Cloud Bursting with A10 Lightning ADS

Leverage AWS for dynamically add capacity for applications deployed in DC

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Cloud Bursting

Cloud bursting is an application deployment model in which

an application that normally runs in a private cloud or data center

“bursts” into a public cloud

when the application needs additional resource (i.e. computing power) and use Cloud Computing for the additional resource requirement.

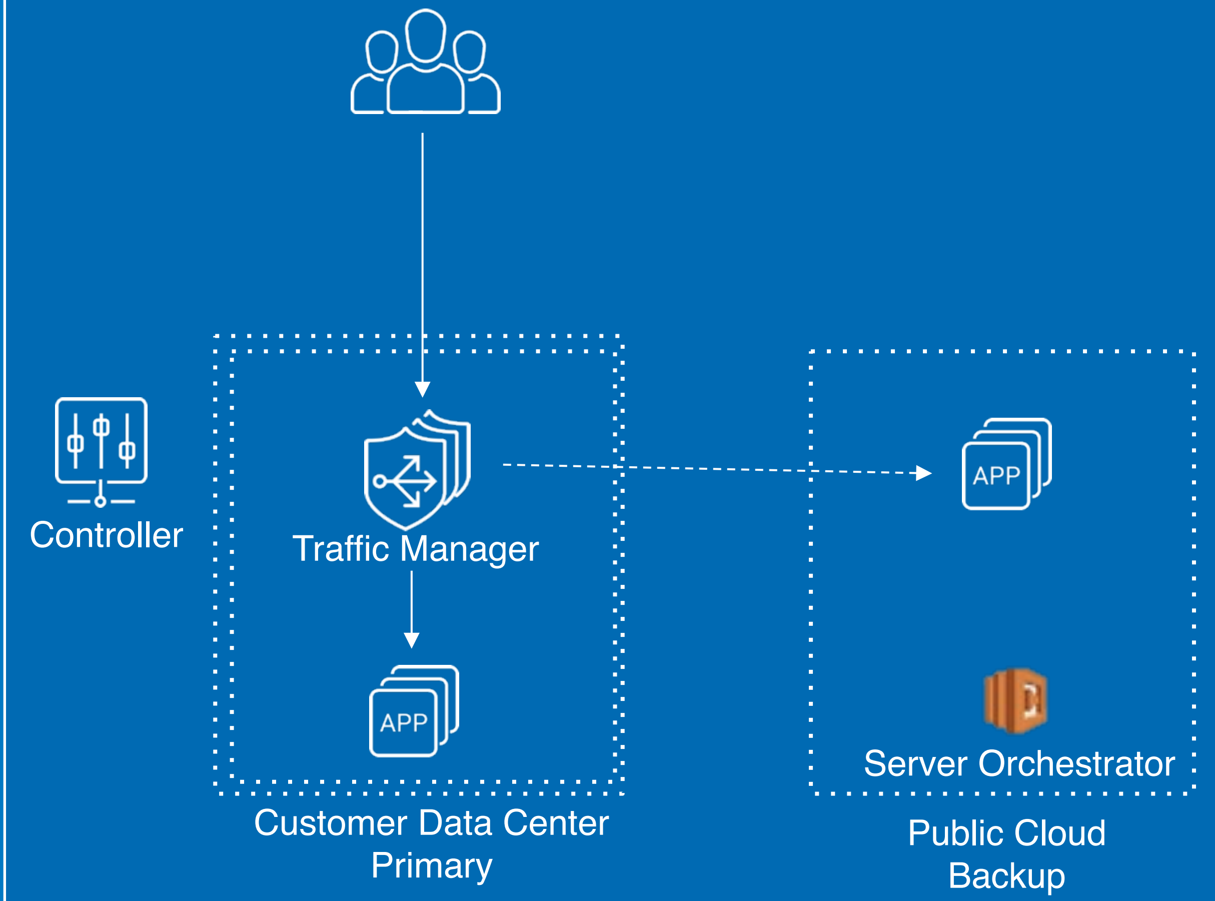
Cloud Bursting Use-Case

- When
  - Existing recourses (onprem) are overwhelmed due to Traffic load increasing
  - Existing Servers are not able to handle the additional load and latency increases
- What
  - Scale server capacity with unlimited Cloud resources
- How
  - Launch new server in public cloud
  - Divert some traffic to the new server

Application Cloud Bursting

From Private to Public Cloud

Automatically provision additional server capacity in AWS as needed



Tasks for Scale-up Solution

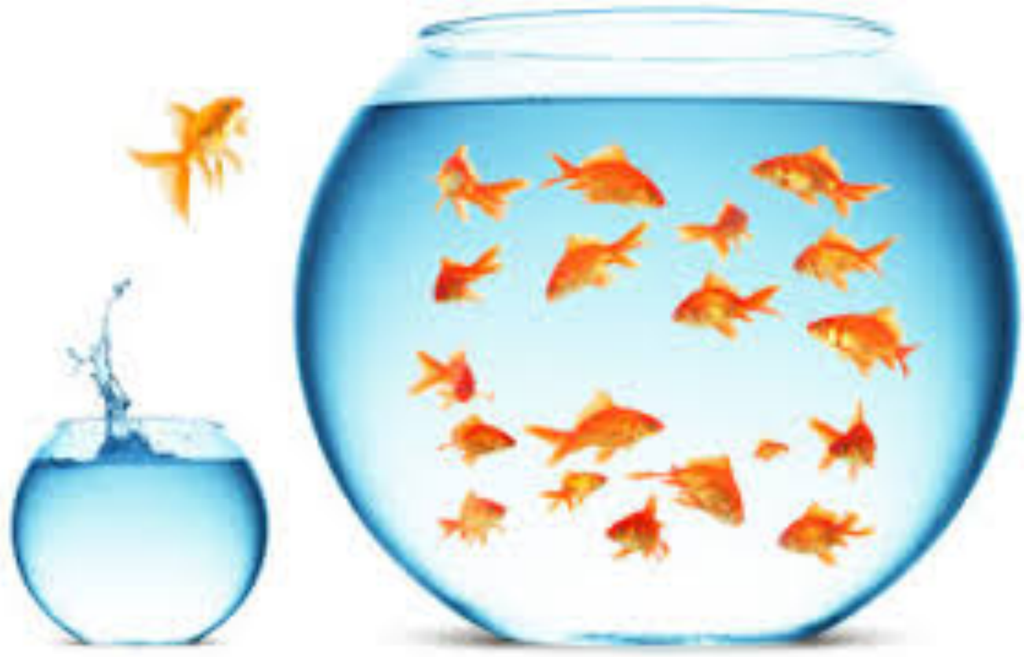
- Traffic Manager
  - Monitor server traffic for high latency
  - Raise an alert trigger for scale up
  - Send traffic to new server when available

- Server Orchestrator
  - Accept the trigger
  - Start a server
  - Inform traffic manager

Tasks for Scale-down Solution

- Traffic Manager
  - Monitor server traffic for low latency
  - Raise an alert trigger for scaling down
  - Stop sending traffic to the server when asked

- Server Orchestrator
  - Accept the trigger
  - Ask traffic manager not to send traffic as needed
  - Stop the server when not needed



In this Solution

- Traffic Manager

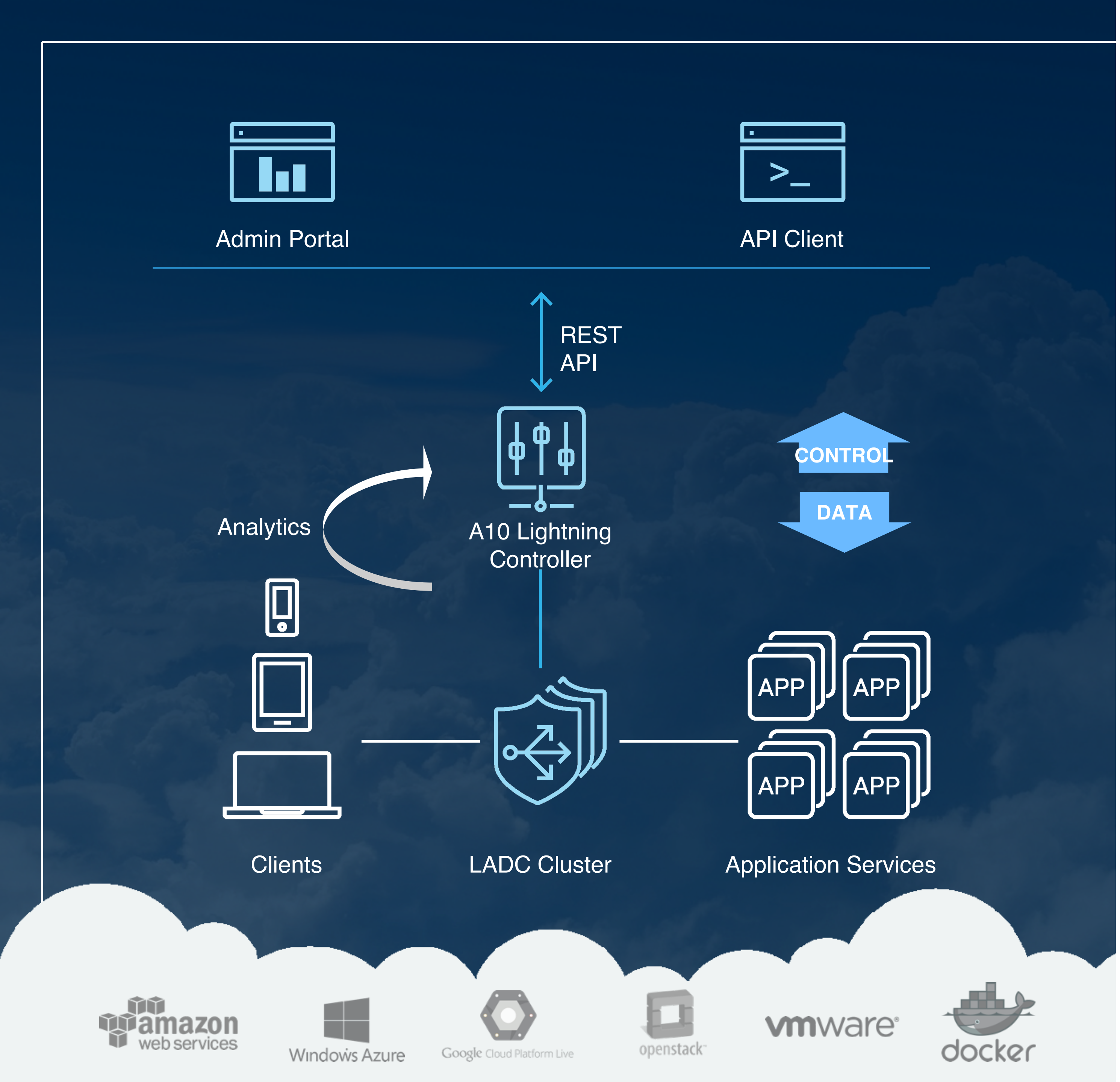
A10 Lightning ADS

- Server Orchestrator

Amazon API Gateway + AWS Lambda

- Have A10 Lightning ADS front-ending the application
  - Monitoring alerts configured for server latency
    - For high latency limit
    - For low latency limit
  - Web-hook configured for alerts

- Have an AWS account with
  - Application server instance
  - API Gateway
  - Lambda functions
    - For starting the instance
    - For stopping the instance



A10 Lightning Application Delivery Service (ADS)

Controller

- Centralized Policy Management
- Multi-tenant portal, with provider-tenant
- Per-App Visibility and Analytics
- Self-service
- Programmability with REST APIs

ADC

- Scale-out
- Traffic Management
- App Security

A10 Lightning ADS Features

Cloud Controller

- Centralized policy management
- Multi-cloud, Multi-Region
- Multi-Tenant, Provider-Tenant
- REST APIs

Delivery: SaaS

Application Traffic Management

- L4/L7 Load Balancing
- SSL Offload
- HTTP 2.0
- Blue-Green provisioning
- Clustering / HA
- Scale-out

App Security

- Web Application Firewall
- 1-Click Provisioning
- Anomaly Detection
- BOT Protection
- Virtual Patching

App Analytics

- Per App Metrics
- Trends and Correlations
- Anomaly Detection
- Alerting

Amazon API Gateway

- Amazon API Gateway supports the following two major functionalities:
  - Create, manage and host a RESTful API to expose AWS Lambda functions, HTTP endpoints as well as other services from the AWS family including, but not limited to, Amazon DynamoDB, Amazon S3 Amazon Kinesis. You can use this feature through the API Gateway REST API requests and responses, the API Gateway console, AWS Command-Line Interface (CLI), or an API Gateway SDK of supported platforms/languages. This feature is sometimes referred to as the API Gateway control service.
  - 3rd-party app developer to call a deployed API to access the integrated back-end features, using standard HTTP protocols or a platform- or language-specific SDK generated by API Gateway for the API. This feature is sometimes known as the API Gateway execution service.

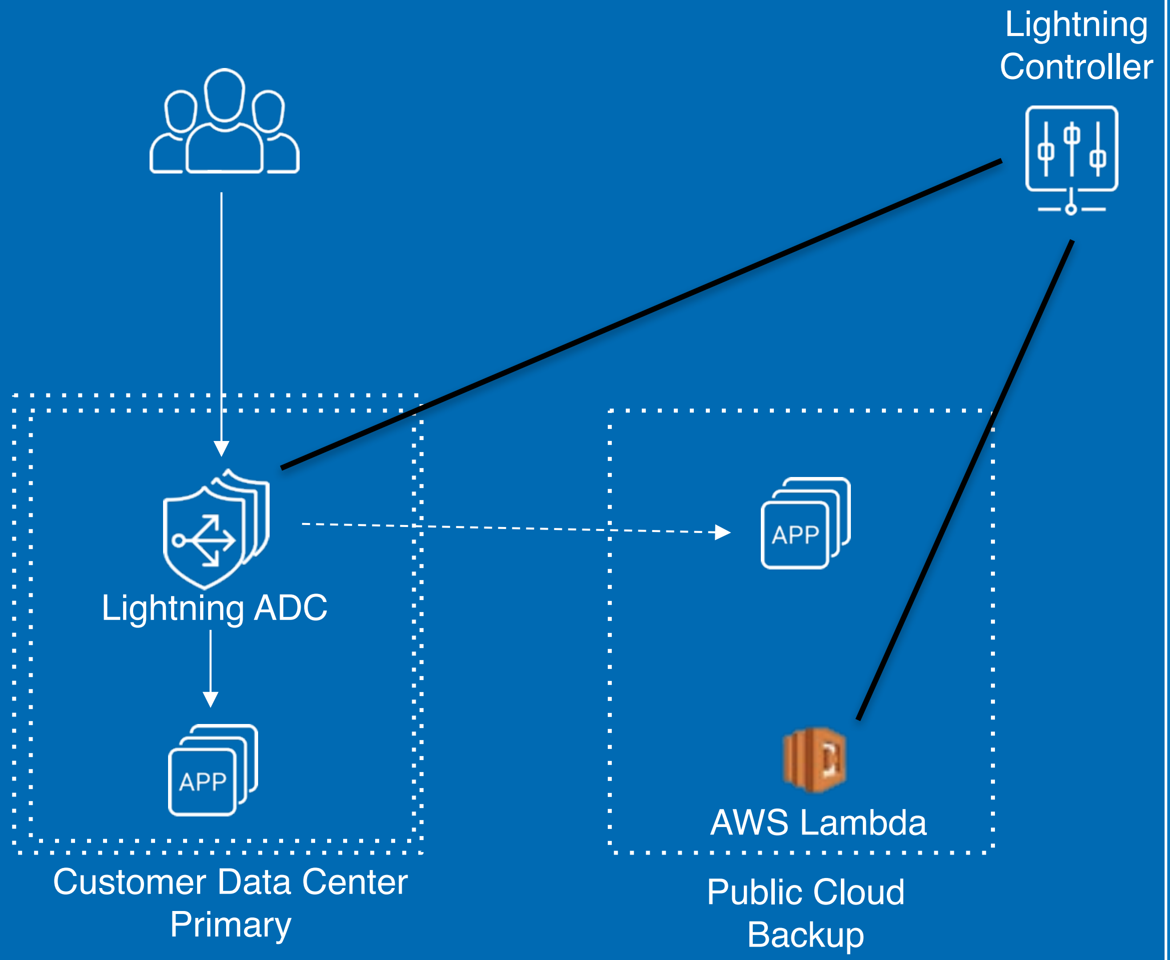
AWS Lambda

- AWS Lambda is a compute service that lets you run code without provisioning or managing servers.
- AWS Lambda executes your code only when needed and scales automatically, from a few requests per day to thousands per second. You pay only for the compute time you consume - there is no charge when your code is not running. With AWS Lambda, you can run code for virtually any type of application or backend service - all with zero administration.
- AWS Lambda runs your code on a high-availability compute infrastructure and performs all of the administration of the compute resources, including server and operating system maintenance, capacity provisioning and automatic scaling, code monitoring and logging.

Application Cloud Bursting

From Private to Public Cloud

Automatically provision additional server capacity in AWS as needed



Scale-up Workflow

ADS

- Continuously monitors the traffic for server latency
- Raises alert and deliver to pre-configured web-hook when latency is beyond specified limit

API Gateway

- Handles the alert and calls corresponding Lambda function

Lambda Function

- Starts the server instance
- Calls ADS APIs to add Server to appropriate server pool

ADS

- Waits for server to become responsive
- Starts sending traffic to the new server

Scale-down Workflow

ADS

- Continuously monitors the traffic for server latency
- Raises alert and deliver to pre-configured web-hook when latency is below specified limit

API Gateway

- Handles the alert and calls corresponding Lambda function

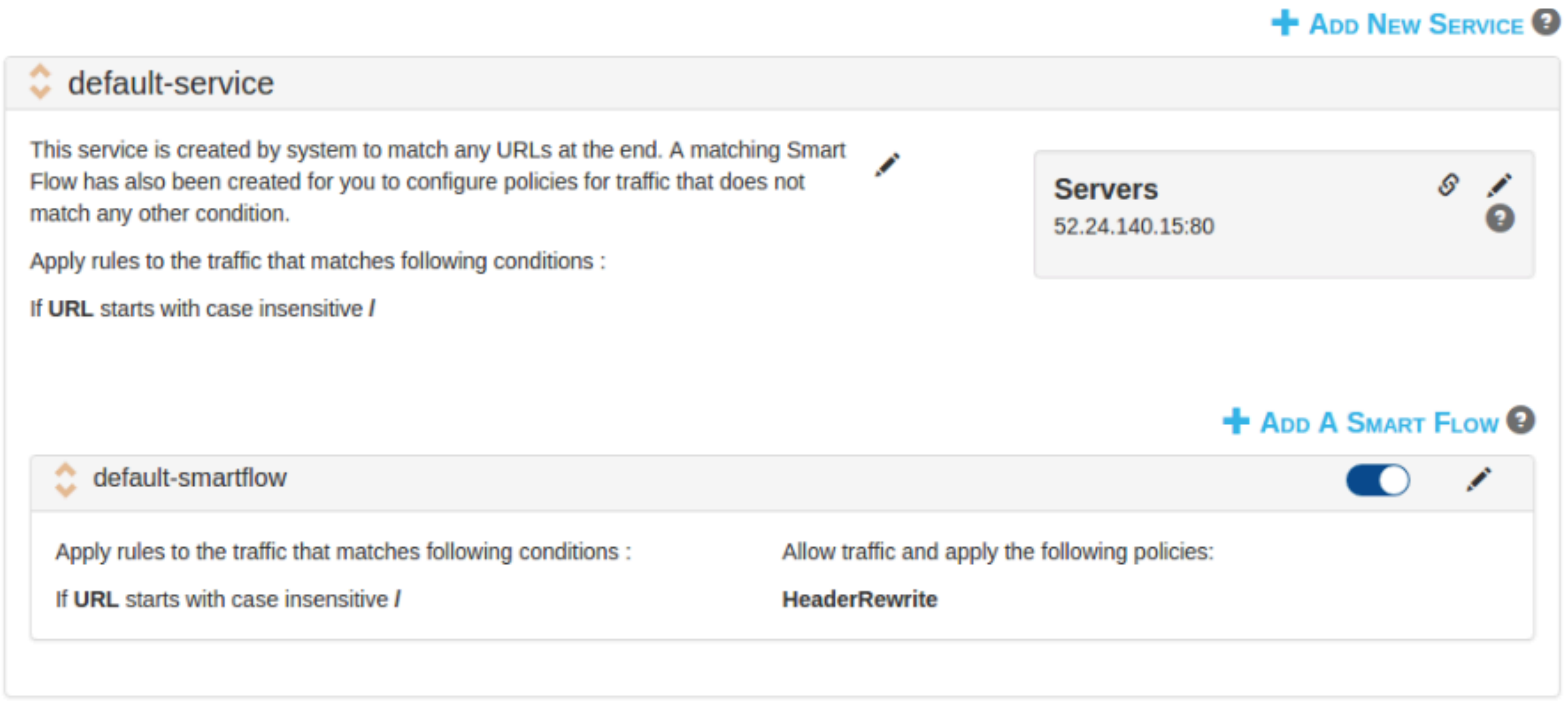
Lambda Function

- Calls ADS APIs to remove Server from appropriate server pool
- Stops the server

ADS

- Stops sending traffic to the server
- If any request is sent to this server and fails, it is forwarded to other server

Service Configuration in ADS



default-service

This service is created by system to match any URLs at the end. A matching Smart Flow has also been created for you to configure policies for traffic that does not match any other condition.

Apply rules to the traffic that matches following conditions :

If **URL** starts with case insensitive **/**

Servers

52.24.140.15:80

default-smartflow

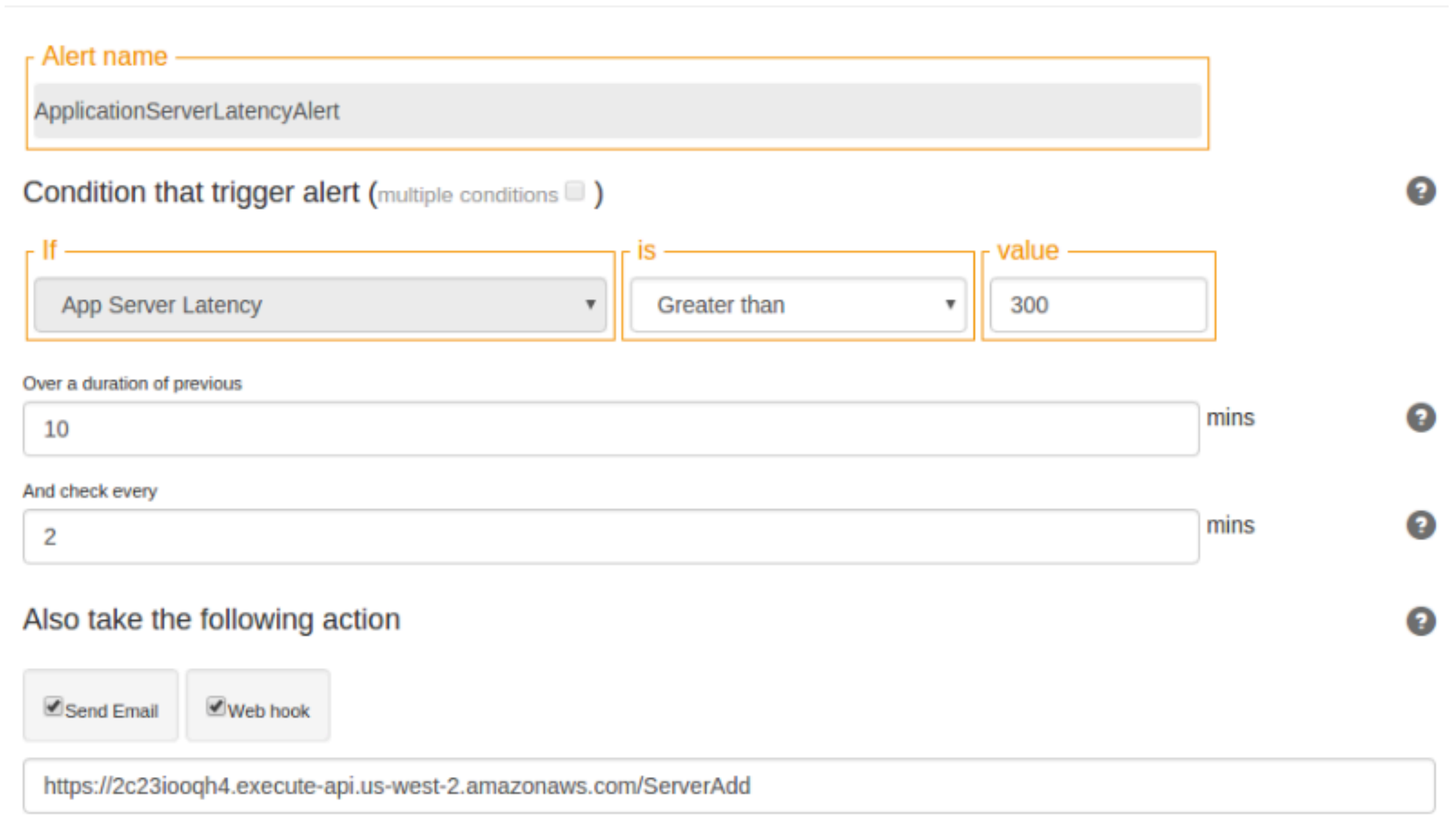
Apply rules to the traffic that matches following conditions :

If **URL** starts with case insensitive **/**

Allow traffic and apply the following policies:

HeaderRewrite

Alert Configuration in ADS



Alert name
ApplicationServerLatencyAlert

Condition that trigger alert (multiple conditions ☐)

If	is	value
App Server Latency	Greater than	300

Over a duration of previous
10 mins

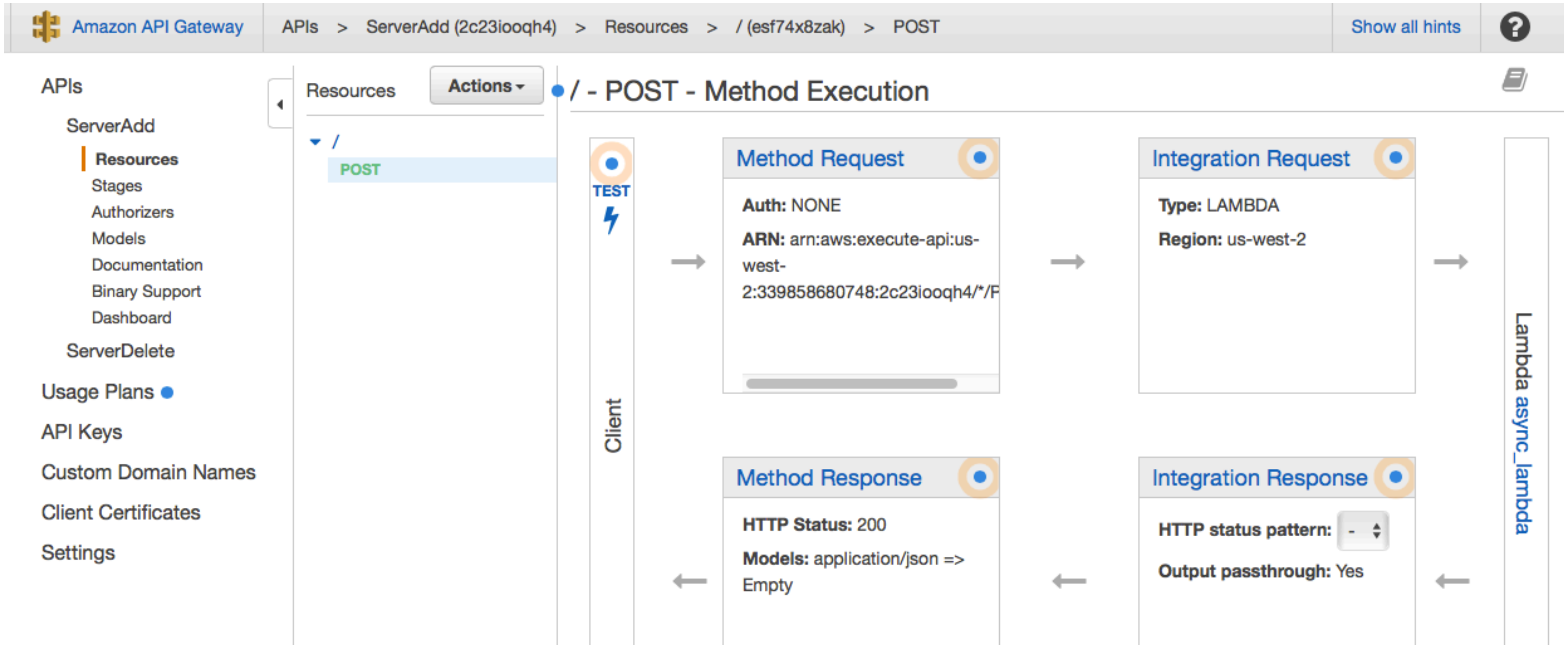
And check every
2 mins

Also take the following action

☑ Send Email ☑ Web hook

https://2c23iooqh4.execute-api.us-west-2.amazonaws.com/ServerAdd

API Gateway Configuration



/ - POST - Method Execution

Method Request

Auth: NONE

ARN: arn:aws:execute-api:us-west-2:339858680748:2c23iooqh4/*/P

Integration Request

Type: LAMBDA

Region: us-west-2

Method Response

HTTP Status: 200

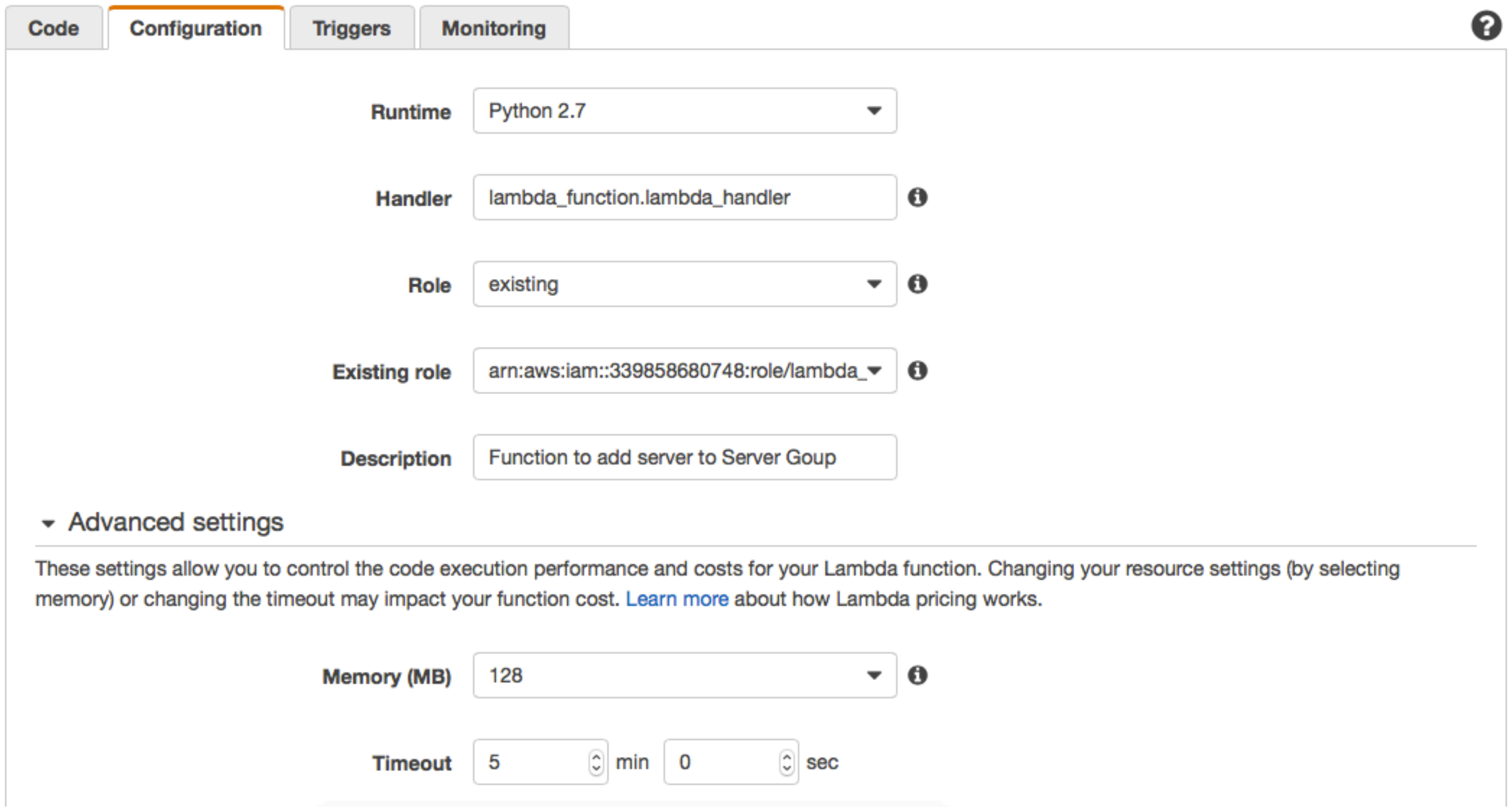
Models: application/json => Empty

Integration Response

HTTP status pattern: -

Output passthrough: Yes

Lambda Function Configuration



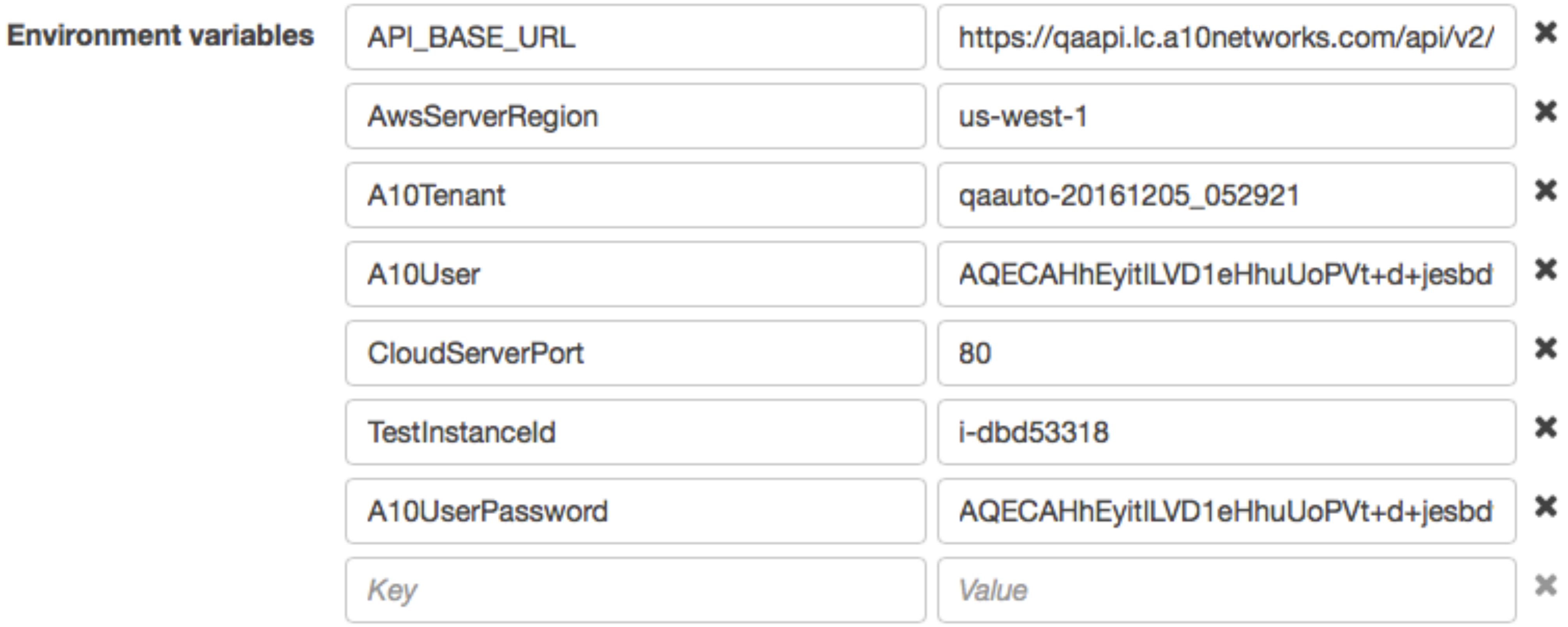
Runtime	Python 2.7
Handler	lambda_function.lambda_handler
Role	existing
Existing role	arn:aws:iam::339858680748:role/lambda_
Description	Function to add server to Server Goup

Advanced settings

These settings allow you to control the code execution performance and costs for your Lambda function. Changing your resource settings (by selecting memory) or changing the timeout may impact your function cost. Learn more about how Lambda pricing works.

Memory (MB)	128
Timeout	5 min 0 sec

Lambda Function Meta Data



Environment variables

API_BASE_URL	https://qaapi.lc.a10networks.com/api/v2/	✖
AwsServerRegion	us-west-1	✖
A10Tenant	qaauto-20161205_052921	✖
A10User	AQECAHhEyitlLVD1eHhuUoPVt+d+jesbd	✖
CloudServerPort	80	✖
TestInstanceId	i-dbd53318	✖
A10UserPassword	AQECAHhEyitlLVD1eHhuUoPVt+d+jesbd	✖
Key	*Value*	✖

Lambda Function Code

```
def lambda_handler(event, context):
   Ec2Client.start_instances(InstanceIds=[ServerInstanceID])
   _add_instance_to_server_grp(**event)

def _add_instance_to_server_grp(**kwargs):
    ServerGrpImportApi =
            "applications/{0}/hosts/{1}/services/{2}/servergroups/
                  _import".format(
                     kwargs['applicationId'],
                     kwargs['hostId'],
                     kwargs['serviceId'])

    server_grp_data = [{"weight": 1, "port": CloudServerPort,
                        "ipAddress": _get_public_ip_addr(SrvInstId)}]

    urllib2.urlopen(ServerGrpImportApi , server_grp_data)
```

Thank you

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