AWS Certified Developer - Associate 2018

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# Sekcja 1: Introduction

## 1. Introduction To The Certified Developer - Associate Course

<https://acloud.guru/>

<https://read.acloud.guru/>

## 2. Information For Students Who Have Completed The Solutions Architect Course

## 3. Setting The Right Expectations, This Is Not A Course To Teach You How To Code

## 4. What You'll Need To Do This Course

* putty
* <https://aws.amazon.com/free/>

## 5. Exam Blue Print

<https://aws.amazon.com/certification/certified-developer-associate/>

<https://d1.awsstatic.com/training-and-certification/docs-dev-associate/AWS_certified_developer_associate_blueprint.pdf>

## 6. The Free Alexa Skill For Amazon Echo

# Sekcja 2: AWS - 10,000 Feet Overview

## 7. The History So Far

<https://acloud.guru/aws-this-week>

## 8. 10,000 Foot Overview - 1 of 4

AWS Global Infrastructure

* Region - geographical area
* Availability Zone - Data center
* Edge location - endpoint to caching content, consists CloudFront or Amazon CDN

## 9. 10,000 Foot Overview - 2 of 4

Compute

* EC2 - elastic computing cloud - virtual machine within VPC
* EC2 Container Service - to run docker containers
* Elastic Beanstalk
* Lambda
* Lightsail - Virtual private service
* Batch - for batch computing in a cloud

Storage

* S3 - simple storage service
* EFS - elastic file system, network attached storage
* Glacier - for archive data, very cheap
* Snowball - for large amount of data
* Storage gateway - virtual machine

Databases

* RDS - relational database service
* Dynamo DB - non relational database
* Elasticache - caching service
* Redshift - for BI and data warehousing [elastic.co/guide/en/elasticsearch/reference/6.2/query-dsl-simple-query-string-query.html](http://elastic.co/guide/en/elasticsearch/reference/6.2/query-dsl-simple-query-string-query.html)

Migration

* AWS Migration HUB - to track application during migration to AWS
* Application Discovery Service - automated detect applications and dependencies
* Database Migration Service - tool to migrate on premise databases to AWS
* Server Migration Service - tool to migrate servers to AWS
* Snowball - for migratinf large amount of data

Networking and Content Delivery

* VPC - Virtual Private Cloud - Virtual data center
* ClaudFront - Amazon CDN (Content Delivery Network) (Edge locations)
* Route53 - Amazon DNS service
* API Gateway - way to create API
* Direct Connect - for direct connection to Amazon from office or data center

Developer Tools

* CodeStart - gather group of developers working together, project managing your code, continuous delivery toolchain,
* CodeCommit - place to store your code using diference source control service.
* CodeBuild - compile code and run tests and produce software packages
* CodeDeploy - deployment service
* CodePipeline - continuous derlivery service
* X-Ray - tracing and debug application
* Cloude 9 - IDE environment for develop code in browser

## 10. 10,000 Foot Overview - 3 of 4

Management Tools

* CloudWatch - monitoring tool
* CloudFormation - for solution architect
* CloudTrial - log changes to your AWS environment
* Config - monitors configuration entire AWS
* OpsWorks - very similar to elastic beans stalk, automation of configuration your environments
* Service Catalog - catalog of services
* Systems Manager - to managing AWS resources
* Trusted advisor - give you advice across different disciplines
* Managed services

Media Services

* Elastic Transcoder - can resize video
* MediaConvert - file based video transcoding service, broadcasts
* MediaLive - live video processing service, High Quality video streams
* MediaPackage - prepare and protect videos for delivery over internet
* MediaStore - storage service optimized for media
* MediaTailor - targeted advertising into video streams without sacrificing broadcast level

Machine learning

* SageMaker - for deep learning (on a neutral network)
* Comprehend - sentiment analysis around data
* DeepLens - artificially web camera, physical piece of hardware you can buy
* Lex - this power amazon alexa service, is a way to communicate with customers, artificial intelligent to chat with customers
* Machine Learning - entry level, not neutral network, gather data, analysis and predict.
* Polly - take taxts and turn it into speech
* Recognition - recognize what is in a file (video and images)
* Amazon translate - translate english into other languages
* Amazon transcribe - automatic speech recognition, upload video and mp3 ant turn them into a text

Analytics

* Athena - run SQL on your s3 storage
* EMR - Elastic Map Reduce, for processing large amount of data <https://aws.amazon.com/emr/>
* CloudSearch - search services for AWS
* ElastcSearch Service - search services for AWS
* Kinesis - for big data
* Kinesis Video Streams - analysis video streams
* Quick Sight - amazon business intelligence  BI tool
* Data Pipeline - way to move data between AWS services
* Glue - uses for ETL (extract, transform, load)

## 11. 10,000 Foot Overview - 4 of 4

Security & Identity & Compliance

* IAM - identity access management
* Cognito - for device authentication to get access to AWS resources
* GuardDuty - monitore malicious activity in aws account
* Inspector - agent to run for verify any vulnerabilities
* Macie - scan s3 and look personal identify information
* Certificate Manager - you get SSL certificates for free when using AWS and register domain through route 53. For managing ssl certificates
* CloudeHSM - hardware security module for store your keys (public, privates). You use this keys to access EC2 instances. An other keys e.g. encryption keys.
* Directory services - to integrate Microsoft Active Directory service with Amazon AWS service
* WAF - web application firewall - layer 7 firewall to stop cross-site scripting, to stop SQL injection
* Shield - to prevent DDOS attack. If you have shield advance and suffer from DDOS then Amazon will not charger you and compay your bill
* Artifact - for audit and compliance. on-demand to download a compliance report and other reports

Mobile Services

* Mobile Hub - for serv services for mobile application. You should user AWS mobile SDK
* Pinpoint - push notification to drive mobile engagement
* AWS AppSync - its automatically update the date in web and mobile applications
* Device Farm - way to test your apps on real devices (android, iPhone, etc)
* Mobile Analytics

AR / VR

* Sumerian - common set of tools to create AR, VR, 3D design. Is still in a preview

Application Integration

* Step Functions - managing different lambda functions
* Amazon MQ - message queues
* SNS - notification service, e.b. if bill goes over 10$ we are going to get a message to our emails
* SQS - for decoupling infrastructure
* SWF - simple work flow service

Customer engagement

* connect - contact center as a service
* simple email service

Business Productivity

* Alexa for business
* Chime -used for video conferencing, record meetings
* Work Docs - like dropbox for AWS
* WorkMail - like office 365, like gmail

Desktop and app streaming

* Workspaces - VDI solution - stream desktop operating system to device
* Appstream 2.0 - stream application to device

Internet of things

* iOT
* iOT Device Management
* Amazon FreeRTOS - operating system for microcontrollers
* Greengrass - local compute messaging data caching sync

Game Development

* GameLift - service to help develop games

## 12. Don't Freak Out!

Pokazanie na jaki egzamin jakie serwisy wpadają

Solution Architect - Associate:

* AWS Global Infrastructure
* Compute
* Storage
* Databases
* Migration
* Networking and Content Delivery
* Management Tools
* Analytics
* Security & Identity & Compliance
* Application Integration
* Desktop and app streaming

Developer Associate

* AWS Global Infrastructure
* Compute
* Storage
* Databases (particular dynamo db)
* Networking and Content Delivery
* Management Tools
* Analytics
* Security & Identity & Compliance
* Application Integration

Sysops Administrator Associate

* AWS Global Infrastructure
* Compute
* Storage
* Databases
* Networking and Content Delivery
* Management Tools
* Security & Identity & Compliance
* Application Integration

## 13. Setting Up A Free Tier Account

<https://aws.amazon.com/>

instrukcja zakładania konta

## 14. AWS This Week

<https://acloud.guru/aws-this-week>

Quiz 1: 10,000 Feet Overview Review

# Sekcja 3: Identity Access Management (IAM)

## 15. IAM 101

IAM allows you to manage users and their level of access to the AWS Console

* centralized control of your AWS account
* shared access to your AWS account
* Granular permissions
* Identity federation (include Active Directory, Facebook, LinkedIn, etc. )
* Multifactor Authentication
* Provide temporary access for users/devices and services when necessary
* allows you to set up your own password rotation policy
* integration with many different AWS services
* support PCI DSS Compliance

Critical terms:

* User - end users (think people)
* Group - A collection of users under one set of permissions
* Role - you create roles and can then assign them to AWS resources
* Policies - A document that define one (or more permissions)

## 16. IAM - Lab

* Turn on MFA
* create user
* create group
* create role

## 17. Security Token Service (STS)

Grant users limited and temporary access to AWS resources. Users can come from three sources:

* Federation (typically Active Directory)
  + Users Security Assertion Markup Language (SAML)
  + Grants temporary access based off the users Active Directory credentials. Does not need to be a user in IAM
  + Single sign on allows users to log in to AWS console without assigning IAM credentials
* Federation with Mobile Apps
  + Use Facebook/Amazon/Google or other OpenID providers to log in.
* Cross Account Access
  + Let’s users from one AWS account access resources in another

Understanding Key Terms

* Federation: combining or joining a list of users in one domain (such as IAM) with a list of users in another domain (such as  Active Directory, Facebook etc.)
* Identity Broker: a service that allows you to take identity from point A and join it (federate it) to point B
* Identity Store - Service like Active Directory, Facebook, Google etc.
* Identities - a user of a service like Facebook etc.

## 18. Active Directory Federation

You can authenticate by Active directory by using SAML

First authenticate by active directory, then you would be assigned the temporary security credentials.

## 19. Web Identity Federation

<https://aws.amazon.com/articles/web-identity-federation-with-mobile-applications/>

## 20. IAM - Summary

Test 2: Identity Access Management Quiz

# Sekcja 4: EC2 & Getting Setup

## 21. EC2 101 - Part 1

What is EC2?

Amazon Elastic Compute Cloud (Amazon EC2) ia a web service that provides resizable compute capacity in the cloud. Amazon EC2 reduce the time required to obtain and boot new server instance to minutes, allowing you to quickly scale capacity, boot up and down, as your computing requirements change.

Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon EC2 provides developers the tools to build failure resilient applications and isolate themselves from common failure scenarios.

EC2 Options

* On Demand - allows you to pay a fixed rate by the hour (or by the second) with on commitment.
* Reserved - provides you with a capacity reservation, and offer a significant discount on the hourly charge for an instance. 1 Year or 3 Year Terms.
* Spot - enables you to bid whatever price you want for instance capacity, providing for even greater savings if your applications have start and end times
* Dedicated Hosts - Physical EC2 server dedicated for your use. Dedicated Hosts can help you reduce costs by allowing you to use your existing server bound software licenses.

On Demand

* Perfect for users that want the low costs and flexibility of Amazon EC2 without any up-front payment or long-term commitment
* Applications with short term, spiky, or unpredictable workloads that cannot be interrupted
* Applications being developed or tested on Amazon EC2 for the first time

Reserved Instances

* Applications with steady state or predictable usage
* Applications that require reserved capacity
* Users can make up-front payments to reduce their total computing costs even further
* Standart RIs (Reserved Instances) (Up to 75% off on-demand)
* Convertible RIs (Up to 54% off on-demand) feature the capability to change the attributes of the RI as long as the exchange results in the creation of Reserved Instances of equal or greater value.
* Scheduled RIs are available to launch within the time window you reserve. This option allows you to match your capacity reservation to a predictable recurring rchedule that only requires a fration of a day, a week, ora month

Spot Instances

* Applications that have flexible start and end time
* Applications that are only feasible at very low compute price
* Users with an urgent need for large amounts of additional computing capacity

Dedicated Hosts

* Useful for regulatory requirements that may not support multi0tenant virtualization.
* Great for licensing which does not support multi-tenancy or cloud deployments.
* Can be purchased On-Demand  (hourly)
* Can be purchased as a Reservation for up to 70% off the On-Demand price

EC2 Instances Types

<https://aws.amazon.com/ec2/instance-types/>

|  |  |  |
| --- | --- | --- |
| Family | Speciality | Use case |
| F1 | Field Programmable Gate Array | Genomics research, financial analytics, real time video processing, big data etc. |
| I3 | High Speed Storage | NoSQL DBs, Data Wearhousing etc |
| G3 | Graphics Intensive | Video Encoding/ 3D applications Streaming |
| H1 | High Disk Throughput | MapREduce-based workloads, distributed file systems such as HDFS and MapR-FS |
| T2 | Lowest Cost, General Purpose | Web Servers/Small DBs |
| D2 | Dense Storage | Fileservers/Data Warehousing/Hadoop |
| R4 | Memory Optimized | Memory Intensive Apps/DBs |
| M5 | General Purpose | Application Servers |
| C5 | Compute Optimized | CPU Intensive Apps/DBs |
| P3 | Graphics/General Purpose GPU | Machine Learning, Bit Coin Mining etc |
| X1 | Memory Optimized | SAP HANA/Apache etc |

How to remember

* D for Density
* R for RAM
* M - main choice for general purpose apps
* C for Compute
* G - Graphics
* I for IOPS
* F for FPGA
* T cheap general purpose (think T2Micro)
* P - Graphics (think Pics)
* X - Extreme Memory

What is EBS

Amazon EBS allows you to create storage volumes and attach them to Amazon EC2 instances. One attached, you can create a file systemson to pot these volumes, run a database, or use them in any other way you would use a block device. Amazon EBS volumes are placed in a specyfic Availability Zone, where they are automatically replicate to protect you from the failure of a single component.

EBS Volume Types

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSVolumeTypes.html>

* General Purpose SSD (GP2)
  + General purpose, balances both price and performance
  + Ratio of 3 IOPS per GB with up to 10000 IOPS and the ability to burst up to 3000 IOPS for extended periods of time for volumes at 3334 GiB and above.
* Provisioned IOPS SSD (IO1)
  + Designed for I/O intensive applications such as large relationa or NoSQL databases,
  + Use if need more than 10000 IOPS
  + Can provision up to 20000 IOPS per volume
* Throughput Optimized HDD (ST1)
  + Big data
  + Data warehouses
  + Log processing
  + Cannot be a boot volume
* Cold HDD (SC1)
  + Lowest Cost Storage for infrequently accessed workloads
  + File Server
  + Cannot be a boot volume
* Magnetic (Standard)
  + Lowest cost per gigabyte of all EBS volume types that is bootable. Magnetic volumes are ideal for workloads where data is accessed infrequently, and applications where the lowest storage cost is important.

If a Spot instance is terminated by Amazon EC2, you will not be charged for a partial hout of usage. However, if you terminate the instance yourself, you will be charged for the complete hour in which the instance ran.

SSD

* General Purpose SSD - balances price and performance for a wide variety of workloads.
* Provisioned IOPS SSD - Highest - performance SSD volume for mission-critical low-latency or high-throughput workloads

Magnetic

* Throughput Optimized HDD - Low cost HDD volume designed for frequently accessed, throughput-intensive workloads
* Cold HDD - Lowest cost HDD volume designed for less frequently accessed workloads
* Magnetic - Previous Generation. Can be a boot volume.

## 22. EC2 101 - Part 2

What is EBS?

Amazon EBS allows you to create storage volumes and attach them to Amazon EC2 instances. Once attached, you can create a file system on top of these volumes, run a database, or use them in any other way you would use a block device. Amazon EBS volumes are placed in a specific Availability Zone, where they are automatically replicated to protect you from the failure of a single component.

You cannot mount 1 EBS volume to multiple EC2 instances, instead use EFS.

## 23. Launch Our First EC2 Instance - Part 1

sudo su

force update pathes to operating system

yum update -y

Install apache

yum install httpd -y

cd /var/www/html

nano index.html

start apache

service httpd start

go to public IP in your browser <http://52.59.194.100/>

## 24. Launch Our First EC2 Instance - Part 2

Summary

* Termination Protection is turned off by default, you must turn it on
* On a EBC-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated
* EBS Root Volumes of your DEFAULT AMI’s cannot be encrypted. You can also use a third party tool (such as bit locker etc.) to encrypt the root volume, or this can be done when creating AMI’s (lab to follow) in the AWS console or using the API.
* Additional volumes can be encrypted

## 25. How to use Putty (Windows Users Only)

Puttygen (PuTTY Key Generator)

* Load private key from pem file
* Save private key with extension ppk

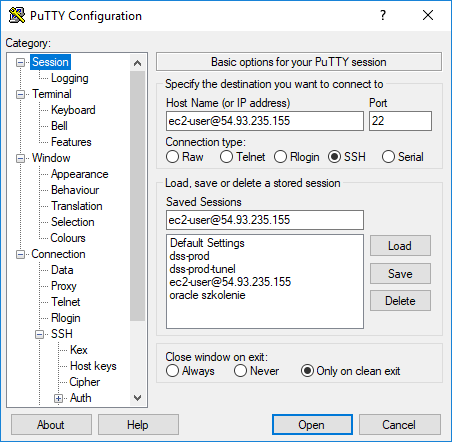
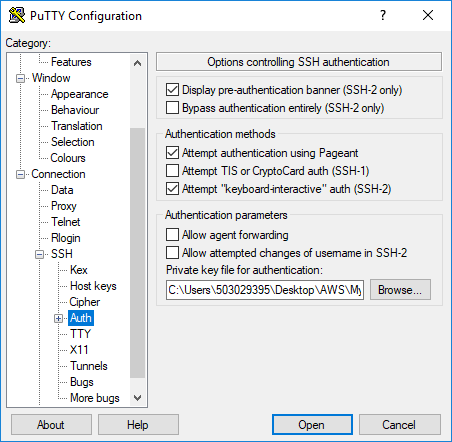
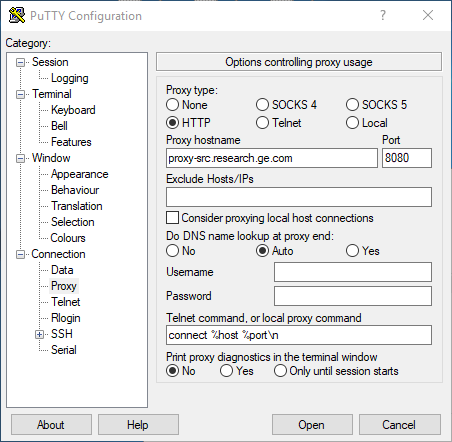
Putty

Hostname: ec2-user@ip

Connection->SSH->Auth: Browse and select private key file with extension ppk

Connection->Proxy:

* Proxy Type: HTTP
* Proxy hostname: proxy-src.research.ge.com
* Port: 8080

## 26. Security Groups

Security group is a Virtual Firewall.

1 instance can have multiple security groups.

Automatyczny start apache

chkconfig httpd on

Reguły w grupach są statefull

Jeżeli ma się gegułę HTTP inbound to domyślnie się ma też taką regułę na outbound nawet jak jej nie widać.

Przy regułach inbound wszystk odomyślnie jest blokowane. Trzeba dopiero to selektywnie odblokowywać.

Manipulacja grupami

Instances: Actions->Networking->Change Security Groups

Można przypisać pare grup do instancji.

Summary

* All Inbound Traffic is Blocked By Default
* All Outbound Traffic is Allowed
* Changes to Security Groups take effect immediately
* You can have aby number of EC2 instances within a security group.
* You can have multiple security groups attached to EC2 Instances
* Security Groups are STATEGUL
  + If you create an inbound rule allowing traffic in, that traffic is automatically allowed back out again.
* You cannot block specific IP address using Security Groups, instead use Network Access Control Lists.
* You can specify allow rules, but not deny rules.

## 27. Upgrading EBS Volume Types – Lab

stop

## 28. EFS - Lab

## 29. The AWS CLI - Using Credentials

## 30. The AWS CLI - Using Roles

## 31. CLI Commands For The Developer Exam

## 32. S3 CLI & Regions

## 33. Bash Scripting

## 34. Installing PHP & Composer

## 35. Using the PHP SDK to access S3

## 36. EC2 Instance Meta-data

## 37. Elastic Load Balancers - Exam Tips

## 38. SDK's - Exam Tips

## 39. Lambda

## 40. Summary of EC2 Section

## Test 3: EC2 Quiz

Podłączenie się przez putty:

ssh ec2-user@52.59.194.100 -i MyEC2KeyPair.pem

z pracy jest jednak problem.

to w git bashu można, tak jak on na maku robi. tylko przy ssh trzeba ominąć proxy, hint od Jurka:

ssh ec2-user@52.59.194.100 -i MyEC2KeyPair.pem -o "ProxyCommand=C:/Program\ Files/Git/mingw64/bin/connect.exe -H <http://proxy-src.research.ge.com:8080/> %h %p"

force update pathes to operating system

yum update -y

Install apache

yum install httpd -y

start apache

service httpd start

Automatyczny start apache

chkconfig httpd on

sudo yum install mysql-server

service mysqld start