Building Infrastructure with Python

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Whoami

20+ years working with *nix systems

Working in the IaaS space since 2010 (3 years Rackspace Cloud, 4 years AWS)

Hold AWS as well as GCP Architect certifications

What are we here to talk about.

- Understand what an Cloud IaaS provider is and who are the major players.
  - AWS
  - GCP
- How do you interact with Cloud IaaS providers programmatically.
  - Raw API calls
  - SDK’s
  - Third party tools
- Putting it all together - examples and demo

So what is a Cloud IaaS and why do I care?

IaaS stands for: **Infrastructure as a Service**

A cloud IaaS is a platform that allows you to purchase and consume resources of various types in various ways and pay for it by the second of utilization.

IaaS resources are the raw building blocks that many popular companies use to build and offer their products think Netflix, Hulu, Expedia.

So what are these resources ?

Amazon currently has over 110 different resources available via AWS.

Google has about 50 resources available via GCP.

We are not going to even begin to talk about all these today, we are going to talk about a small subset of ‘core’ resources.

So what are ‘Core Resources’ ?

These are the original services/resources that AWS first provided over 11 years ago which started the whole Cloud IaaS craze we see today.

These are basic components needed to create a website using a webserver and database model, think basic CMS such as Django or Wordpress.

This would include Networking, virtual servers, and object storage.

Networking

Networking includes many components:

- Virtual Private Network space
- Load Balancers
- Firewalls / Security Groups
- Content Delivery Network (CDN)

All of these items can be created and managed via the API

Compute

For today we are just talking about Virtual Machines, there are also options for bare metal servers and containers in many IaaS solutions.

AWS provides over 50 options for size and style of Compute systems to meet various work loads. https://aws.amazon.com/ec2/pricing/on-demand/

GCP provide a few less but still has many options for different CPU's, RAM and storage needs. https://cloud.google.com/compute/pricing

Object Storage

Unlimited object storage - can be accessed publicly using HTTPS or privately using API authentication.

AWS S3 - https://aws.amazon.com/s3/

GCP Cloud Storage - https://cloud.google.com/storage/

So how do we programmatically utilize these things ?

All modern IaaS providers have some type of REST based API’s to interact with most of their services.

Since AWS and GCP are so huge, these are all broken down into individual API’s for each service.

AWS S3 REST API

Here is a great article that explains how to craft a curl statement to grab a object from S3 using the raw REST API

http://czak.pl/2015/09/15/s3-rest-api-with-curl.html

So yeah this is why we have SDK’s

SDK’s are utilized to interact with these REST API’s without having to do all that.

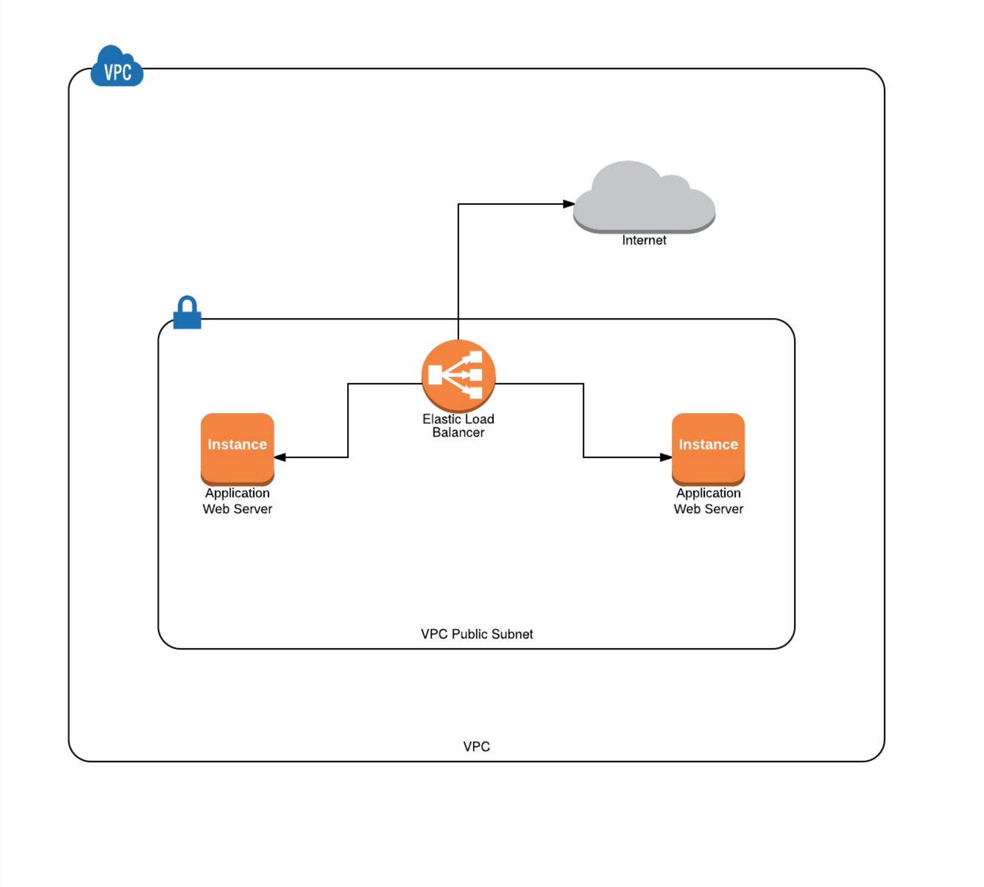
AWS Python SDK - https://aws.amazon.com/sdk-for-python/

AWS Python SDK Github source code - https://github.com/boto/boto3

GCP Python SDK - https://googlecloudplatform.github.io/google-cloud-python/

GCP Python SDK Github source code - https://github.com/GoogleCloudPlatform/google-cloud-python

Demo time - Let’s try to build something like this using a SDK:



Now let’s look at some other great tools:

Terraform - https://www.terraform.io/

Ansible - https://www.ansible.com/

Salt - https://saltstack.com/

Now go get an account with some credit and get started...

AWS - https://aws.amazon.com/free

GCP - https://cloud.google.com/free

Questions ?