

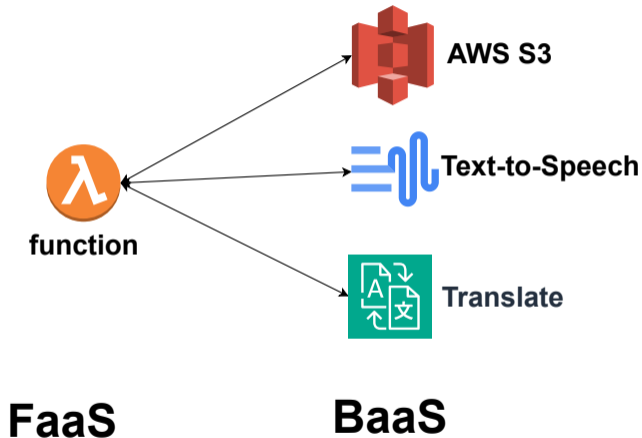


Engineering Serverless Workflows With Interoperable BaaS Services

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Serverless = FaaS + BaaS

- Function-as-a-Service + Backend-as-a-Service



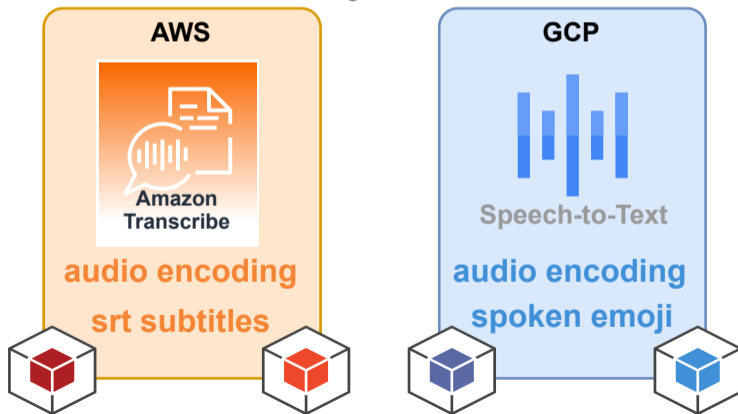
Cloud providers offer various managed BaaS services

- We will focus on managed BaaS services

BaaS service	AWS	GCP
S2T	AWS Transcribe	GCP Speech-To-Text
T2S	AWS Polly	GCP Text-To-Speech
Translate	AWS Translate	GCP Translation
OCR	AWS Textract	GCP Vision

Heterogeneity Challenges with Driver Approach

- Only AWS users can use srt subtitles
- Only GCP users can use spoken emoji
- Both users can use audio encoding (but not with all features)



Input Data and Passing Abstraction

- Specify the location of the input file with some URL of a bucket
- Transparently
 - download the input file from the AWS S3 bucket to the function file system
 - load the text, and
 - invoke the GCP service Text-To-Speech since it is the only BaaS service that supports OGG_OPUS

```
SpeechSynthesisRequest request=SpeechSynthesisRequest.builder()  
    .inputFile("https://bucket.s3.xxx/input.txt")  
    // other features  
    .build();  
speechSynthesizer.synthesizeSpeech(request,  
    SynthesisAudioFormat.OGG_OPUS);
```

FeaturesScope Abstraction

- Select a combination or a union of features supported by individual provider only
- Transparently
 - invoke BaaS services on both providers
 - merge the results together

SpeechRecognitionFeatures

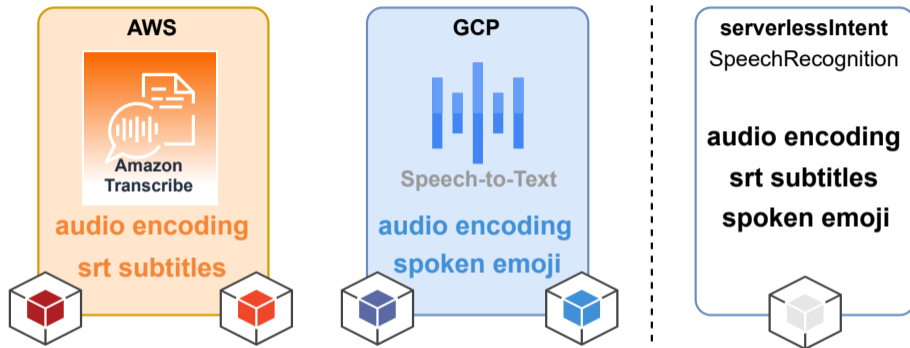
```
features=SpeechRecognitionFeatures.builder()  
  .srtSubtitles(true) // only supported on AWS  
  .profanityFilter(true) // only supported on GCP  
  .build();  
speechRecognizer.recognizeSpeech(request, features);
```

Provider Abstraction

- Select and change the provider without code changes

```
// run the service on AWS  
speechSynthesizer.synthesizeSpeech(request,Provider.AWS);  
// run the service on GCP  
speechSynthesizer.synthesizeSpeech(request,Provider.GCP);
```

Features Union



Literature

- Libraries (<https://github.com/FaaSTools>)
 - CORE
 - PySpeechLess
 - PyRecognition
 - GoSpeechLess
- AFCL Workflows (<https://github.com/AFCLWorkflows>)
 - pdf2Speech
 - speechTranslate

