiegspunkt \* HandleQuote FUNKTION TESTEN

Quellcode Inline-Editor

+ go.mod ...

main.go

Drücken Sie Option+F1, um Optionen für Bedienungshilfen aufzurufen.

```
1 package dogop
2
3 import (
4     "net/http"
5     "github.com/GoogleCloudPlatform/functions-framework-go/functions"
6 )
7
8 func init() {
9     functions.HTTP("HandleQuote", func(w http.ResponseWriter, req *http.Request) {
10         w.Write([]byte("Hello Quote!"))
11     })
12 }
```

ZURÜCK BEREITSTELLEN ABBRECHEN

# Quote Function testen





## Cloud Run-Funktionen

## Funktionsdetails

BEARbeiten

LÖSCHEN

KOPIEREN

LERNEN

G

quote

Cloud Run function

(Bereitgestellt am 29.10.2024, 17:01:41)

URL: <https://europe-west10-dogop-serverless.cloudfunctions.net/quote>In Cloud Run ansehen  
quote

MESSWERTE

DETAILS

QUELLE

VARIABLEN

TRIGGER

BERECHTIGUNGEN

LOGS

TEST

## Auslösendes Ereignis konfigurieren

Drücken Sie Option+F1, um Optionen für Bedienungshilfen aufzurufen.

```
1
2 "name": "Hello World"
3
```

FUNKTION TESTEN

## Abfrageparameter

+ ABFRAGEPARAMETER HINZUFÜGEN

## Header

+ HEADER HINZUFÜGEN

## Ausgabe

\$ Hello Quote!

## Logs

Abgerufen (bis zu 100 Einträge). [Alle Logs ansehen](#)

WICHTIGKEIT	ZEITSTEMPEL	FATZ
> i	2024-10-29 16:39:00.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:01.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:02.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:03.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:04.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:05.045 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:06.043 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:07.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:08.043 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:09.045 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:10.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:11.044 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 16:39:12.048 MEZ	POST 200 171 B 1 ms Go-http-client/2.0 ht...
> i	2024-10-29 17:00:23.144 MEZ	Cloud Run ReplaceInternalService quote_...
> i	2024-10-29 17:01:35.322 MEZ	Cloud Run ReplaceInternalService quote_...
> i	2024-10-29 17:01:40.293 MEZ	Default STARTUP TCP probe succeeded after 1 at...
> i	2024-10-29 17:01:40.347 MEZ	Cloud Run ReplaceInternalService quote_...
> i	2024-10-29 17:01:41.703 MEZ	Cloud Run ReplaceInternalService quote_ {@...
> i	2024-10-29 17:02:13.061 MEZ	POST 200 108 B 1 ms Google-Cloud-Functions...



# Quote mit Rechner

```
1 func HandleQuote(w http.ResponseWriter, r *http.Request) {  
2     // 1. JSON Request lesen  
3     var q Quote  
4     json.NewDecoder(r.Body).Decode(&q)  
5  
6     // 2. Tarif berechnen  
7     tariff := Tariff{N  
8     quote.Tariff = tariff  
9  
10    // 3. Response schreiben  
11    w.WriteHeader(http.StatusOK)  
12    w.Header().Set("Content-Type", "application/json")  
13    json.NewEncoder(w).Encode(quote)  
14  
15    func init() {  
16        functions.HTTP("HandleQuote", HandleQuote)  
17    }
```

Achtung, noch ohne Fehlerhandlung! 



# Struct statt Klasse

```
1 type Tariff struct {  
2     Name string `json:"name"  
3     Rate float64 `json:"rate"  
4 }  
5  
6 type Quote struct {  
7     Age     int      `json:"age"  
8     Breed   string   `json:"breed"  
9     Tariffs []Tariff `json:"tariffs"  
10 }
```

```
// Struct erzeugen  
tariff := Tariff{Name: "Dog 0P _ Basic", Rate: 12.4}
```



# Quote Function deployen

# Deployment als Zip-Datei

# Cloud Build baut Docker Container

```
function.zip  
| - main.go  
| - go.mod
```

# Quote Function testen



Google Cloud dogop-serverless Nach Ressourcen, Dokumenten, Produkten und mehr suchen (.) Suche

Cloud Run-Funktionen ← Funktionsdetails BEARBEITEN LÖSCHEN KOPIEREN LERNEN C

quote Cloud Run function (Bereitgestellt am 28.10.2024, 19:44:10)

URL: <https://europe-west1-dogop-serverless.cloudfunctions.net/quote> ⓘ ⓘ

Auslösendes Ereignis konfigurieren

Drücken Sie Option+F1, um Optionen für Bedienungshilfen aufzurufen.

```
1 {  
2   "age": 8,  
3   "breed": "chow"  
4 }
```

FUNKTION TESTEN

Abfrageparameter

+ ABFRAGEPARAMETER HINZUFÜGEN

Header

+ HEADER HINZUFÜGEN

In Cloud Run ansehen quote

Ausgabe

```
$ {"age":8,"breed":"chow","tariffs":[{"name":"Dog OP _ Basic","rate":100,"minAge":0,"maxAge":100,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":1}, {"name":"Dog OP _ Medium","rate":150,"minAge":10,"maxAge":20,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":2}, {"name":"Dog OP _ Large","rate":200,"minAge":20,"maxAge":30,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":3}, {"name":"Dog OP _ Extra Large","rate":300,"minAge":30,"maxAge":40,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":4}, {"name":"Dog OP _ XXL","rate":400,"minAge":40,"maxAge":50,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":5}, {"name":"Dog OP _ XXXL","rate":500,"minAge":50,"maxAge":60,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":6}, {"name":"Dog OP _ XX-XXL","rate":600,"minAge":60,"maxAge":70,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":7}, {"name":"Dog OP _ XXX-XXXL","rate":700,"minAge":70,"maxAge":80,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":8}, {"name":"Dog OP _ XXXX-XXXXL","rate":800,"minAge":80,"maxAge":90,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":9}, {"name":"Dog OP _ XXXXX-XXXXXL","rate":900,"minAge":90,"maxAge":100,"minBreed":null,"maxBreed":null,"minWeight":0,"maxWeight":100,"order":10}], "status": "Success", "error": null}
```

Logs Abgerufen (bis zu 100 Einträge). [Alle Logs ansehen](#)

WICHTIGKEIT	ZEITSTEMPEL	FAZIT
> i	2024-10-28 20:47:46.395 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:46.895 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:47.394 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:47.895 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:48.396 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:48.894 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:49.395 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:49.895 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:50.395 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:50.896 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:51.396 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:51.895 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:52.396 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:52.896 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...
> i	2024-10-28 20:47:53.395 MEZ	POST 200 171 B 1 ms Go-http-client/2.0...



# Quote Cloud Run Function

## Zahlen, Daten, Fakten

- # Function Container Image **14,5 MB**
- # Container Startup in **50-60 ms**
- # Hauptspeicher **25 MB**
- # Antwortzeit Quote **15 ms**



# Fehler



```
1 func HandleQuote(w http.ResponseWriter, r *http.Request) {  
2     // 1. JSON Request lesen  
3     var q Quote  
4     json.NewDecoder(r.Body).Decode(&q) // 💣 Fehler möglich!  
5  
6     // 2. Tarif berechnen  
7     tariff := Tariff{Name: "Dog OP _ Basic", Rate: 12.4}  
8     quote.Tariffs = []Tariff{tariff}  
9  
10    // 3. JSON Response schreiben  
11    json.NewEncoder(w).Encode(quote) // 💣 Fehler möglich!  
12 }
```



pkgo.dev/encoding/json#Decoder.Decode

GO json package standard library Version: go1.20.4 Latest | Published: May 2, 2023 | License: BSD-3-Clause | Imports: 15 | Imported by: 726,789

Jump to ... f

**Documentation**

Overview

Index

Constants

Variables

Functions

Types

type Decoder

- NewDecoder(r)
- (dec) Buffered()
- (dec) Decode(v)**
- (dec) DisallowUnknownFiel...
- (dec) InputOffset()
- (dec) More()
- (dec) Token()
- (dec) UseNumber()

type Delim

type Encoder

type InvalidUTF8Error

type InvalidUnmarshalError

Source Files

**func (\*Decoder) Decode**

```
func (dec *Decoder) Decode(v any) error
```

Decode reads the next JSON-encoded value from its input and stores it in the value pointed to by v.

See the documentation for Unmarshal for details about the conversion of JSON into a Go value.

▼ Example (Stream)

This example uses a Decoder to decode a streaming array of JSON objects.

```
package main

import (
    "encoding/json"
    "fmt"
    "log"
    "strings"
)

func main() {
    const jsonStream = `[
        {"Name": "Ed", "Text": "Knock knock."},
        {"Name": "Sam", "Text": "Who's there?"},
        {"Name": "Ed", "Text": "Go fmt."},
        {"Name": "Sam", "Text": "Go fmt who?"},
        {"Name": "Ed", "Text": "Go fmt yourself!"}
    ]`
```

```
type Message struct {
    Name, Text string
}
```



# Fehler

- # Go kennt kein spezielles Konstrukt zur Fehlerbehandlung
- # Fehler sind normale Rückgabewerte



# Fehler

```
1 func HandleQuote(w http.ResponseWriter, r *http.Request) {
2     // 1. JSON Request lesen
3     var q Quote
4
5     // Potentieller Fehler 💣
6     err := json.NewDecoder(r.Body).Decode(&q)
7
8     // Auf Fehler prüfen
9     if err != nil {
10         // Fehler behandeln
11         http.Error(w, "Could not decode quote.😔", http.StatusBadRequest)
12         return
13     }
14
15     // ...
16 }
```



# HTTP Handler testen

```
# HTTP Handler mit Standardlib testbar
# Unit Tests in Standardlib enthalten
# Google Cloud Functions sind HTTP Handler
# Tests in Datei main_test.go
```



# HTTP Handler testen

```
1 func TestHandleQuote(t *testing.T) {
2     // 1. HTTP Recorder erstellen
3     recorder := httptest.NewRecorder()
4
5     // 2. Request erstellen (mit Body)
6     body := `{
7         "age": 8,
8         "breed": "chow"
9     }`  

10    req, _ := http.NewRequest("GET", "/api/quote", strings.NewReader(body))
11
12    // 3. Handler Funktion aufrufen
13    HandleQuote(recorder, req)
14
15    // 4. Return Code prüfen
16    if recorder.Code != http.StatusOK {
17        t.Errorf("Wrong status: got %v expected %v", recorder.Code, http.StatusOK)
18    }
19}
20}
```



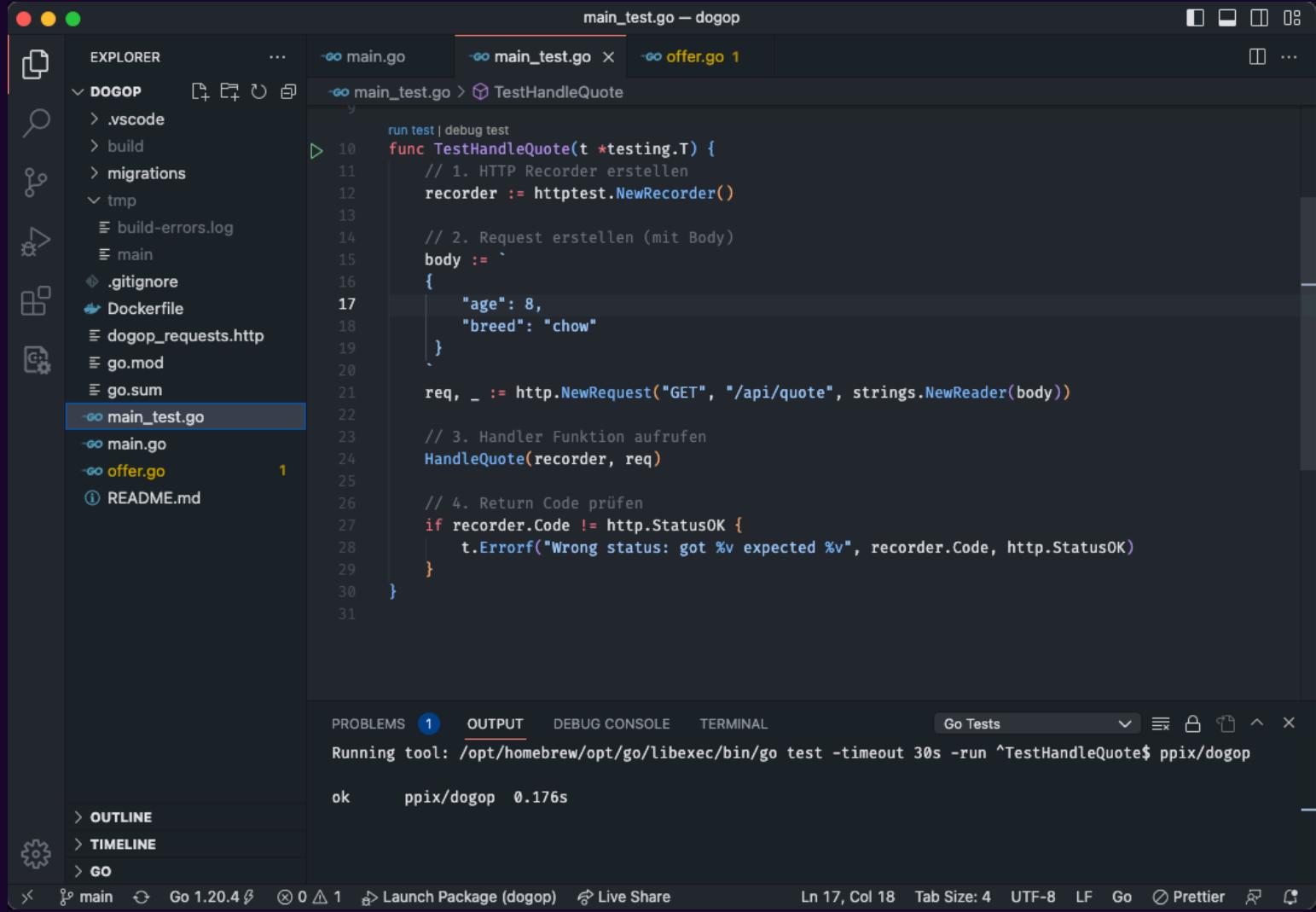
# HTTP Handler testen

```
go test -v ./...
```

```
==== RUN TestHandleQuote
--- PASS: TestHandleQuote (0.00s)
PASS
ok crossnative.com/dogop-serverless 0.228s
```



# HTTP Handler testen



The screenshot shows a dark-themed instance of VS Code with the following details:

- Explorer View:** Shows a project structure for a "DOGOP" application. Files listed include .vscode, build, migrations, tmp, build-errors.log, main, .gitignore, Dockerfile, dogop\_requests.http, go.mod, go.sum, main.go, main\_test.go (selected), offer.go, and README.md.
- Editor View:** Displays the content of main\_test.go. The code is a Go test function named TestHandleQuote. It demonstrates how to use the http test recorder to test a handler function that takes a JSON body.
- Terminal View:** Shows the output of running the test command. It includes the command used ("go test -timeout 30s -run ^TestHandleQuote\$ ppix/dogop") and the result ("ok ppix/dogop 0.176s").
- Bottom Status Bar:** Provides standard status bar information including the Go version (1.20.4 beta), file name (main), and terminal output.



# Quote Azure Function App



# Quote Azure Function aufsetzen

```
1 package main
2
3 import (
4     "net/http"
5     "os"
6 )
7
8 func main() {
9     // 1. Port initialisieren
10    listenAddr := ":8080" // Default Port
11    customHandlerPort, ok := os.LookupEnv("FUNCTIONS_CUSTOMHANDLER_PORT")
12    if ok {
13        listenAddr = ":" + customHandlerPort
14    }
15
16    // 2. Quote Handler registrieren
17    http.HandleFunc("/api/quote", HandleQuote)
18
19    // 3. Web Server starten
20    http.ListenAndServe(listenAddr, nil)
21 }
```



# Quote Azure Function aufsetzen

host.json

```
1 {
2   "version": "2.0",
3   "logging": {
4     "applicationInsights": {
5       "samplingSettings": {
6         "isEnabled": true,
7         "excludedTypes": "Request"
8       }
9     }
10 },
11 "extensionBundle": {
12   "id": "Microsoft.Azure.Functions.ExtensionBundle",
13   "version": "[4.*, 5.0.0)"
14 },
15 "customHandler": {
16   "description": {
17     "defaultExecutablePath": "function",
18     "workingDirectory": "",
19     "arguments": []
20   },
21   "enableForwardingHttpRequest": true
22 }
23 }
```

quote/function.json

```
1 {
2   "bindings": [
3     {
4       "authLevel": "anonymous",
5       "type": "httpTrigger",
6       "direction": "in",
7       "name": "req",
8       "methods": [
9         "get",
10        "post"
11       ]
12     },
13     {
14       "type": "http",
15       "direction": "out",
16       "name": "res"
17     }
18   ]
19 }
```



# Quote Azure Function deployen

# Deployment als Zip-Datei

# Function Binary als Linux Executable

```
GOOS=linux GOARCH=amd64 go build main.go
```

```
function.zip
|- function
|- quote/function.json
|- host.json
```

# Quote Function erstellen



Microsoft Azure Search resources, services, and docs (G+/-) Copilot ... Jan.Stamer@crossnative...  
PPI AG (ppi.de)

Home > Function App ... X

PPI AG (ppi.de)

+ Create Manage view Refresh Export to CSV Open query | Assign tags Start Restart Stop Delete

Filter for any field... Subscription equals all Resource group equals all Location equals all Add filter

Showing 1 to 1 of 1 records. No grouping List view

<input type="checkbox"/> Name ↑↓	Status ↑↓	Location ↑↓	Pricing Tier ↑↓	App Service Plan ↑↓	Subscription ↑↓	App Type ↑↓	...
<input type="checkbox"/> dogop-serverless-quote	Running	West Europe	Dynamic	dogop-service-plan	Azure_Subscription_Cr...	Function App	...

< Previous Page 1 of 1 Next >

Give feedback

# Quote Function erstellen



Microsoft Azure Search resources, services, and docs (G+) Copilot Jan.Stamer@crossnative...  
PPI AG (PPI.DE)

Home > dogop-serverless-quote Function App

Search Browse Refresh Stop Restart Swap Get publish profile Reset publish profile Download app content Delete ...

**Overview** JSON View

Essentials

Resource group (...	: <a href="#">dogop-serverless</a>	Default domain	: <a href="#">dogop-serverless-quote.azurewebsites.net</a>
Status	: Running	Operating System	: Linux
Location ( <a href="#">move</a> )	: West Europe	App Service Plan	: <a href="#">dogop-service-plan (Y1: 0)</a>
Subscription ( <a href="#">move</a> )	: <a href="#">Azure Subscription Crossnative Dev</a>	Runtime version	: 4.636.1.1
Subscription ID	: 258b0030-3486-42c7-87c7-2ace4e9e9552		
Tags (edit)	: Add tags		

Functions Metrics Properties Notifications (0)

{ } Set up local environment Refresh

Filter by name...

Name	Trigger	Status	Monitor	...
quote	HTTP	<span>Enabled</span>	<a href="#">Invocations and more</a>	...

**Functions**

- App keys
- App files
- Proxies

**Deployment**

- Deployment slots
- Deployment Center

**Settings**

- Environment variables
- Configuration
- Authentication
- Identity
- Backups
- Custom domains



# Quote Function erstellen

Benötigte Azure Resourcen:

 dogop-appinsights	Application Insights
 dogop-log-analytics	Log Analytics workspace
 dogop-serverless-quote	Function App
 dogop-service-plan	App Service plan
 dogopstorage	Storage account



# Quote Azure Function App

## Zahlen, Daten, Fakten

# Antwortzeit Quote **30 ms**

# Binary function Größe **9 MB**

# Keine extra Dependencies, nur Standardlib 😍



# Quote Google Cloud Run

# Go Standardlib WebServer nutzen

```
1 package main
2
3 import (
4     "net/http"
5     "os"
6 )
7
8 func main() {
9     // 1. Port initialisieren
10    listenAddr := ":8080" // Default Port
11    customHandlerPort, ok := os.LookupEnv("PORT")
12    if ok {
13        listenAddr = ":" + customHandlerPort
14    }
15
16    // 2. Http Router erstellen
17    router := http.NewServeMux()
18
19    // a) Quote Handler registrieren
20    router.HandleFunc("POST /api/quote", HandleQuote)
21
22    // b) Hello Handler registrieren
23    router.HandleFunc("GET /", func(w http.ResponseWriter, r *http.Request) {
24        w.Write([]byte("Hello DogOp!"))
25    })
26
27    // 3. Web Server starten
28    log.Printf("Listening on %v", listenAddr)
29    http.ListenAndServe(listenAddr, router)
30 }
```



# Dockerfile für DogOP

```
1 # 1. DogOp Builder
2 FROM golang as builder
3 WORKDIR /app
4 ADD . /app
5 RUN CGO_ENABLED=0 go build -o build/dogop .
6
7 # 2. Google Distroless Image
8 FROM gcr.io/distroless/static
9 CMD ["./build/dogop"]
10 EXPOSE 8080
11 ENTRYPOINT ["/usr/bin/dogop"]
```



Google Distroless Image 8,5 MB



# Docker DogOP mit



Build

```
// 1. Docker Image bauen  
>_ pack build
```



## Docker Image Buildpack 40 MB

[https://github.com/buildpacks/builder-jammy-tiny](#)

```
// 2. Docker Image ausführen  
>_ docker run dogop-cnb
```

# Cloud Run erstellen



Google Cloud dogop-serverless Nach Ressourcen, Dokumenten, Produkten und mehr suc...  ⚡ ☐ 🔔 ⓘ ⋮

Cloud Run  BEFEHLSZEILE ANZEIGEN

Ein Dienst stellt einen eindeutigen Endpunkt bereit und skaliert die zugrunde liegende Infrastruktur automatisch, um eingehende Anfragen zu verarbeiten. Der Dienstname und die Region können später nicht mehr geändert werden.

**Zusammenfassung der Preise**

**Cloud Run – Preise**

Kostenlose Stufe

Erste 180.000 vCPU-Sekunden/Monat

Erste 360.000 GiB-Sekunden/Monat

2 Millionen Anfragen/Monat

→ Details zu kostenpflichtigen Stufen ansehen

**Artifact Registry** **Docker Hub**

Überarbeitung aus dem vorhandenen Container-Image bereitstellen

Kontinuierlich aus einem Repository bereitstellen (Quelle oder Funktion)

**Funktionen**

Funktion mit einem Inline-Editor erstellen

**MIT CLOUD BUILD EINRICHTEN**

Erforderlich

**Konfigurieren**

Dienstname \*

Region \*  ▾

[So wählen Sie eine Region aus](#)

Endpoint-URL

<https://dogop-746651650023.europe-west10.run.app>

**Authentifizierung \***

Nicht authentifizierte Aufrufe zulassen  
Klicken Sie dieses Kästchen an, wenn Sie eine öffentliche API oder eine Website erstellen.

Authentifizierung erforderlich  
Verwalten Sie autorisierte Nutzer mit Cloud IAM.



# Quote Cloud Function

## Zahlen, Daten, Fakten

# Container Startup in **40-80 ms**

# Hauptspeicher **25 MB**

# Antwortzeit Quote **17 ms**



# Quote Azure Container App



# Azure Container App

# Kubernetes ohne Server

# KEDA Autoscaling, Replicas und Ingress von  
Kubernetes

# Ein Container App Environment für mehrere Apps

# Container App erstellen



Microsoft Azure  Search resources, services, and docs (G+)

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Home > Container Apps >

## Create Container App

Basics **Container** Ingress Tags Review + create

Select a quickstart image for your container, or deselect quickstart image to use an existing container.

Use quickstart image

**Container details**

Name \*

Image source  Docker Hub or other registries  Azure Container Registry

Image type  Public  Private

Registry login server \*

Image and tag \*

Advanced settings

**Environment variables**

Name	Value	Delete
<input type="text" value="Enter name"/>	<input type="text" value="Enter value"/>	<input type="button"/>

Review + create  < Previous  Next : Ingress >

# Container App erstellen



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Home > Microsoft.App-ContainerApp-Portal-d0274b53-9f7a | Overview X

Deployment

Search × ⟲ Delete Cancel Redeploy Download Refresh

Overview Inputs Outputs Template

Deployment is in progress

Deployment name : Microsoft.App-ContainerAp... Start time : 10/31/2024, 10:37:14 PM  
Subscription : Azure\_Subscription\_Crossna... Correlation ID : edae90cc-98dd-4917-8355-...  
Resource group : dogop-serverless

Deployment details

Resource	Type	Status	Open
dogop-serverless	Container Apps Environment	Created	<a href="#">Open</a>
workspacedogopse	Log Analytics workspace	OK	<a href="#">Open</a>
workspacedogopse	Log Analytics workspace	OK	<a href="#">Open</a>
workspacedogopse	Log Analytics workspace	OK	<a href="#">Open</a>

Give feedback

Tell us about your experience with deployment

Microsoft Defender for Cloud  
Secure your apps and infrastructure [Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials [Start learning today >](#)

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Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

# Container App erstellen



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Home > **dogop** Container App

Search Stop Refresh Delete Send us your feedback

**Overview** JSON View

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Application

- Revisions and replicas
- Containers
- Scale
- Volumes

Settings

- Authentication
- Secrets
- Ingress
- Deployment
- Custom domains
- Dapr
- Identity
- Service Connector (preview)
- CORS
- Resiliency (preview)
- Locks

Essentials

Resource group ([move](#)) **dogop-serverless**

Status **Running**

Location ([move](#)) **West Europe**

Subscription ([move](#)) **Azure Subscription Crossnative Dev**

Subscription ID **258b0030-3486-42c7-87c7-2ace4e9e9552**

Application Url **<https://dogop.ashyforest-0cd99410.westeurope.azurecontainerapps.io>**

Container Apps Environment **dogop-serverless**

Environment type **Workload profiles**

Log Analytics **[workspacedogopserverless9e4d](#)**

Development stack **Generic (manage)**

.NET Aspire Dashboard **enable**

Tags ([edit](#)) **Add tags**

Get started Properties Monitoring

Discover Azure Container Apps Features

 **Upload artifact**  
Upload an executable JAR file from your computer, then Container Apps will build it into a container image and deploy it as a new app.

 **Manage your app with revisions**  
Use revisions for immutable snapshots of your app to manage versions, split and direct traffic, support blue-green deployments, and more.

 **Set up continuous deployment**  
Set up GitHub Actions for automatic deployment of the container image and the application code. [Learn more](#)



# Azure Container App

## Zahlen, Daten, Fakten

# Container Cold Startup in **600 ms** 😴

# Antwortzeit Quote **13 ms**



# Health Check

# Nutzung von health-go (hellofresh)

# Fertige des Checks für Postgres, HTTP, Redis, ...



# Health Check

```
1 // Register Health Check
2 h, _ := health.New(
3     health.WithComponent(health.Component{
4         Name:      "dogop",
5         Version:   "v0.0.1",
6     }),
7     health.WithChecks(
8         health.Config{
9             Name:        "check",
10            Timeout:    time.Second * 2,
11            SkipOnErr:  false,
12            Check: func(ctx context.Context) error {
13                // check implementation goes here
14                return nil
15            },
16        },
17    ),
18 )
19
20 // Register Handler Function
21 router.HandleFunc("GET /health", h.HandlerFunc)
```

# Serverless Tarifrechner DogOp

## Function-as-a-Service

1. Google Cloud Run Function

# Go Function Framework

# HTTP Handler Function

# JSON und Structs

# Fehler

# HTTP Handler Test

2. Azure Function App

# Umgebungsvariablen

# HTTP Router/Server

# Lokale Ausführung

## Serverless Containers

3. Google Cloud Run

# Docker Image

# HTTP Router/Server

4. Azure Container Apps

# Health Check



# Serverless Booster



Schnell



Einfach



Zuverlässig



# 3 Gründe für Go

1. Einfach
2. Mächtig
3. Langweilig



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# Serverless mit Go

