

serverless arch. on aws - 1



오늘 다룰 주제

serverless architecture on aws

- **lambda**, s3, api gateway, cloudfront, +...

AWS Lambda

Run code without thinking about servers.
Pay only for the compute time you consume.

서버를 고려하지 않고 애플리케이션과 서비스 구축, 실행

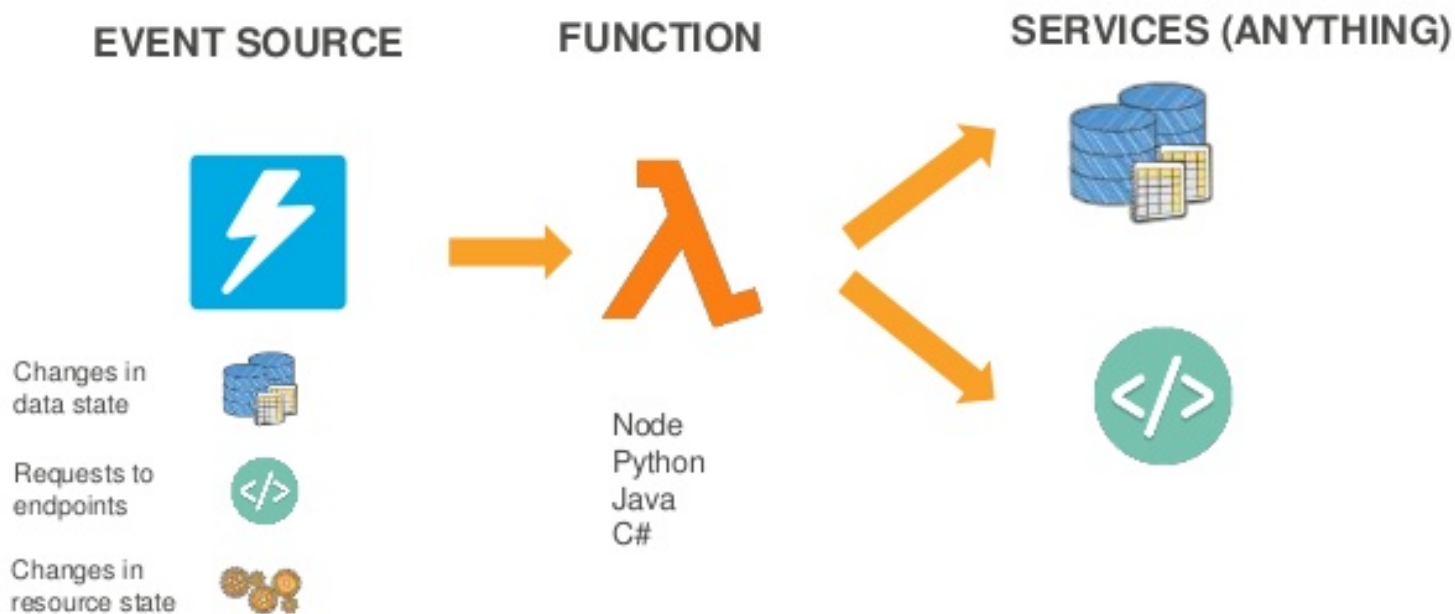
간단한 설정
저렴한 비용
충분한 성능
AWS 타 기능 통합

EC2 vs Elastic Beanstalk vs Lambda

많은 강점을 가진 서비스인데...

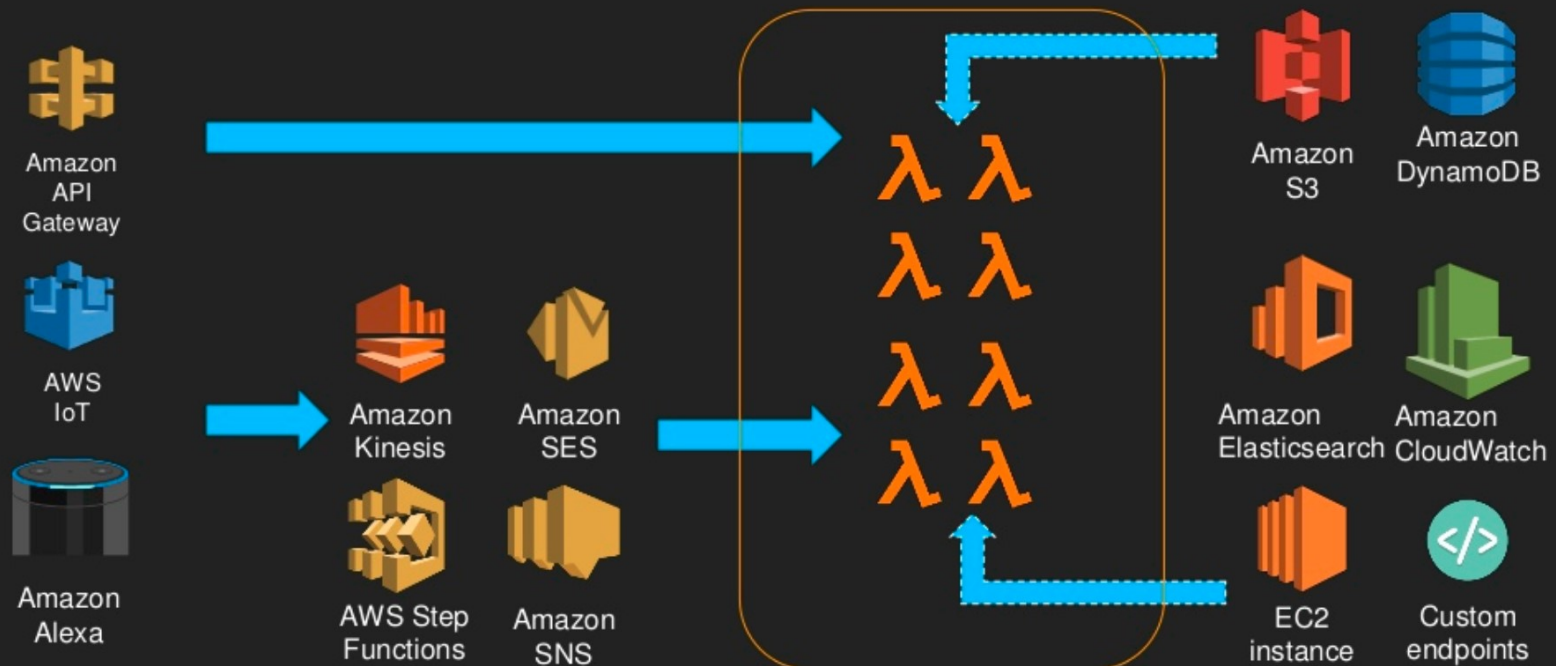
AWS Lambda

Working with AWS Lambda



AWS Lambda

INVOCATION PATHS



AWS re:Invent

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AWS Lambda

Amazon linux 기반 (64bit)

Node.js – v8.10, v6.10

Java – 8

Python – 3.6, 2.7

.NET Core – 1.0.1, 2.0, 2.1

Go – 1.x

예약/지정된 환경 변수, 직접 컴파일한 모듈도 사용 가능

AWS Lambda

메모리 : 128MB ~ 3008MB(CPU 할당은 메모리 비례)
실행 시간 : 100ms ~ 15min

128MB 제한 함수 100ms 실행 시 : \$0.000000208

ex) 512MB 제한 함수 월 3백만 회, 매회 1초 실행 시

- 3,000,000 회 * 1초 = 3,000,000 초

- 3,000,000 초 * 512MB 100ms 당 \$0.000000834

= \$25.02 + 요청 1백만 건당 \$0.2

= \$25.62 (무료 구간 제외), \$18.34 (무료 구간 포함)

AWS Lambda

Lambda 컨테이너 생명 주기를 AWS가 관리

- 개발자가 컨테이너 생성/소멸 시점을 알 수 없음

하나의 컨테이너는 하나의 lambda 함수 실행만 가능.

- 반복적으로 실행되면 컨테이너를 재활용

한번 실행 후, 일정 시간 실행되지 않으면 컨테이너는 소멸

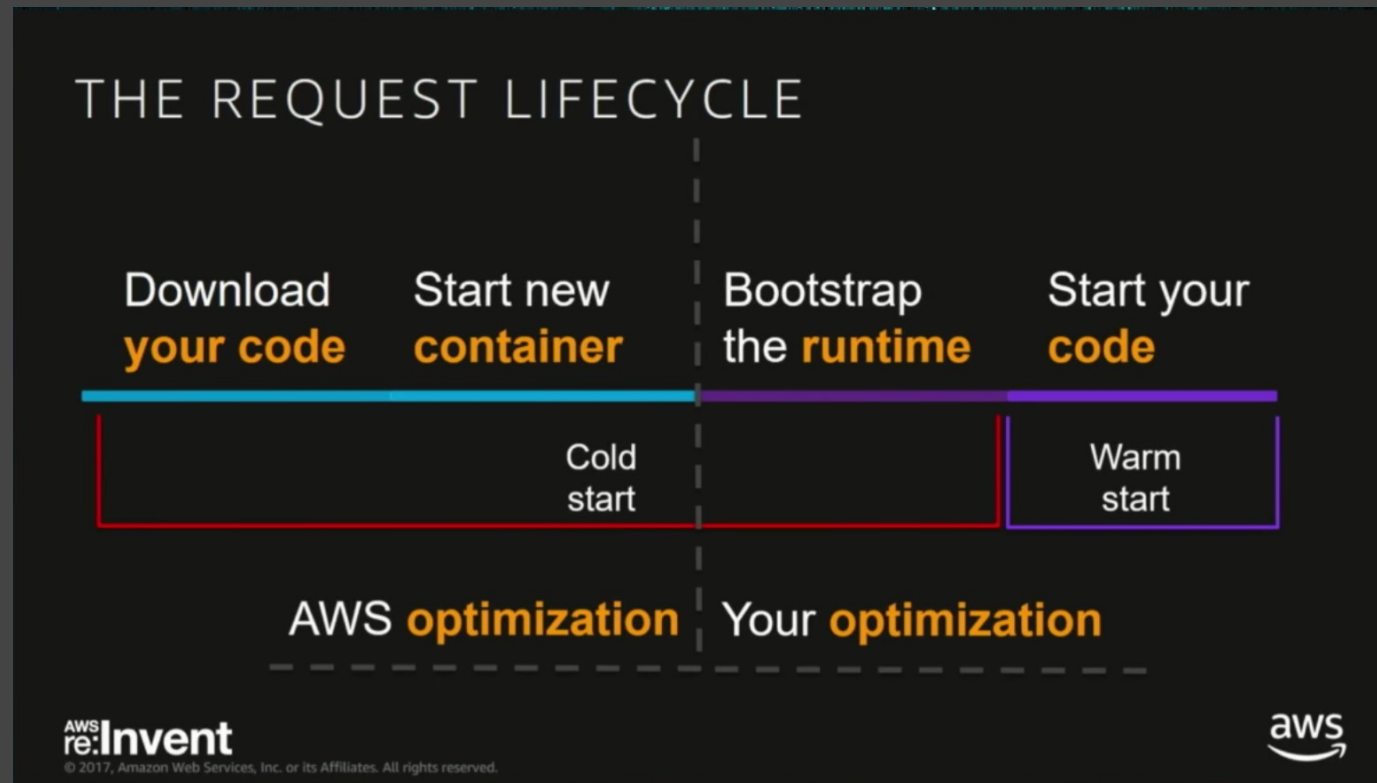
- 소멸 후 재 실행 시 재생성, 지연 발생 (cold-start)

기본 설정 값은 VPC 사용 안함. 사용 시 추가 지연 및 제한

- 사설망 접근 필요 시 IP 할당 제한 및 ENI 생성 지연

AWS Lambda

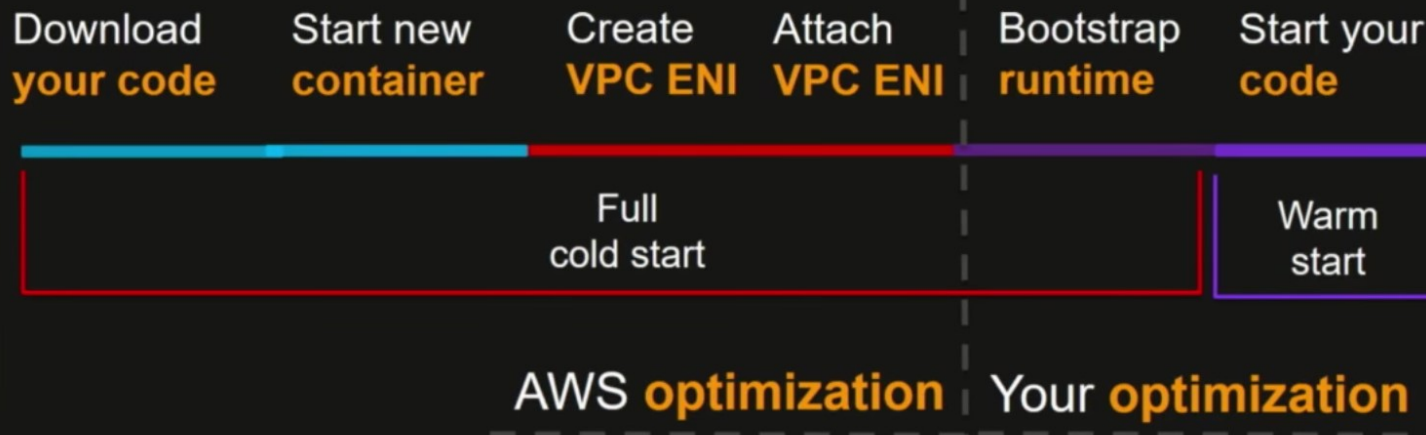
한번 실행 후, 일정 시간 실행되지 않으면 컨테이너는 소멸
- 소멸 후 재 실행 시 재생성, 지연 발생 (cold-start)



AWS Lambda

기본 설정 값은 VPC 사용 안함. 사용 시 추가 지연 및 제한
- 사설망 접근 필요 시 IP 할당 제한 및 ENI 생성 지연

SECURED: VPC vs LATENCY



AWS Lambda

메모리 최대 3008MB, 설정한 제한 초과 시 종료

임시 디스크 /tmp 512MB

file descriptor 1024개

process + thread 1024개

최대 실행 시간 15분(5분 -> 15분)

실행 요청/응답 페이로드 - 6MB(동기), 256KB(비동기)

배포 패키지 크기 - 50MB(zip 압축), 250MB(압축 해제)

리전 별 동시 실행 - 1000

배포 패키지 총 크기 - 75GB

AWS Lambda

Run code without thinking about servers.
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서버를 고려하지 않고 애플리케이션과 서비스 구축, 실행

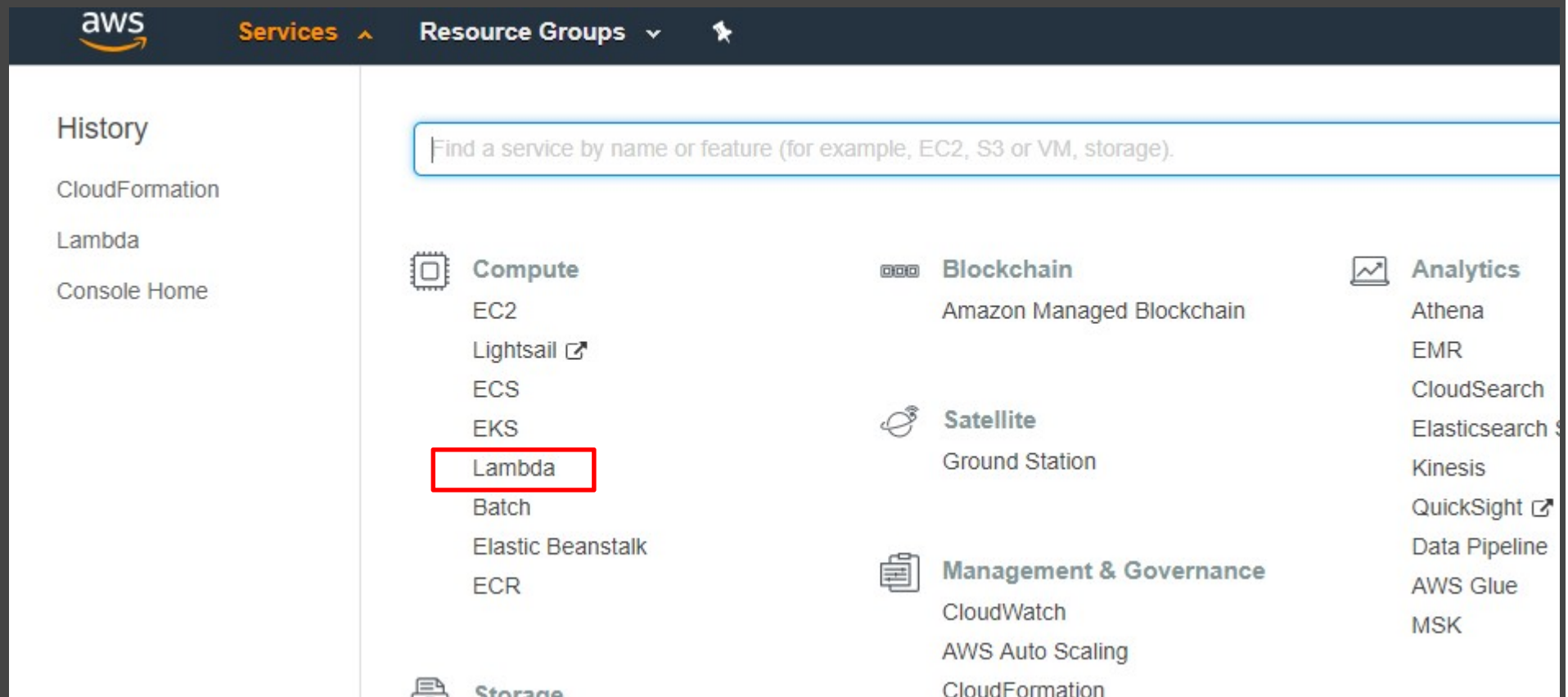
간단한 설정
저렴한 비용
충분한 성능
AWS 타 기능 통합

많은 강점을 가진 서비스인데...

여러 제한 조건도 따르니, 적절하게 사용

AWS Lambda

AWS Console -> Services -> Lambda 선택



AWS Lambda

좌측 메뉴에서 Functions 선택 후
우측 Create function 클릭

The screenshot displays the AWS Lambda console interface. On the left, the 'AWS Lambda' sidebar menu is visible, with 'Functions' highlighted. The main content area shows the 'Functions (1)' page, which includes a search bar and a table of functions. The 'Create function' button is highlighted in the top right corner of the main content area.

Code size	Last modified
6.2 kB	5 hours ago

AWS Lambda

Author from scratch ☒

Start with a simple "hello world" example.



Blueprints ☐

Choose a preconfigured template as a starting point for your Lambda function.



Author from scratch [Info](#)

Name

Runtime

You can select a supported AWS Lambda runtime or provide your own runtime as part of the function deployment package or Lambda layer after creating the function.


Role

Defines the permissions of your function. Note that new roles may not be available for a few minutes after creation. [Learn more](#) about Lambda execution roles.

Lambda automatically creates a role with permissions from the selected policy templates. Basic Lambda permissions (such as logging to Amazon CloudWatch) are automatically added. If your function accesses a V permissions are also added.

Role name

Enter a name for your new role.

 This new role will be scoped to the current function. To use it with other functions, you can modify it in the IAM console.

Policy templates

Choose one or more policy templates. A role will be generated for you before your function is created. [Learn more](#) about the permissions that each policy template will add to your role.

AWS Lambda

우측 상단 Author from scratch 선택 확인

Name : 함수 이름(관리용)

Runtime : 함수 런타임 선택(샘플이니 자유롭게 선택)

Role : 함수가 사용할 IAM Role

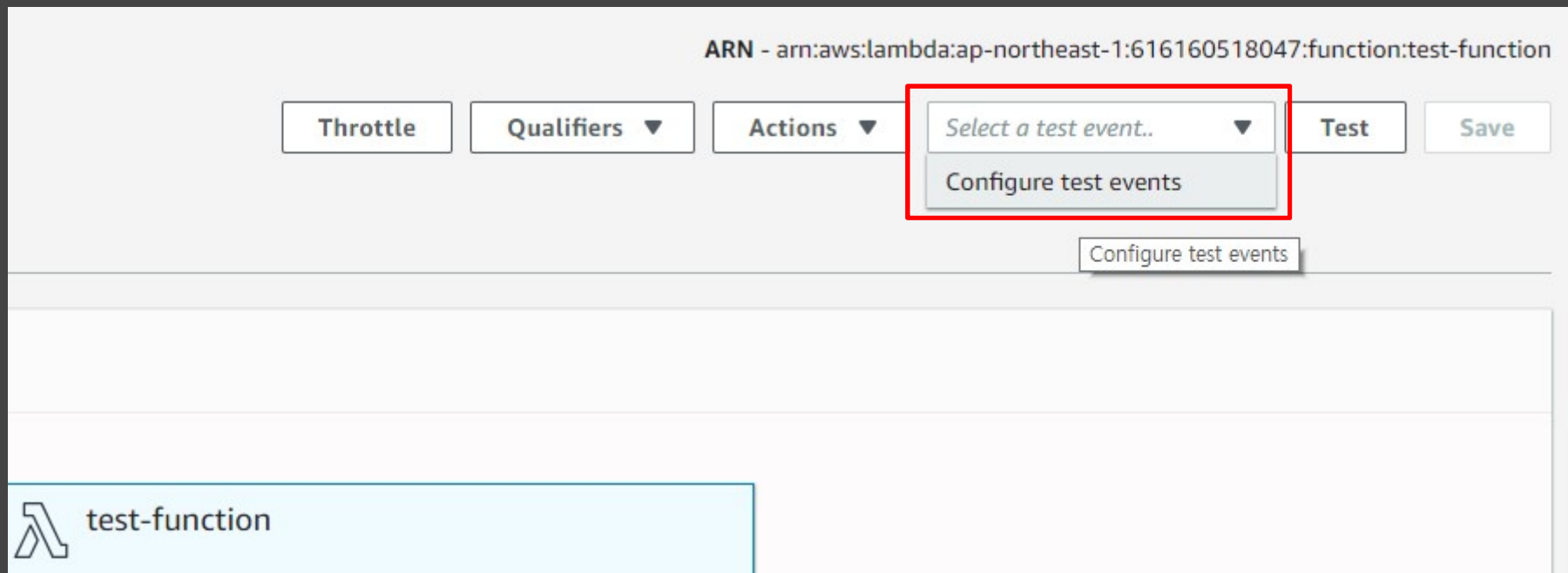
- Create a new role from one or more templates

Role Name : 함수 생성 시 만들어질 Role 이름(관리용)

입력 후 Create function 클릭

AWS Lambda

우측 상단의 Select a test event.. 클릭 후
Configure test events 클릭



AWS Lambda

Event template - Hello World 혹은 임의 지정
Event name - 테스트 이벤트 명(관리용)
우측 하단 Create 클릭

Configure test event

A function can have up to 10 test events. The events are persisted so you can switch to another computer or web browser and test your function with the same events.

- ☒ Create new test event
- ☐ Edit saved test events

Event template

Hello World

Event name

sample1

```
1 {  
2   "key1": "value1",  
3   "key2": "value2",  
4   "key3": "value3"  
5 }
```

AWS Lambda

테스트 이벤트 생성 확인 후 Test 버튼 클릭

ARN - arn:aws:lambda:ap-northeast-1:616160518047:function:test-function

Throttle Qualifiers ▼ Actions ▼ sample1 ▼ Test Save

test-function
Unsaved changes

AWS Lambda

Execution result: succeeded ([logs](#))

▼ Details

The section below shows the result returned by your function execution.

```
{
  "statusCode": 200,
  "body": "\"Hello from Lambda!\""
}
```

Summary

Code SHA-256

ZQukCqxtkqFgyF2cU41Avj99TKQ/hNihPtDtRcc08ml=

Duration

0.33 ms

Resources configured

128 MB

Request ID

e581f9ac-fc94-11e8-afe0-69bcfb7bd1fb

Billed duration

100 ms

Max memory used

21 MB

Log output

The section below shows the logging calls in your code. These correspond to a single row within the CloudWatch log group corresponding to this Lambda function.

START RequestId: e581f9ac-fc94-11e8-afe0-69bcfb7bd1fb Version: \$LATEST

END RequestId: e581f9ac-fc94-11e8-afe0-69bcfb7bd1fb

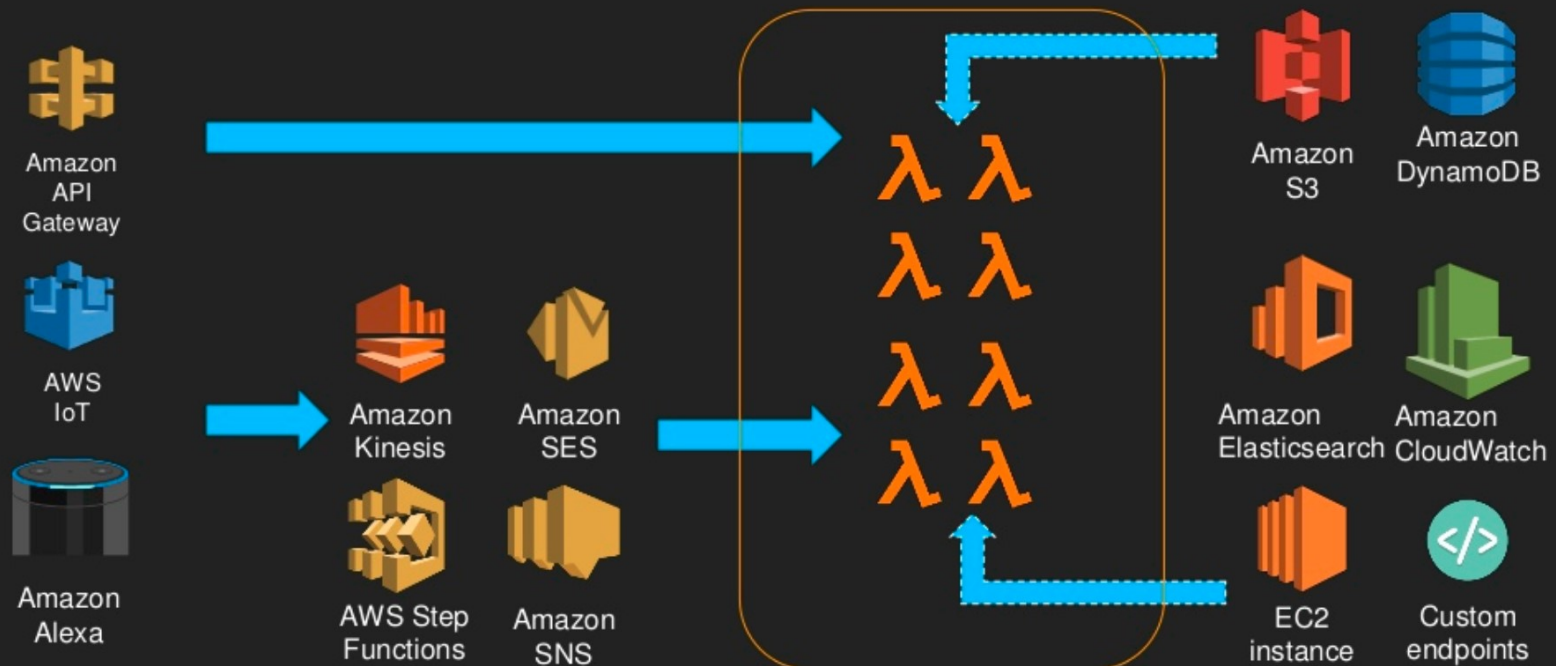
REPORT RequestId: e581f9ac-fc94-11e8-afe0-69bcfb7bd1fb Duration: 0.33 ms

Billed Duration: 100 ms

Memory Size: 128 MB

AWS Lambda

INVOCATION PATHS



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AWS Lambda

함수 생성 페이지에서
AWS Serverless Application Repository
선택 후 image-processing-service 로 검색


Author from scratch ☐

Start with a simple "hello world" example.




Blueprints ☐

Choose a preconfigured template as a starting point for your Lambda function.



AWS Serverless Application Repository ☒

Find and deploy serverless applications published by AWS, AWS partners, and other developers.



Public applications (56)

Private applications

Info

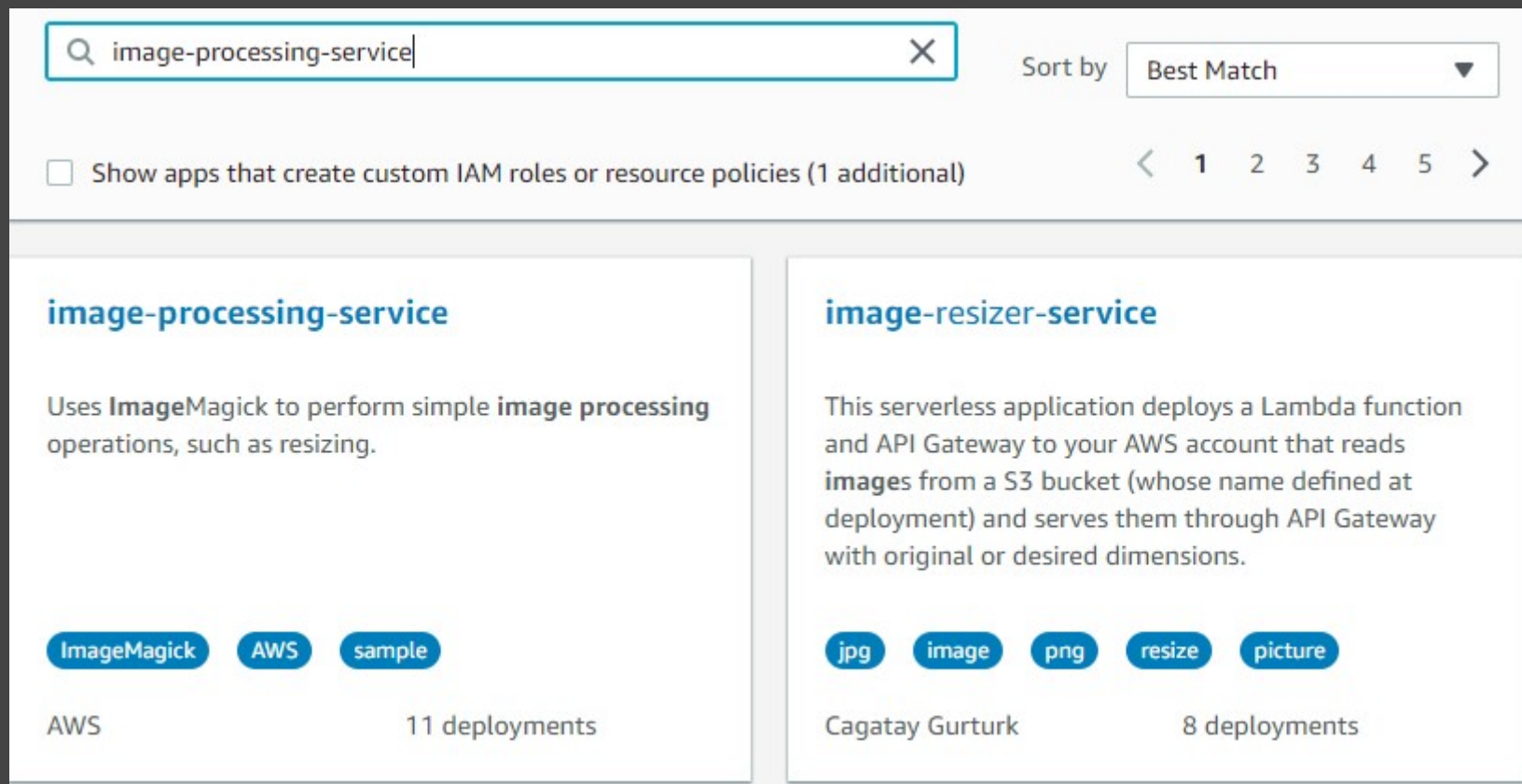
×

Sort by

Best Match ▼

AWS Lambda

검색 결과 중 AWS 가 작성자인
image-processing-service 선택



The screenshot shows the AWS Lambda console search results for the query 'image-processing-service'. The search bar at the top contains the text 'image-processing-service' with a magnifying glass icon on the left and a close 'X' icon on the right. To the right of the search bar is a 'Sort by' dropdown menu set to 'Best Match'. Below the search bar is a checkbox labeled 'Show apps that create custom IAM roles or resource policies (1 additional)'. A pagination bar shows a left arrow, the number '1' (highlighted), and numbers '2', '3', '4', '5', followed by a right arrow. Two service cards are displayed below the search bar. The first card is for 'image-processing-service', which uses ImageMagick for image processing operations like resizing. It has tags for 'ImageMagick', 'AWS', and 'sample', and is attributed to 'AWS' with 11 deployments. The second card is for 'image-resizer-service', a serverless application that reads images from an S3 bucket and serves them through API Gateway. It has tags for 'jpg', 'image', 'png', 'resize', and 'picture', and is attributed to 'Cagatay Gurturk' with 8 deployments.

Search bar: image-processing-service

Sort by: Best Match

☐ Show apps that create custom IAM roles or resource policies (1 additional)

< 1 2 3 4 5 >

image-processing-service

Uses **ImageMagick** to perform simple **image processing** operations, such as resizing.

ImageMagick **AWS** **sample**

AWS 11 deployments

image-resizer-service

This serverless application deploys a Lambda function and API Gateway to your AWS account that reads **images** from a S3 bucket (whose name defined at deployment) and serves them through API Gateway with original or desired dimensions.

jpg **image** **png** **resize** **picture**

Cagatay Gurturk 8 deployments

AWS Lambda

우측 하단 IdentityNameParameter 에
임의의 도메인 주소를 입력하고 Deploy 선택

The screenshot shows the AWS Lambda console interface. On the left, the 'Readme file' section contains the text: 'Uses ImageMagick to perform simple image processing operations, such as resizing.' On the right, the 'Application settings' section is visible. It includes a text input field for 'Application name' with the value 'image-processing-service'. Below this, the 'IdentityNameParameter' field is highlighted with a red rectangular box and contains the text 'domain.com'. At the bottom right of the 'Application settings' section, there are three buttons: 'Cancel', 'Previous', and 'Deploy'. The 'Deploy' button is highlighted with an orange background.

Readme file	Application settings
Uses ImageMagick to perform simple image processing operations, such as resizing.	<p>Application name The stack name of this application created via AWS CloudFormation</p> <p>image-processing-service</p> <p>IdentityNameParameter</p> <p>domain.com</p> <p>Cancel Previous Deploy</p>

AWS Lambda

좌측 메뉴 Application 선택 후
생성 요청한 리소스들이 생성 완료 상태인지 확인

The screenshot shows the AWS Lambda console interface. On the left, the 'Applications' menu item is highlighted. The main content area displays the 'Applications (1)' page. A search bar is present above a table listing applications. The table has columns for Name, Description, Last modified, and Status. One application is listed: 'aws-serverless-repository-image-processing-service', which is described as using ImageMagick for image processing. Its status is 'Create complete', indicated by a green checkmark icon.

Name	Description	Last modified	Status
aws-serverless-repository-image-processing-service	Uses ImageMagick to perform simple image processing operations, such as resizing.	2 days ago	✓ Create complete

AWS Lambda

제공된 코드가 정상 동작하도록 테스트 이벤트 생성
임의의 Event template 선택 후 아래 body json 에
{"operation": "ping"} 입력 후
우측 하단 Create 클릭

A function can have up to 10 test events. The events are persisted so you can switch to another computer or web browser and test your function with the same events.

- ☒ Create new test event
- ☐ Edit saved test events

Event template

Hello World

Event name

ping

```
1 {  
2   "operation": "ping"  
3 }
```

AWS Lambda

위에서 생성한 ping 테스트 이벤트로 동작 확인 후
위와 유사하게 sample 테스트 이벤트 생성.
Body json - {"operation": "getSample"}

Configure test event



A function can have up to 10 test events. The events are persisted so you can switch to another computer or web browser and test your function with the same events.

☒ Create new test event

☐ Edit saved test events

Event template

Hello World



Event name

sample

```
1 {  
2   "operation": "getSample"  
3 }
```

AWS Lambda

앞서 생성한 sample 이벤트는 내장 장미 이미지를 반환
<https://codebeautify.org/base64-to-image-converter>

✓ Execution result: succeeded ([logs](#))

▼ Details

The area below shows the result returned by your function execution. [Learn more](#) about returning results from your function.

```
"iVBORw0KGgoAAAANSUhEUgAAAEYAAAAuCAIAAAa6/jkAAAABGdBTUEAALGPC/xhBQAAAFzUkdCAK7OH0kAAAAgY0hSTQAAeiYAAICEAAD6AAAAgOgAAHUwAADqYAAAOpgAABdwnLpRPAAAAZiS0dEAP8A/wD/oL2nkWAAAA1wSF1zAAAASAAAAEgARslrPgAAGlZJREFUan5VelmPZclx3hcRmWe5+629qtfp2ReOhjNDijRjKRiLEBilypBAwwJsQDb8gwzYsB4MGDDsNy+AAUOWBAm2LFu2TJGjZTSc6enpmV6qu7rqVt2629kyM8IPNaTlQOI8nIeTJzIiv1i+oLd+5gtM5JiYjGFmMAURmRKAM1NVMyMiABEJBBEREwBOHHLvnBCbMiE33BJ+yexIeeqKa9YbmpVdDKbHLjy0dQcNhIp0Y+hMTJVgBGN2Dv5A0G05y/JH6+okuJQUUDNLptGIAEKQw9Gg//bW+NrhY/Ojr3y2tscf/hm71f0vX7v9/M7xw3uf3n3qzEwBUzOCwmBQAxNAAAhqBgBETDAwydV7M6iRaTI1hZolY2qc2xCWMQyIZVkeE9QsMyMgEFpTg8LIAD0YwQDAVKFkApRKQ2Z1XqZkyJg0GUBQkBKJgQUx6Ca0VXNR1xcd+TpSVyXicPL0rD/m5XoFgksKkIKJ1EgTiNWIk8GutIKBADXlK9VAgMEMBMRg0MCAMLxQ53lm5lJqUmQ1yRwhSR9asZ1gs6bkTKKhBTpLCaQgM1EQiHqipeZBBtW419Qdb6IiGSESRcDAZhaNjHARur88v1wPDm/2top1qbazWZyffvDgwcmm/aFM8syBxABVJSSoKakZA2CiQ2MkAOzMDMSmUYwNhgr
```

Summary

Code SHA-256

Request ID

AWS Lambda

sample 이벤트가 출력한 base64 값을 인자로 사용하여
새 테스트 이벤트 생성

`{"operation": "getDimensions", "base64Image":
"sample 이벤트의 출력 값"}`

A function can have up to 10 test events. The events are persisted so you can switch to another computer or web browser and test your function with the same events.

- ☒ Create new test event
- ☐ Edit saved test events

Event template

Hello World ▼

Event name

getDimensions

```
1 {  
2   "operation": "getDimensions",  
3   "base64Image": "iVBORw0KGgoAAAANSUhEUgAAAEYAAAAuCAIAAAa6/jkAAAABGdBTUEAALGPC/xhBQAAAFzUkdCAk  
4 }
```

AWS Lambda

✓ Execution result: succeeded ([logs](#))

▼ Details

The area below shows the result returned by your function execution. [Learn more](#) about returning results from your function.

```
"70x46\n"
```

Summary

Code SHA-256

ovgEUevo4Xo7EeKapsv4//SPkBI1n6x0Bw+GfENCgQ
=

Duration

30.47 ms

Resources configured

512 MB

Request ID

c6a856c0-fe06-11e8-8477-85e007bd5783

Billed duration

100 ms

Max memory used

54 MB

AWS Lambda

SAM

- Serverless application model
- Cloudformation +

IAM

- Identity and Access Management
- AWS 내 자원에 대한 액세스/인증 제어

Cloudwatch

- AWS 자원 및 애플리케이션 모니터링
- 지표 수집/경보/로그