Using AWS Lambda and API Gateway from a web context

About me

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Background: Software Dev

now: Kapitän @ Digital Sailors

past:

CTO @ parku,

VP, Technology @ StayFriends

Author: „Nginx richtig konfigurieren“

Web Context

A Web-Browser makes an HTTP-Request

AWS Lambda

Serverless

Lambda is to logic what S3 is to data

Supports JavaScript(Node.js), Java, Python

Minimal Lambda function (Node.js)

```
exports.handler = function(event, context, callback) {
  console.log(event);
  callback(null, { output: 'Hello World' });
};
```

💰 Pricing

1 million invocations: 0.20 USD

1 GB/second computing time: 0.00001667 USD

- smallest units (128 MB/100 msec)
- Node.js: 128 MB are possible, runtime ~ 300 msec

Human readable estimate

- 1 million Invocations ~ 1.20 USD

Free per month

- 1 million invocations, 400 000 GB/s

 Limits

„None“

100 simultaneous invocations per account and region

- only for safety
- AWS support will remove it

🏞 Environment

Default: outside VPC

Can run inside existing VPC

- VPC IP addresses required for invocations
- RDS (MySQL, etc.) access

😎ProTip: Existing Webserver on EC2 as proxy to other AWS Services

🚀 Deployment

```
zip -r lambda-function.zip lambda-function.js && aws lambda
update-function-code --function-name lambda-function --zip-
file fileb://lambda-function.zip –publish
```

require() works

- include npm-packages in zip file

aws-sdk already available

 Invocation

From various AWS services

Function name

Versioning available

- Version or Alias

IAM

- Roles

🐞 Debugging

Logs go into CloudWatch

Easy to mock

```
exports.lambda({ input : 'Hello Lambda' }, null, function(err,
value) {
  if (err) {
    console.log('Error', err);
  } else {
    console.log(value);
  }
});
```

 ProTips

Cold start can take 3-5 seconds

Function goes stale after x minutes

Provide No-OP for Kickstart

- Call from 1st user interaction
- Use CloudWatch Event Rule to call periodically (cron)

Demo

API Gateway

HTTP Frontend for Lambda

Focus on REST/JSON

Point-and-click REST API creator 😨

Swagger import/export

💰 Pricing

3.50 USD per million incoming requests

0.09 USD per GB of outgoing traffic

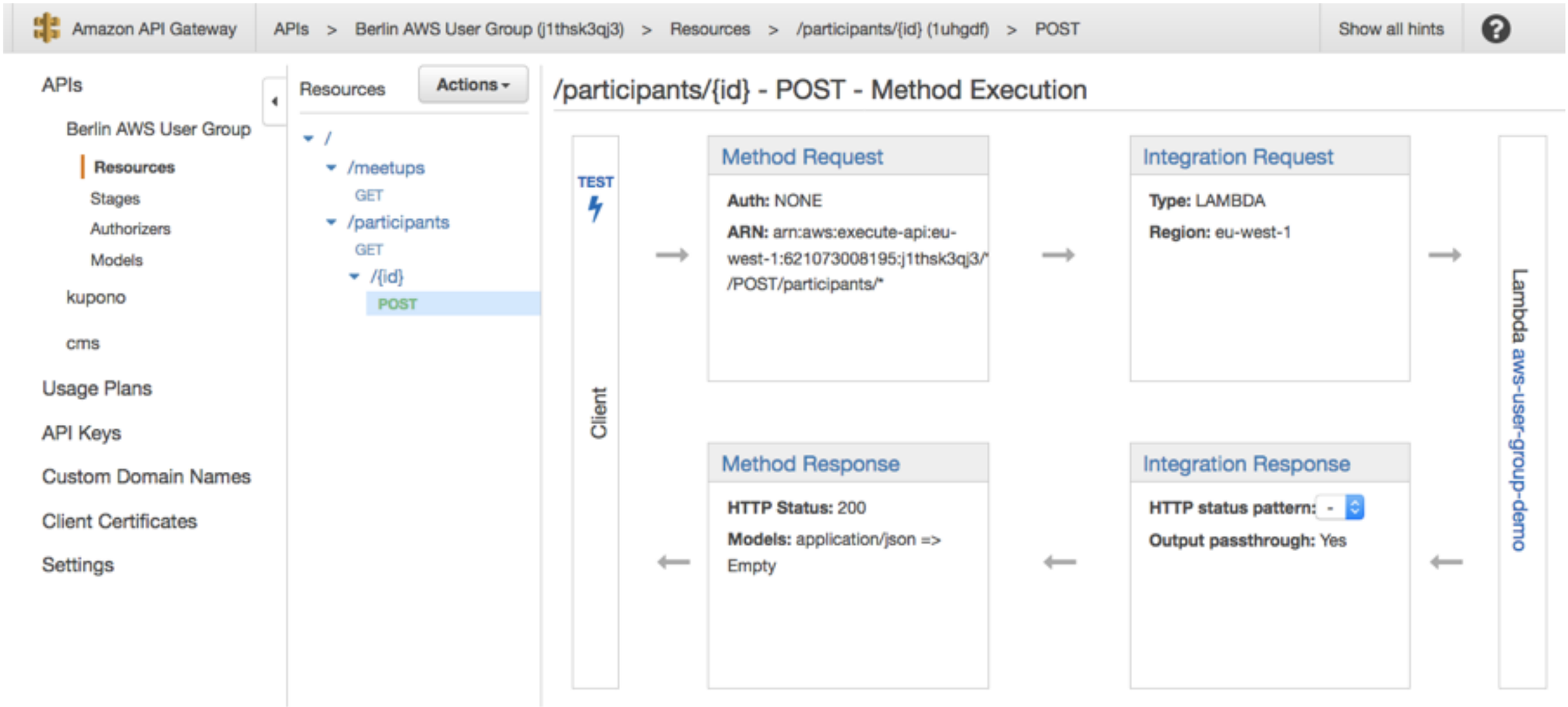
 Building Blocks

Resources/methods

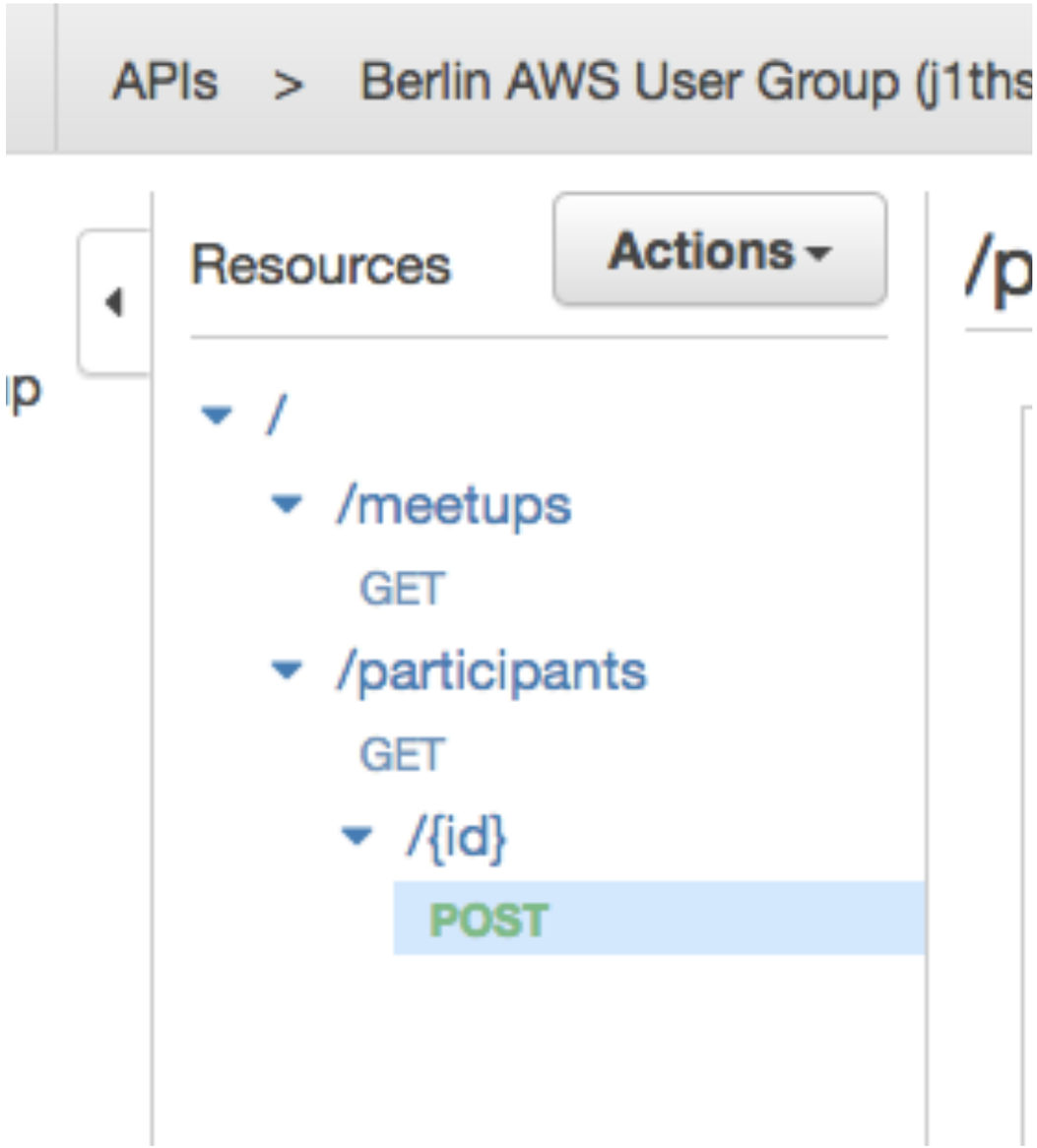
Stages

Models

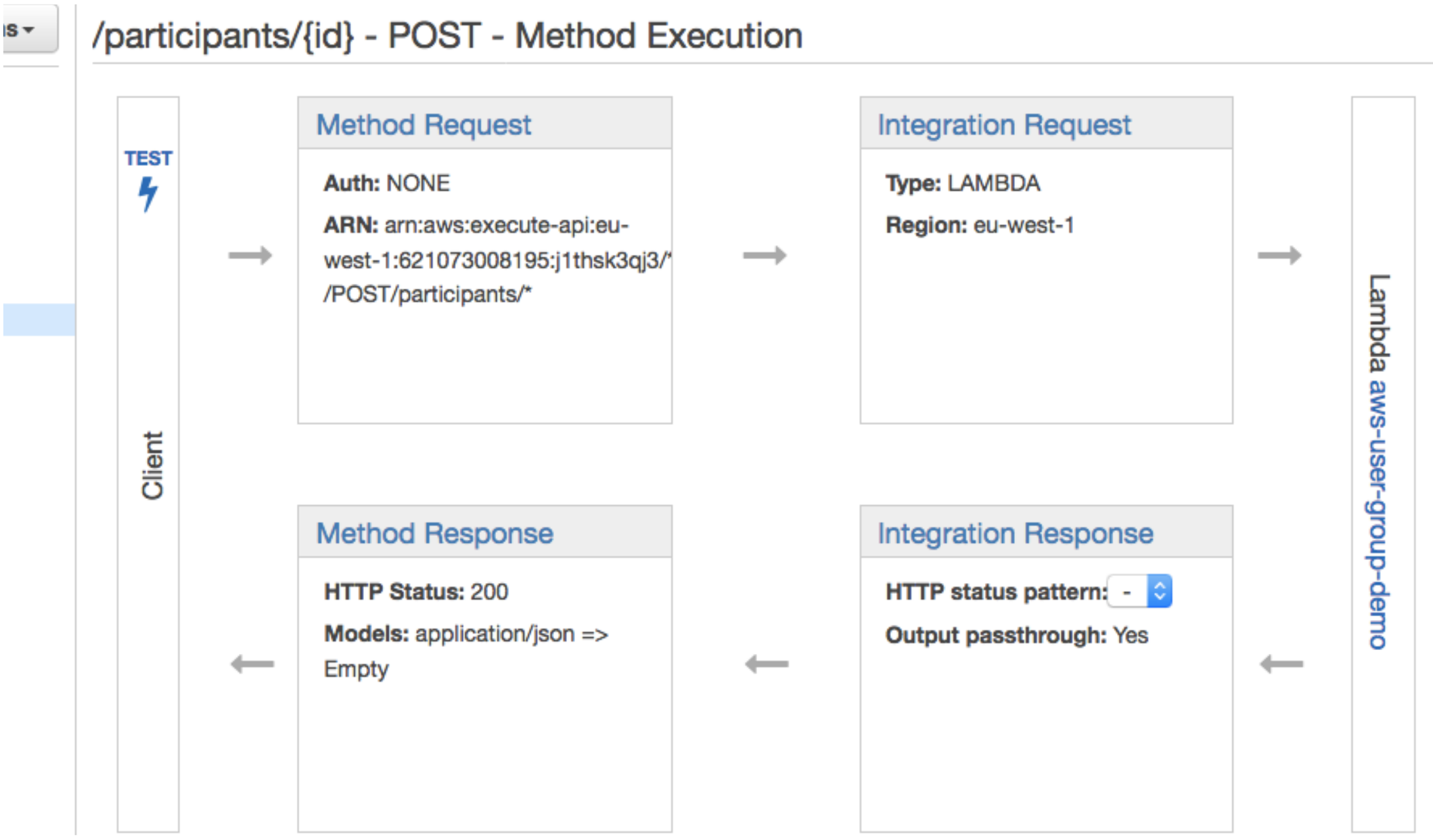
API definition



API definition



API definition



Integration Request

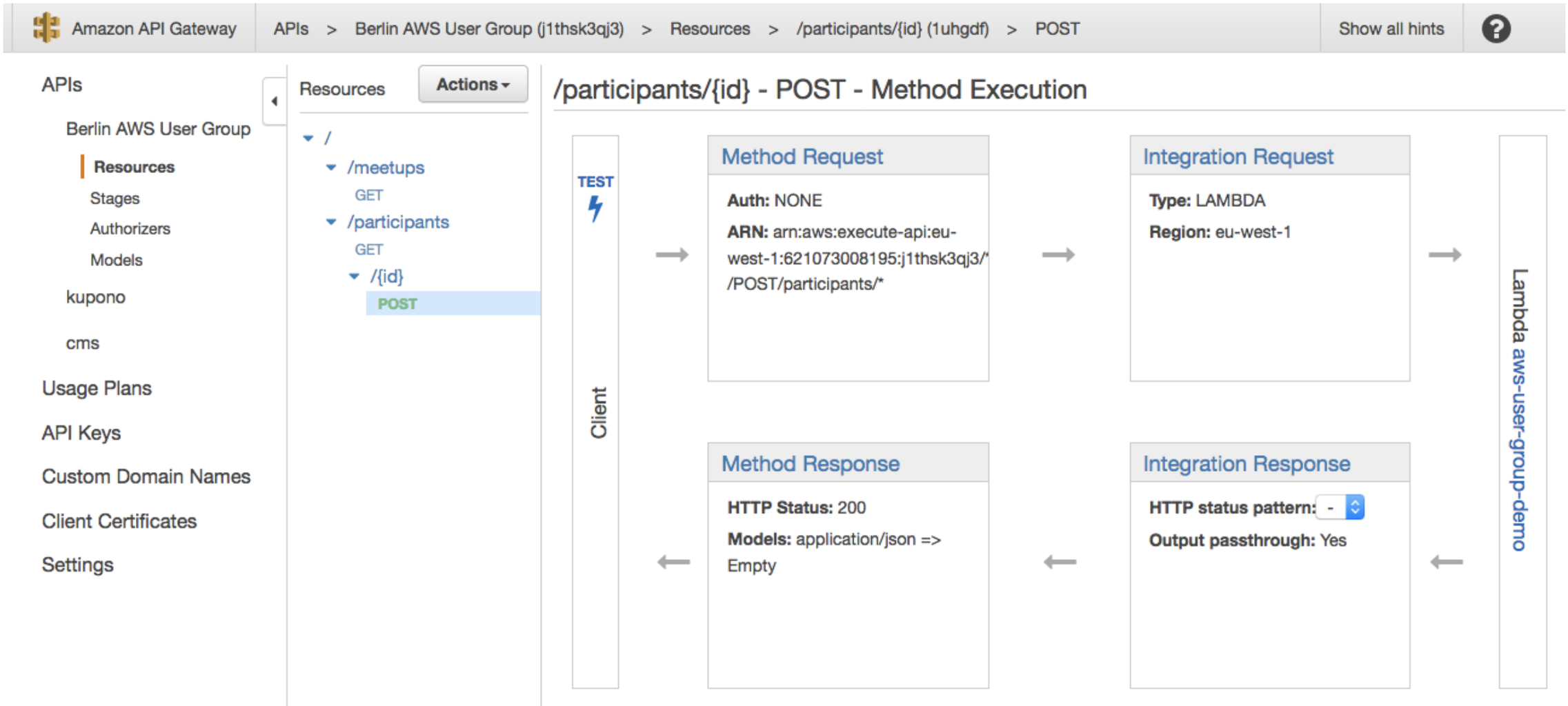
Based on Content-Type

Used to pass request metadata to Lambda function

Uses Apache Velocity Template Language (VTL) 😨

```
#set($allParams = $input.params())
{
"body-json" : $input.json('$'),
"params" : {
#foreach($type in $allParams.keySet())
    #set($params = $allParams.get($type))
"$type" : {
    #foreach($paramName in $params.keySet())
    "$paramName" : "$util.escapeJavaScript($params.get($paramName))"
        #if($foreach.hasNext),#end
    #end
}
    #if($foreach.hasNext),#end
    #end
    },
    "stage-variables" : {
    #foreach($key in $stageVariables.keySet())
    "$key" : "$util.escapeJavaScript($stageVariables.get($key))"
        #if($foreach.hasNext),#end
    #end
    },
    "context" : {
        "account-id" : „$context.identity.accountId",
        ...
      }
    }
```

API definition



Integration Response

Define Model for JSON Response

- in JSON-Schema

VTL (again) to map from Lambda output to API Gateway Response 🤔

HTTP Response Status (other than 200)

- derived from Regular Expression on Lambda error output 😳

Headers need to be defined in advance

Deployment

Stages („prod“, „test“, …)

Stage variables

- passed to Lambda function

Create SDKs

- Android, iOS, JavaScript

API Keys

- Quotas
- Throttling

🎭API Gateway shortcomings

Plain HTML output is difficult

Status codes, headers difficult to define

URL-Space design is limited (only placeholders)

Limits Lambda Functions to REST/JSON

 Wishlist

Manage URL-Space

- not just REST

Process POST forms

- e.g. contact form to email

Set headers easily

- 301, 302, 304, …

Generate HTML

- not just JSON

An alternative

Lambda Proxy

- Very thin proxy
- Connects web server to Lambda function
- Open Source
- (PHP version available)

Installation

```
# sudo npm install lambda-proxy -g
# lambda-proxy &
```

nginx.conf

```
server {
  set $lambdaregion 'eu-west-1';
  set $lambdaqualifier '';
  set $lambdaparameters '';

  proxy_set_header 'lambda-proxy-region' '$lambdaregion';
  proxy_set_header 'lambda-proxy-qualifier' '$lambdaqualifier';
  proxy_set_header 'lambda-proxy-function' '$lambdafunction';
  proxy_set_header 'lambda-proxy-parameters' '$lambdaparameters';
  proxy_set_header 'lambda-proxy-scheme' '$scheme';
  proxy_set_header 'lambda-proxy-host' '$host';

  location /some/location {
    set $lambdafunction 'handle-form';
    proxy_pass http://localhost:8080;
  }
}
```

Minimal Lambda function

```
exports.lambda = function(event, context, callback) {
  console.log(event);
  callback(null, {
    status: 200,
    headers: {
      'Content-Type': 'text/plain'
    },
    body: 'Hello World'
  });
}
```

Defined event structure

```
{
  method: 'POST',
  scheme: 'https',
  host: 'www.digital-sailors.de',
  url: '/some/url',
  httpVersion: '1.0',
  parameters: {
    'from_webserver': 'private value'
  },
  headers: {
    'Set-Cookie': 'ACookie=MadeOfChocolate'
  },
  body: 'parameter=value'
}
```

Try it

https://github.com/digital-sailors/lambda-proxy

Contributors welcome!

Questions?

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🌍 https://www.digital-sailors.de