AWS DATA PROCESSING INFRASTRUCTURE 1B

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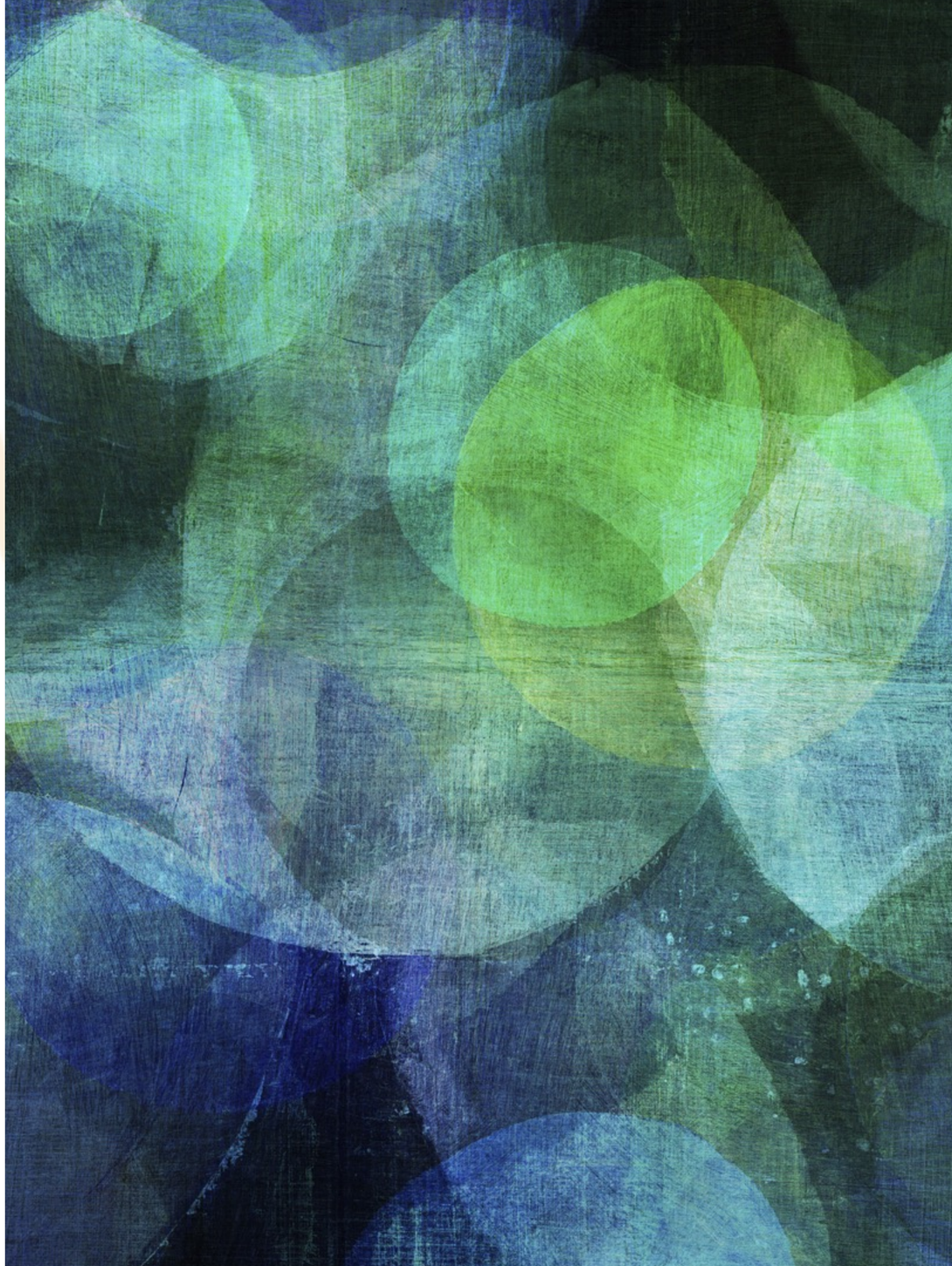

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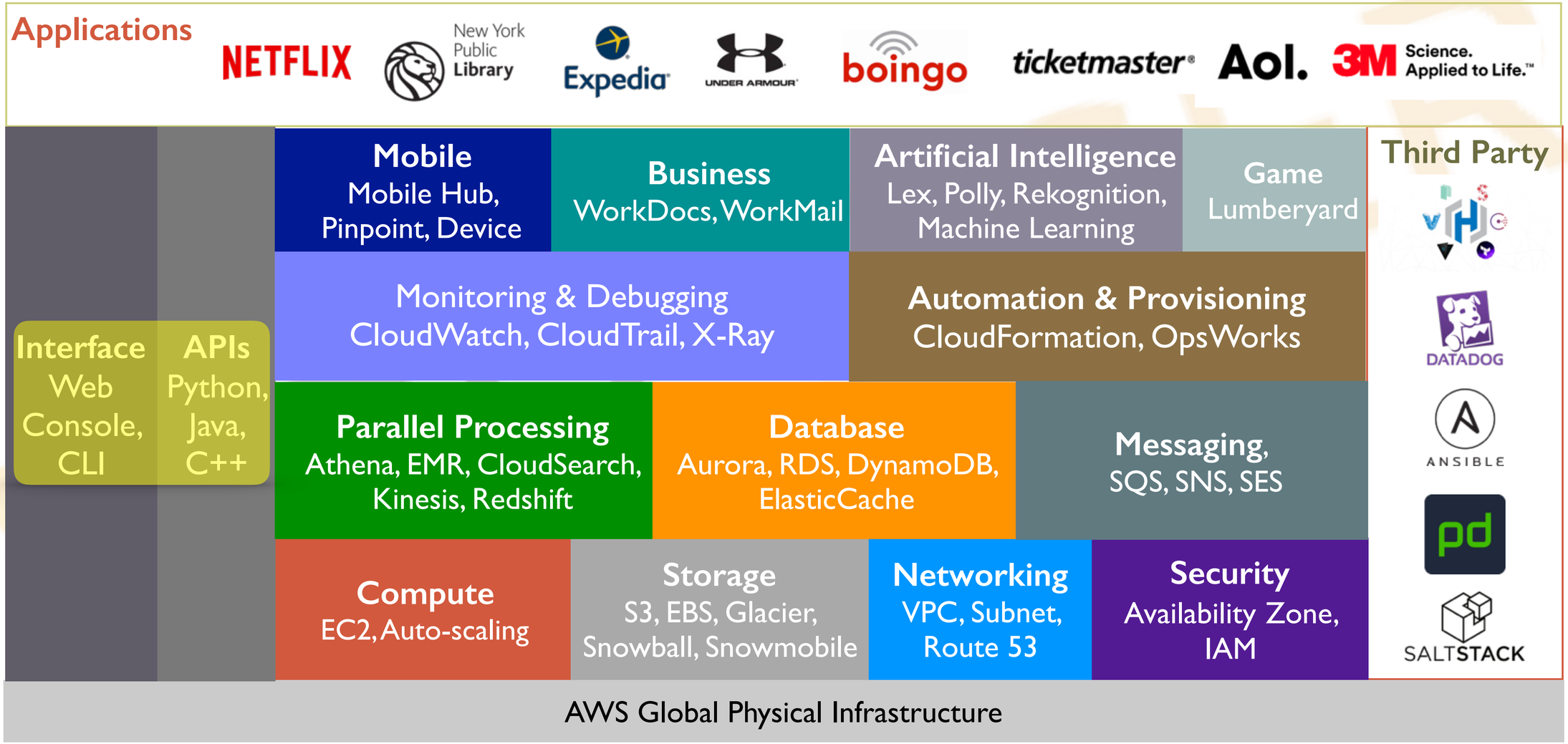
TODAY'S TOPIC



ENVIRONMENT SETUP

- Python > 2.7.9
  - Use brew or macports to install Python
- Git > 2.10
  - If you are using Mac, it should come with Xcode
- Unix/Linux Command Line Tools
  - http://osxdaily.com/2014/02/12/install-command-line-tools-mac-os-x/
- Checkout the repository
  - Bitbucket account
  - Fork the repository
  - `$ make prepare`

AWS ACCOUNT SETUP

- Bookmark following URLs
  - http://www.ec2instances.info/
  - http://calculator.s3.amazonaws.com/index.html
  - http://s3speedtest.com
- AWS Account Setup
  - Credit card information
  - Set billing alarm in CloudWatch
  - Inbound SSH rule for default VPC security group
  - Create main user and save your key pair
- Customize your console

AWS CLI

AWS CLI CONFIGURATION

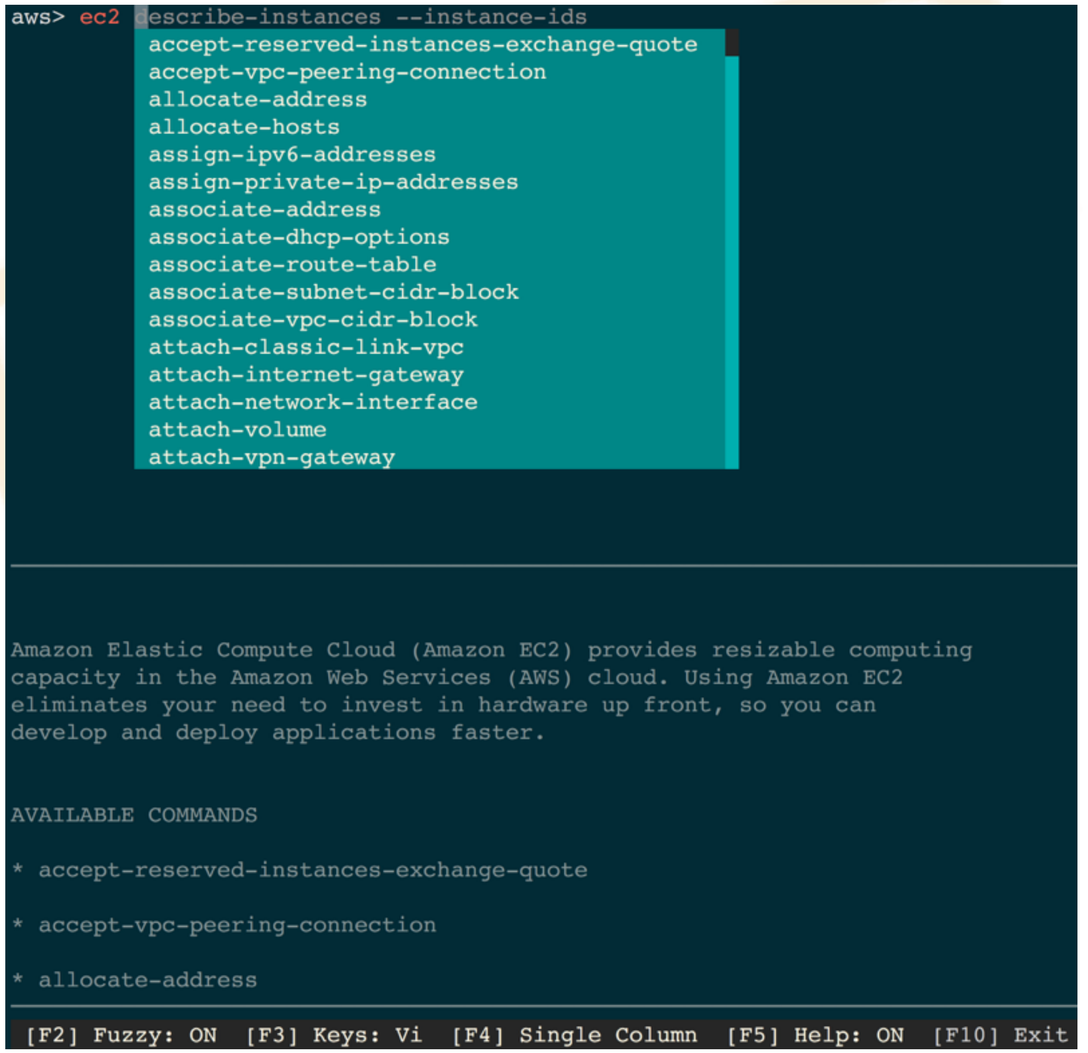
- Examples: scripts/configure.sh
- ~/.aws/credentials
- ~/.aws/config
- Profile
  - default
  - dev

AWS CLI EXAMPLES

- aws COMMAND SUBCOMMAND [OPTIONS]
- Github: https://github.com/aws/aws-cli
- Examples: scripts/awscli.sh

AWS SHELL

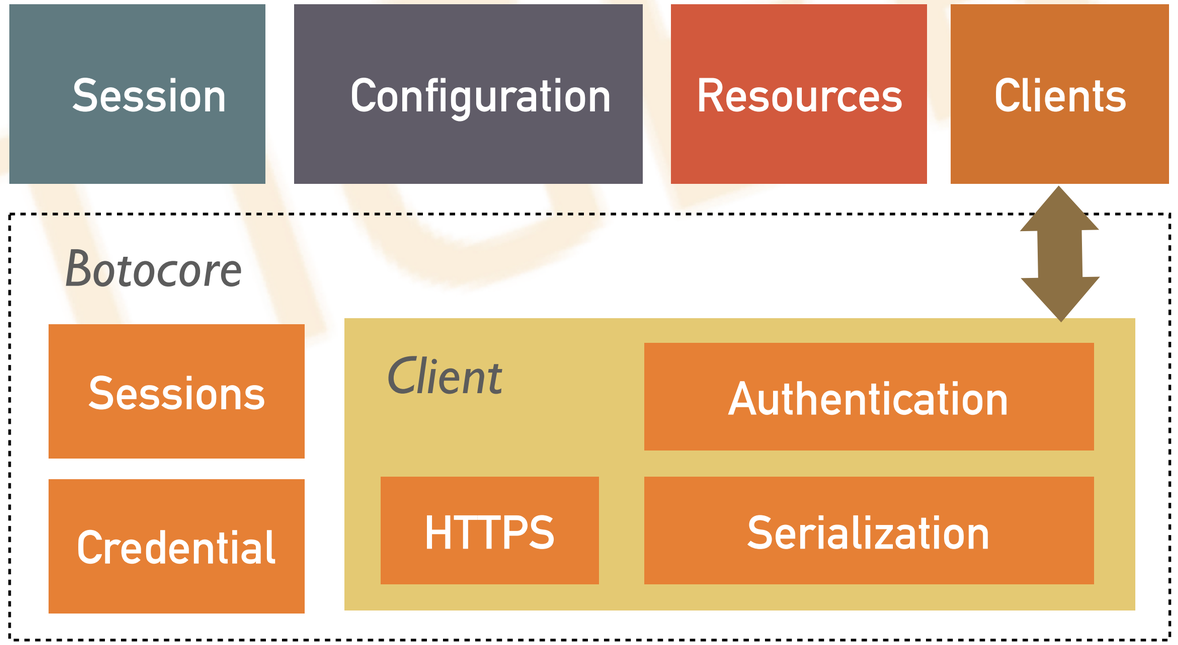
- Auto completion
- Pop document
- Server side auto completion
- Execute shell command



BOTO3

BOTO3

- AWS SDK for Python
- boto2
  - Early project
  - Community contributed code
- boto3
  - New version with consistent interfaces and up-to-date API support
- botocore
  - Low-level service and configurations
- https://github.com/boto/boto3
- https://boto3.readthedocs.io/en/latest/



EC2

A VPC REVIEW

- Create a VPC
- Create a public subnet
- Create a private subnet
- Create a internet gateway and attach to VPC
- Check ACL and security group
  - Add inbound SSH rule
- Make sure you can login to you instance in public subnet

EC2 - EXAMPLES

- Launch EC2 instance by CLI and Boto3
- Evaluation
  - CPU
  - EBS Bandwidth
    - fio
  - Inter-Instance Bandwidth
    - iPerf
  - Enhanced networking SR-IOV
    - Check if SR-IOV
    - Bandwidth comparison

“

Whenever you find yourself on the side of majority, it is time to pause and reflect.

-Mark Twain

S3

S3 - EXAMPLES

- Create/empty/delete bucket
- List/upload/download/copy from/to bucket
- Selective copy
- Examples
  - scripts/s3.sh
  - scripts/s3cp.py
  - taxi/raw2s3.py

PROJECT NYC TAXI DATA

- Source: http://www.nyc.gov/html/tlc/html/about/trip_record_data.shtml
  - Stored in S3
    - https://s3.amazonaws.com/nyc-tlc/trip+data/yellow_tripdata_2016-01.csv
- Format
  - vendor_id, tpep_pickup_datetime, tpep_dropoff_datetime, passenger_count, trip_distance, pickup_longitude, pickup_latitude, rate_code_id, store_and_fwd_flag, dropoff_longitude, dropoff_latitude, payment_type, fare_amount, extra, mta_tax, tip_amount, tolls_amount, improvement_surcharge, total_amount
  - Not aligned…

PROJECT - DATA PREPROCESSING

1. Clean: remove empty lines and invalid data
2. Select interested fields
   - pickup_datetime, dropoff_datetime
   - pickup_longitude, pickup_latitude, dropoff_longitude, dropoff_latitude
   - trip_distance, total_amount
3. Compact data (160 bytes/recored vs. 80 byes/record)
   - Change datetime to offset since 2009/1/1, e.g., 2009/1/1 12:01 => 60
   - Round coordinates to 6 digits
   - Round distance and fare to 2 digits
   - Padding to 80 bytes

DATA PIPELINE

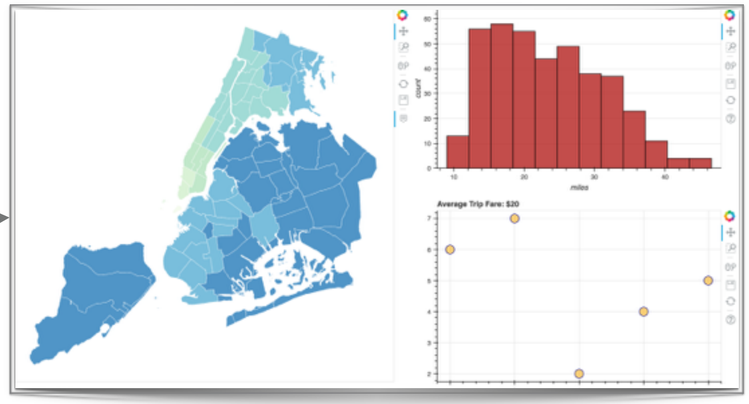
vendor_id, tpep_pickup_datetime, tpep_dropoff_datetime, passenger_count, trip_distance, pickup_longitude, pickup_latitude, rate_code_id, store_and_fwd_flag, dropoff_longitude, dropoff_latitude, payment_type, fare_amount, extra, mta_tax, tip_amount, tolls_amount, improvement_surcharge, total_amount

pickup_datetime, dropoff_datetime, pickup_longitude, pickup_latitude, dropoff_longitude, dropoff_latitude, trip_distance, total_amount

Parallel Processing

pickup_datetime, dropoff_datetime, pickup_district, dropoff_district, trip_distance, total_amount

district, total_pickup, total_dropoff, total_trip_distance, total_amount

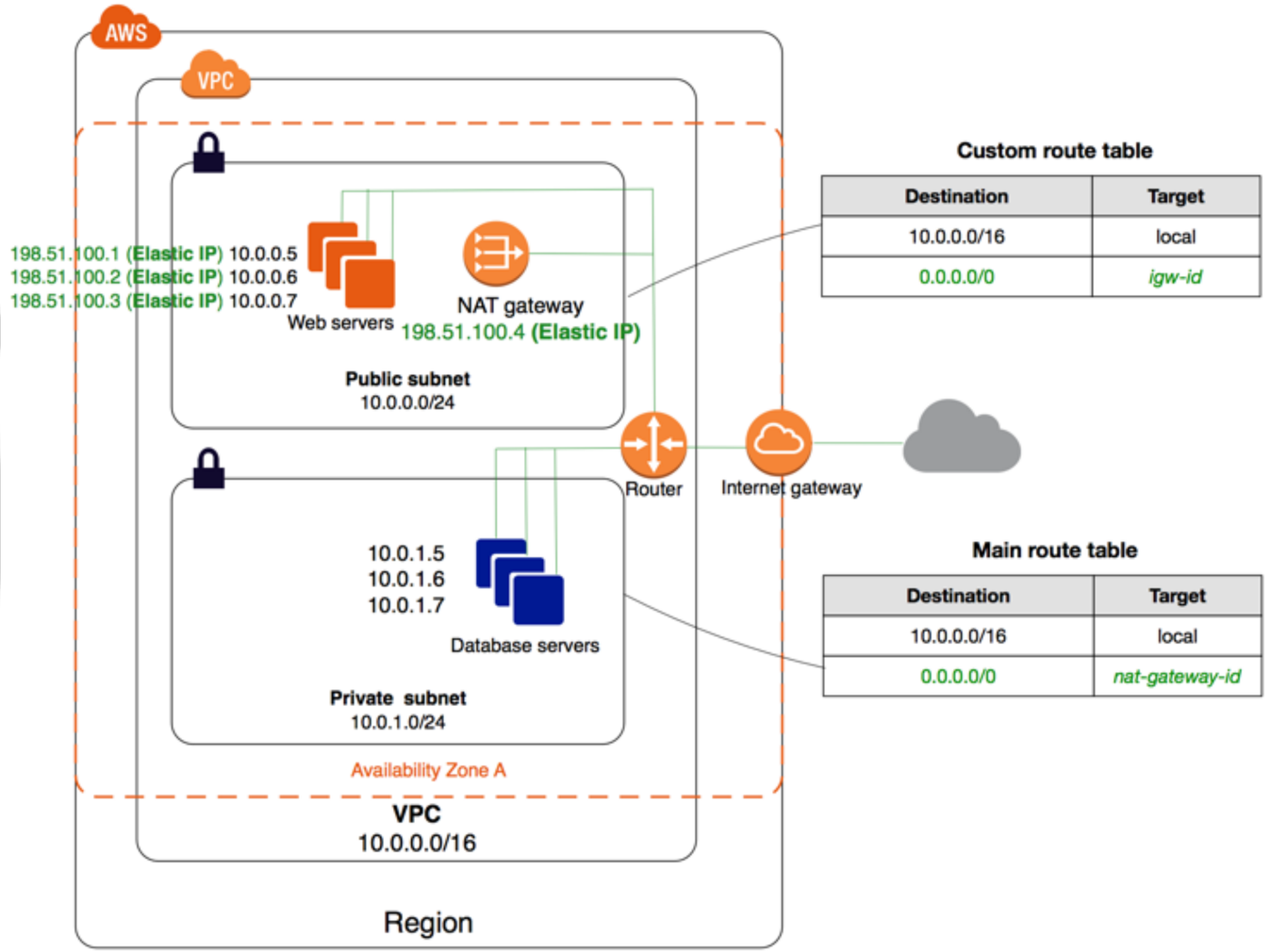


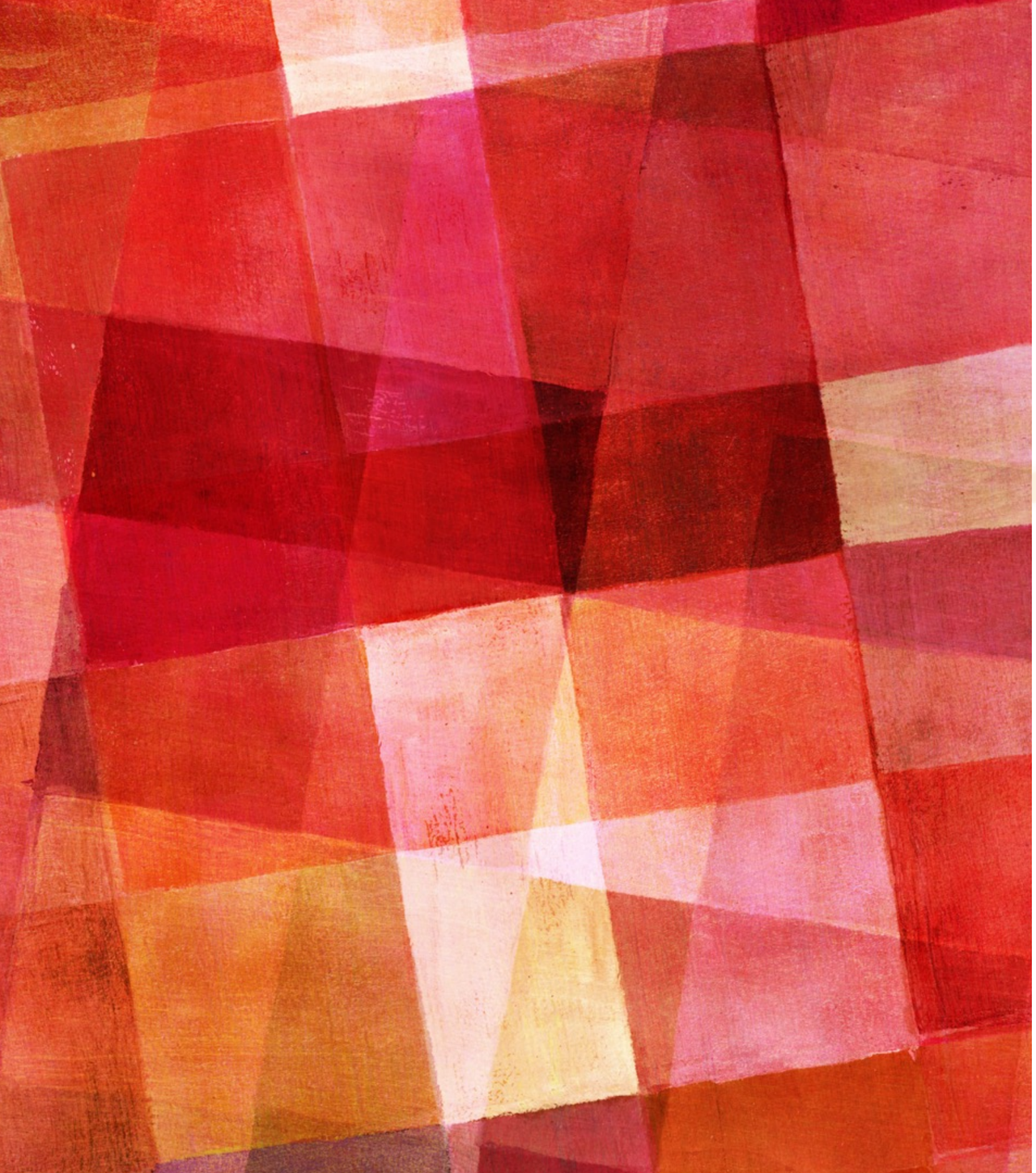
VPN

- Subnet
  - Create public subnet
- Security group
  - Dynamic attach
  - Multiple security group attach
  - Inbound/Outbound rules
  - Rules reasoning

HOMEWORK

- Create a VPC with both public and private subnet
- Write a boto3 program to launch two instances in each subnet
- Verify the one in public subnet can be accessed from internet and another cannot
- Measure the performance of these two instances
- Use taxi/raw2aws.py to upload part of data to s3://aws-nyc-taxi-data and explain how you make the transfer efficient (parallel)





QUESTIONS

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