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AWS CLOUD FOUNDATION BUILD AUTOMATION – PART 1

Contents

Glossary.....	3
Introduction	4
Single Account Setup	4
Naming Convention	5
Organization Unit.....	6
Resource Type.....	6
Region	6
Environment	6
FB Input.....	7
FB Automation Process	8
FB Automation Steps	9
FB Automation Run.....	10
Reading VPCs	10
Creating VPCs.....	10
Tagging VPCs.....	10
Creating subnets	10
Tagging subnets	12
Creating Internet Gateways.....	13
Creating VPC Route Tables.....	14
Creating VCP Security Groups.....	16
Creating Key Pairs	17
Making Public Subnets.....	18
Launching instances in public subnets.....	19
Tagging launched instances	19
Displaying EC2 Linux instance ssh connection commands	20
Connecting to instances.....	20
Verifying FB creation in AWS Portal.....	24
FB Removal	28
Terminating instances in public subnets	29

AWS Cloud Foundation Build Automation – Part 1

Deleting Key Pairs	32
Deleting VPC Security Groups	32
Deleting Subnets	33
Deleting VPC Route Tables.....	34
Deleting VPC Internet Gateways.....	34
Deleting VPCs	35
Verifying FB removal in AWS Portal	35
Conclusion.....	36

Created on February 28, 2019
Revised on November 26, 2019
Revised on December 3, 2019

AWS Cloud Foundation Build Automation – Part 1

Glossary

Term	Description
AWS	Amazon Web Services
CSP	Cloud Service Provider
FB	Foundation Build
FBA	Foundation Build Automation
VPC	Virtual Private Cloud
IAM	Identity and Access Management
RHEL	Red Hat Enterprise Linux
Centos	Centos Linux Distribution
SMB	Small or Midsize Business
SG	Security Group
NACL	Network Access Control List
IaaS	Infrastructure as a Service
NC	Naming Convention
AZ	Availability Zone
KP	Key Pair
IaC	Internet as Code
CIDR	Classless Inter-Domain Routing

Introduction

AWS is the most popular Cloud Service Provider (CSP) today. It offers a great variety of cloud services from which businesses and organizations can benefit in using AWS to create, store, process, disseminate, and share digital information with a global reach. Since cloud is a completely virtual platform acting as a huge online software system, for many it imposes a steep learning curve and getting used to. One way to ramp up quickly into cloud is to start with building an infrastructure foundation or Foundation Build (FB) in your cloud environment. FB enables you to use and interact with cloud services effectively. In so doing you learn to master your cloud.

FB consists of networking, virtual machines called instances in AWS parlance, and a range of security controls for your cloud to be functional and secure. Without FB your cloud is essentially an empty shell. It takes, however, considerable amount of time to set up FB manually. This article introduces you to FB automation (FBA). With FBA, you can stand up, tear down, and re-create your FB to suite your particular needs easily.

FB includes but not limited to the following:

1. Virtual Private Clouds (VPCs) for production and non-production purposes in one or more regions
2. Subnets in each VPC that are evenly distributed over all Availability Zones (AZs) in a region
3. Security controls in place such as Security Groups (SGs), Key Pairs, Network Access Control Lists (NACLs), and public and private subnets separation
4. IAM users, groups, and roles properly defined for user authentication and authorization
5. Ability to create, delete, and recreate FB constructs for modeling, re-modeling, and optimization
6. Ability to expand FB from a single AWS account to a multi-account organization environment

In this article, we will demonstrate how FBA works and how it can get job done in a matter of an hour or less. We also show you how to build FB with minimum planning input. FBA will help you get off ground and into your cloud in a smooth and speedy manner.

Single Account Setup

AWS allows a customer to have one or more AWS accounts to use AWS cloud services. When the customer has signed up AWS with only one AWS account, he is in Single Account Setup. Cost management and billing involves one account only. Multi-account Setup applies when the customer needs to have more than one AWS accounts to dedicate to different parts of his business and yet still wants to maintain a certain degree of integration across his accounts. Cost management and billing can be consolidated from those accounts. Organization is the logical entity that links up multiple accounts together. Obviously, Multi-Account Organization Setup is much more complex than Single Account Setup. In this article, we focus on Single Account Setup. We discuss Multi-Account Organization Setup in a separate article.

AWS Cloud Foundation Build Automation – Part 1

Single Account Setup requires a certain amount of preparation. In the preparation user needs to go through the following four steps to get things in place, in order and ready:

1. Sign up with AWS by creating an AWS account, log in the account. The account used to login is called master account or root account. Make sure the account name, alias, and other attributes are set to your liking, record the account ID for future use.
2. When in Master Account, create an IAM user account with Administrator privileges. This IAM account is your non-master/non-root admin account. Make sure you have given both Console (AWS Portal) access and API access to the account when creating it. Record the account API access key and secret key for future use
3. On your premise, select a Linux system, for instance, a RHEL or Centos virtual machine (VM) with Internet access. In that system, create a user account and name it appropriately to indicate that it is the counterpart account for your AWS non-root admin account that you set up in Step 2. You use this on-premise counterpart account to access AWS cloud with your AWS non-root account credentials to run AWS API, including AWS CLI
4. Download, install, upgrade, if required, and configure AWS CLI in your on-premise account. AWS CLI configuration asks you to enter your non-root admin account access key and secret key that you recorded in Step 2. After configuration, test and verify that you can execute AWS CLI commands in your AWS cloud space without issues from your on-premise account.

Table 1 shows an example of what you should have after completing your single account setup as describe above.

Table 1 - Single Account Setup Example

AWS Account Name	AWS Account ID	AWS IAM Admin Account Name	Your VM account name	Your AWS CLI version
DSL	123456789012	dsladmin	awsdslcadmin	AWS CLI 1.16.106/Python 3.7.2

Naming Convention

FB generates numerous constructs in your AWS space. Before starting FB, it is critical to draw up a right naming convention (NC) to go by in naming, identifying, and governing those objects. Your NC applies to all subsequent objects that you will add in future. In this demo, a location based NC is adopted. FB depends on this NC for automation.

This location-based NC starts with five (5) basic elements. See Table 2 below as an example

Table 2 – Example of NC basic elements

Organization Unit	Resource Type	Region	Environment	Numeric Suffix
ret	vpc	us-east-1	Dev	01
whs	vpc	us-west-1	Prd	01

A brief explanation of each element follows.

AWS Cloud Foundation Build Automation – Part 1

Organization Unit

This is a three-letter designation for a unit in your company. The unit can be a department, an operation group, a team, a branch office, or an LOB (line of business), etc. In the example, “ret” stands for “Retail”; “whs” stands for Wholesale.

Resource Type

This is a three-letter designation for a particular type of resource in AWS cloud. In this example, “vpc” stands for Virtual Private Cloud. Other possible designations are “s3b” for S3 buckets, “rds” for Relational Database Service, and “eks” for Kubernetes/Docker/Container cluster, just name a few.

Region

AWS provides cloud services in dozens of geographic regions around the world. A four-letter designation is set up for AWS region. In Table 3 below, each NC region code corresponds to an AWS region.

Table 3 – AWS Regions

NC region code	Region	Region Name	Country/Continent
use1	us-east-1	N. Virginia	US
use2	us-east-2	Ohio	US
usw1	us-west-1	N. California	US
usw2	us-west-2	Oregon	US
apa1	ap-south-1	Mumbai	Asia Pacific
apa2	ap-northeast-1	Tokyo	Asia Pacific
apa3	ap-northeast-2	Seoul	Asia Pacific
apa5	ap-southeast-1	Singapore	Asia Pacific
apa6	ap-southeast-2	Sydney	Asia Pacific
cac1	ca-central-1	Canada	Canada
euc1	eu-central-1	Frankfurt	Europe
euw1	eu-west-1	Ireland	Europe
euw2	eu-west-2	London	Europe
euw3	eu-west-3	Paris	Europe
eun1	eu-north-1	Stockholm	Europe
sae1	sa-east-1	Sao Paulo	South America

Environment

This is a three-letter designation that indicates a dedicated IT environment

Table 4 - Environment

Environment	Description
dev	Development
prd	Production
uat	User Acceptance Testing
lab	Lab

AWS Cloud Foundation Build Automation – Part 1

stg	Staging
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FB Input

As it was mentioned at the beginning of this section, FB automation depends on NC. In other words, NC drives FB automation. See a simple example of required input for FB automation in Table 5 below. This input will guide FB automation from the beginning through the end, creating, naming, and identifying all objects in a mnemonic way to facilitate IaC (Internet as Code) down the road.

Table 5 – FB Input example

VPC	CIDR	Comment
ret-vpc-use1-dev-01	10.10.0.0/16	Retail VPC for Development in N. Virginia region
ret-vpc-use1-prd-01	10.12.0.0/16	Retail VPC for Production in N. Virginia region
ret-vpc-use2-dev-01	10.14.0.0/16	Retail VPC for Development in Ohio region
ret-vpc-use2-prd-01	10.16.0.0/16	Retail VPC for Production in Ohio region
whs-vpc-use1-dev-01	10.11.0.0/16	Wholesale VPC for Development in N. Virginia region
whs-vpc-use1-prd-01	10.13.0.0/16	Wholesale VPC for Production in N. Virginia region
whs-vpc-use2-dev-01	10.15.0.0/16	Wholesale VPC for Development in Ohio region
whs-vpc-use2-prd-01	10.17.0.0/16	Wholesale VPC for Production in Ohio region

Example of FB input in text file format:

ret-vpc-use1-dev-01	10.10.0.0/16	1	1
ret-vpc-use1-prd-01	10.12.0.0/16	1	1
ret-vpc-use2-dev-01	10.14.0.0/16	1	1
ret-vpc-use2-prd-01	10.16.0.0/16	1	1
whs-vpc-use1-dev-01	10.11.0.0/16	1	1
whs-vpc-use1-prd-01	10.13.0.0/16	1	1
whs-vpc-use2-dev-01	10.15.0.0/16	1	1
whs-vpc-use2-prd-01	10.17.0.0/16	1	1

In the example above, the files contains lines. Each line has four fields, delimited by white space or tab

Field 1 – VPC name

Field 2 – VPC CIDR

Field 3 – Number of instances to create in each subnet

Field 4 – Number of subnets to create in each Availability Zone (AZ)

This very simple input instructs FB automation process to make a rather sophisticated delivery by creating the following

1. Four VPCs for Retail
2. Four VPCs for Wholesale
3. One Retail VPC for Dev is in N. Virginia region
4. One Retail VPC for Prod is in N. Virginia region
5. One Retail VPC for Dev is in Ohio region
6. One Retail VPC for Prod is in Ohio region

AWS Cloud Foundation Build Automation – Part 1

7. One Wholesale VPC for Dev is in N. Virginia region
8. One Wholesale VPC for Prod is in N. Virginia region
9. One Wholesale VPC for Dev is in Ohio region
10. One Wholesale VPC for Prod is in Ohio region
11. In each VPC, a number of subnets are created, and distributed over multiple AZs in the region.
12. If Field 4 is 1, the number of subnets equals the number of AZs in the region. For instance, Ohio region (use2) has three (3) AZs, and three subnets will be created, with one subnet in one AZ.
13. If Field 4 is 2, the number of subnets is 2 times the number of AZs, with 2 subnets in each AZ, and so on and so forth.
14. Of the subnets, the one(s) in the last AZ are public subnets. The rest are all private subnets.
15. If Field 3 is 1, 1 instance is created in each subnet. If Field 3 is 2, 2 instances are created in each subnet, and so on and so forth.
16. Security Groups (SGs) are created and attached to instances
17. Key Pairs are created for SSH access to instances
18. Systems Manager endpoints are created for all instances automatically registered in Systems Manager's Inventory

The simple input delivers a complex output.

FB automation can save SMB tremendous amount of time and energy that it has to spend otherwise in planning for and building up a highly desirable IaaS infrastructure in AWS with security, quality, and complexity to meet various needs.

FB Automation Process

FB automation is coded in an executable program, using AWS CLI commands. The program takes multiple options, which reflect the automation steps.

```
[awsdsllcadmin@linux721 ~]$ t1 help
Usage: /home/awsdsllcadmin/bin/t1 [option]
Valid options:
To create
  CreateConstructs
  ReadVPCs
  CreateVPCs
  TagVPCs
  CreateSubnets
  TagSubnets
  CreateVPCIGWs
  CreateVPCRouteTables
  CreateVPCSGs
  CreateKeyPairs
  MakePublicSubnets
  LaunchInstances
  TagInstances
  CheckInstances
```

To delete

```
DeleteConstructs
TerminateInstances
DeleteKeyPairs
DeleteVPCSGs
DeleteVPCRouteTables
DeleteVPCIGWs
DeleteSubnets
DeleteVPCs
```

```
[awsdsllcadmin@linux721 ~]$
```

FB Automation Steps

Specifically, the important FB steps are:

1. Reading user requirement (ReadVPCs) – FB reads and interprets the user requirement in preparation to launch automation
2. Creating VPCs (CreateVPCs) – Default maximum number of VPCs in a region is 5. FB stays within this default limit when creating VPCs
3. Tagging VPCs (TagVPCs) – Naming VPCs per NC
4. Creating subnets in each VPC – FB creates multiple subnets in VPC. The number of subnets corresponds to the number of AZs in the region where VPC is located.
5. Tagging subnets (TagSubnets) – Naming subnets per NC
6. Creating VPC Internet Gateways (CreateVPCIGWs) – Tagging is included in this step
7. Creating VPC Route Tables (CreateVPCRouteTables) – Tagging is included in this step
8. Creating VPC Security Groups (SGs) (CreateVPCSGs) – FB creates three SGs for each VPC, one for remote access that permits SSH for EC2 Linux instance access, and RDP for EC2 Windows instance access; one for web access that allows HTTP and HTTPS ingress traffic to VPC; the third one is for database access, permitting ingress traffic to the instances running in VPC to Oracle, Microsoft SQL Server, MySQL, and PostgreSQL. Each SG can be revised to suite more granular security controls
9. Creating Key Pairs to be used to access Linux instances (CreateKeyPairs) – FB creates key pairs (KPs) per VPC, though key pairs are scoped by region. The FB does it this way is to place more security than otherwise. Since VPCs are assigned to various environments, such as Development and Production. By limiting KP scope to VPC, developers who have access to instances running in Development VPCs may not have access to Production VPCs, and vice versa for Operators with access Production who are prevented from accessing Development.
10. Making selected subnets public subnets (MakePublicSubnets) – FB configures selected subnets to allow certain access from Internet
11. Launching instances in public subnets (LaunchInstances) – FB launches one instance in each public subnet
12. Tagging launched instances (TagInstances) – FB tags the launched instances per NC
13. Checking the state of launched instances – FB polls the state of the launched instances till the instances passed two checks and are running normally. FB then displays instance ssh connection commands on the screen to facilitate login

FB Automation Run

To create FB automatically, simply run this command:
[awsdsllcadmin@linux721 ~]\$ t1 CreateConstructs

Reading VPCs

```
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3
```

Creating VPCs

```
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7
```

Tagging VPCs

Creating subnets

```
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-07547a838202c336c us-
east-1a 10.10.0.0/24
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-023e5bbebbc4fd10a us-
east-1b 10.10.1.0/24
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-086aee61f7263d637 us-
east-1c 10.10.2.0/24
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-07318edb378ca6f67 us-
east-1d 10.10.3.0/24
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-09e92f92c0f746531 us-
east-1e 10.10.4.0/24
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-0defa327929e500c5 us-
east-1f 10.10.5.0/24
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-016cc08155744ab0b us-
east-1a 10.12.0.0/24
```

AWS Cloud Foundation Build Automation – Part 1

ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-071a725ebac36a7aa us-east-1b 10.12.1.0/24
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0d0035e6f6fba10eb us-east-1c 10.12.2.0/24
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0653878e5cb44d885 us-east-1d 10.12.3.0/24
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0f5e1257671be456a us-east-1e 10.12.4.0/24
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-05efc54a7a2481464 us-east-1f 10.12.5.0/24
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-0b83644f42d4a335a us-east-2a 10.14.0.0/24
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-00fd7e24217df32bb us-east-2b 10.14.1.0/24
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-0362e8e4a2c703d21 us-east-2c 10.14.2.0/24
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-099ebec47677ce82e us-east-2a 10.16.0.0/24
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-0d8bba86a32c539b9 us-east-2b 10.16.1.0/24
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-02676fe4cc68cc076 us-east-2c 10.16.2.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0e7924708b5170d55 us-east-1a 10.11.0.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-095741a8d2e8485f0 us-east-1b 10.11.1.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0aa8ff605cb124d8c us-east-1c 10.11.2.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-09f01d094be632a1c us-east-1d 10.11.3.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0b53d59914d56e5cf us-east-1e 10.11.4.0/24
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0c2f9d240bdd06347 us-east-1f 10.11.5.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-00f20f451d4c4e0b2 us-east-1a 10.13.0.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-041c7321b422c3e13 us-east-1b 10.13.1.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-03848993753fc7d38 us-east-1c 10.13.2.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-0fb6170eabcf35ac4 us-east-1d 10.13.3.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-08732b9b9836f9132 us-east-1e 10.13.4.0/24
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-00282bc317559b870 us-east-1f 10.13.5.0/24
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-074162395c8f30a2d us-east-2a 10.15.0.0/24

AWS Cloud Foundation Build Automation – Part 1

whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-0d22d366b97251d9e us-east-2b 10.15.1.0/24
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-09930bdf9f414a16b us-east-2c 10.15.2.0/24
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-0484efc9c4ff180c0 us-east-2a 10.17.0.0/24
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-03b4020c38b7f820c us-east-2b 10.17.1.0/24
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-07f4a116a6609f07e us-east-2c 10.17.2.0/24

Tagging subnets

ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-07547a838202c336c us-east-1a 10.10.0.0/24 ret-vpc-use1-dev-01-a-sn000
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-023e5bbebbc4fd10a us-east-1b 10.10.1.0/24 ret-vpc-use1-dev-01-b-sn000
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-086aee61f7263d637 us-east-1c 10.10.2.0/24 ret-vpc-use1-dev-01-c-sn000
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-07318edb378ca6f67 us-east-1d 10.10.3.0/24 ret-vpc-use1-dev-01-d-sn000
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-09e92f92c0f746531 us-east-1e 10.10.4.0/24 ret-vpc-use1-dev-01-e-sn000
ret-vpc-use1-dev-01 10.10.0.0/16 us-east-1 6 vpc-006b7736bb15f3ef2 subnet-0defa327929e500c5 us-east-1f 10.10.5.0/24 ret-vpc-use1-dev-01-f-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-016cc08155744ab0b us-east-1a 10.12.0.0/24 ret-vpc-use1-prd-01-a-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-071a725ebac36a7aa us-east-1b 10.12.1.0/24 ret-vpc-use1-prd-01-b-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0d0035e6f6fba10eb us-east-1c 10.12.2.0/24 ret-vpc-use1-prd-01-c-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0653878e5cb44d885 us-east-1d 10.12.3.0/24 ret-vpc-use1-prd-01-d-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-0f5e1257671be456a us-east-1e 10.12.4.0/24 ret-vpc-use1-prd-01-e-sn000
ret-vpc-use1-prd-01 10.12.0.0/16 us-east-1 6 vpc-092757791ff4f8c53 subnet-05efc54a7a2481464 us-east-1f 10.12.5.0/24 ret-vpc-use1-prd-01-f-sn000
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-0b83644f42d4a335a us-east-2a 10.14.0.0/24 ret-vpc-use2-dev-01-a-sn000
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-00fd7e24217df32bb us-east-2b 10.14.1.0/24 ret-vpc-use2-dev-01-b-sn000
ret-vpc-use2-dev-01 10.14.0.0/16 us-east-2 3 vpc-072f6cb31eceb356d subnet-0362e8e4a2c703d21 us-east-2c 10.14.2.0/24 ret-vpc-use2-dev-01-c-sn000
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-099ebec47677ce82e us-east-2a 10.16.0.0/24 ret-vpc-use2-prd-01-a-sn000
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-0d8bba86a32c539b9 us-east-2b 10.16.1.0/24 ret-vpc-use2-prd-01-b-sn000

```
ret-vpc-use2-prd-01 10.16.0.0/16 us-east-2 3 vpc-0cc3840b608a13cd0 subnet-02676fe4cc68cc076 us-
east-2c 10.16.2.0/24 ret-vpc-use2-prd-01-c-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0e7924708b5170d55
us-east-1a 10.11.0.0/24 whs-vpc-use1-dev-01-a-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-095741a8d2e8485f0 us-
east-1b 10.11.1.0/24 whs-vpc-use1-dev-01-b-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0aa8ff605cb124d8c us-
east-1c 10.11.2.0/24 whs-vpc-use1-dev-01-c-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-09f01d094be632a1c us-
east-1d 10.11.3.0/24 whs-vpc-use1-dev-01-d-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0b53d59914d56e5cf us-
east-1e 10.11.4.0/24 whs-vpc-use1-dev-01-e-sn000
whs-vpc-use1-dev-01 10.11.0.0/16 us-east-1 6 vpc-0ea6d4d20c96e57ce subnet-0c2f9d240bdd06347 us-
east-1f 10.11.5.0/24 whs-vpc-use1-dev-01-f-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-00f20f451d4c4e0b2 us-
east-1a 10.13.0.0/24 whs-vpc-use1-prd-01-a-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-041c7321b422c3e13
us-east-1b 10.13.1.0/24 whs-vpc-use1-prd-01-b-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-03848993753fc7d38 us-
east-1c 10.13.2.0/24 whs-vpc-use1-prd-01-c-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-0fb6170eabcf35ac4 us-
east-1d 10.13.3.0/24 whs-vpc-use1-prd-01-d-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-08732b9b9836f9132
us-east-1e 10.13.4.0/24 whs-vpc-use1-prd-01-e-sn000
whs-vpc-use1-prd-01 10.13.0.0/16 us-east-1 6 vpc-027033927d9d2d785 subnet-00282bc317559b870
us-east-1f 10.13.5.0/24 whs-vpc-use1-prd-01-f-sn000
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-074162395c8f30a2d us-
east-2a 10.15.0.0/24 whs-vpc-use2-dev-01-a-sn000
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-0d22d366b97251d9e us-
east-2b 10.15.1.0/24 whs-vpc-use2-dev-01-b-sn000
whs-vpc-use2-dev-01 10.15.0.0/16 us-east-2 3 vpc-06f5a908f92f5a65a subnet-09930bdf9f414a16b us-
east-2c 10.15.2.0/24 whs-vpc-use2-dev-01-c-sn000
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-0484efc9c4ff180c0 us-
east-2a 10.17.0.0/24 whs-vpc-use2-prd-01-a-sn000
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-03b4020c38b7f820c us-
east-2b 10.17.1.0/24 whs-vpc-use2-prd-01-b-sn000
whs-vpc-use2-prd-01 10.17.0.0/16 us-east-2 3 vpc-0e7b331700dce4da7 subnet-07f4a116a6609f07e us-
east-2c 10.17.2.0/24 whs-vpc-use2-prd-01-c-sn000
```

Creating Internet Gateways

```
aws --region us-east-1 ec2 create-internet-gateway
aws --region us-east-1 ec2 create-tags --resources igw-09fd100a901f417f3 --tags Key=Name,Value=ret-
vpc-use1-dev-01-igw
aws --region us-east-1 ec2 attach-internet-gateway --vpc-id vpc-006b7736bb15f3ef2 --internet-gateway
igw-09fd100a901f417f3
aws --region us-east-1 ec2 create-internet-gateway
```

AWS Cloud Foundation Build Automation – Part 1

```
aws --region us-east-1 ec2 create-tags --resources igw-0ba058d0289406f23 --tags Key=Name,Value=ret-  
vpc-use1-prd-01-igw  
aws --region us-east-1 ec2 attach-internet-gateway --vpc-id vpc-092757791ff4f8c53 --internet-gateway  
igw-0ba058d0289406f23  
aws --region us-east-2 ec2 create-internet-gateway  
aws --region us-east-2 ec2 create-tags --resources igw-0de3025821ed9f3f1 --tags Key=Name,Value=ret-  
vpc-use2-dev-01-igw  
aws --region us-east-2 ec2 attach-internet-gateway --vpc-id vpc-072f6cb31eceb356d --internet-gateway  
igw-0de3025821ed9f3f1  
aws --region us-east-2 ec2 create-internet-gateway  
aws --region us-east-2 ec2 create-tags --resources igw-0789249c8b244bf9f --tags Key=Name,Value=ret-  
vpc-use2-prd-01-igw  
aws --region us-east-2 ec2 attach-internet-gateway --vpc-id vpc-0cc3840b608a13cd0 --internet-gateway  
igw-0789249c8b244bf9f  
aws --region us-east-1 ec2 create-internet-gateway  
aws --region us-east-1 ec2 create-tags --resources igw-09978af3aae1241dd --tags  
Key=Name,Value=whs-vpc-use1-dev-01-igw  
aws --region us-east-1 ec2 attach-internet-gateway --vpc-id vpc-0ea6d4d20c96e57ce --internet-gateway  
igw-09978af3aae1241dd  
aws --region us-east-1 ec2 create-internet-gateway  
aws --region us-east-1 ec2 create-tags --resources igw-0edc0ac3a03c46ba0 --tags  
Key=Name,Value=whs-vpc-use1-prd-01-igw  
aws --region us-east-1 ec2 attach-internet-gateway --vpc-id vpc-027033927d9d2d785 --internet-  
gateway igw-0edc0ac3a03c46ba0  
aws --region us-east-2 ec2 create-internet-gateway  
aws --region us-east-2 ec2 create-tags --resources igw-0fd386810ee0105a9 --tags  
Key=Name,Value=whs-vpc-use2-dev-01-igw  
aws --region us-east-2 ec2 attach-internet-gateway --vpc-id vpc-06f5a908f92f5a65a --internet-gateway  
igw-0fd386810ee0105a9  
aws --region us-east-2 ec2 create-internet-gateway  
aws --region us-east-2 ec2 create-tags --resources igw-04b7f9a6476c03b24 --tags  
Key=Name,Value=whs-vpc-use2-prd-01-igw  
aws --region us-east-2 ec2 attach-internet-gateway --vpc-id vpc-0e7b331700dce4da7 --internet-gateway  
igw-04b7f9a6476c03b24
```

Creating VPC Route Tables

```
aws --region us-east-1 ec2 create-route-table --vpc-id vpc-006b7736bb15f3ef2  
aws --region us-east-1 ec2 create-tags --resources rtb-0fc28defbd524fba1 --tags Key=Name,Value=ret-  
vpc-use1-dev-01-rtb  
aws --region us-east-1 ec2 create-route --route-table-id rtb-0fc28defbd524fba1 --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-09fd100a901f417f3  
{  
  "Return": true  
}  
aws --region us-east-1 ec2 create-route-table --vpc-id vpc-092757791ff4f8c53
```

AWS Cloud Foundation Build Automation – Part 1

```
aws --region us-east-1 ec2 create-tags --resources rtb-0680baba728d98093 --tags Key=Name,Value=ret-  
vpc-use1-prd-01-rtb  
aws --region us-east-1 ec2 create-route --route-table-id rtb-0680baba728d98093 --destination-cidr-  
block 0.0.0.0/0 --gateway-id igw-0ba058d0289406f23  
{  
  "Return": true  
}  
aws --region us-east-2 ec2 create-route-table --vpc-id vpc-072f6cb31eceb356d  
aws --region us-east-2 ec2 create-tags --resources rtb-0aea04f9f05b5ad26 --tags Key=Name,Value=ret-  
vpc-use2-dev-01-rtb  
aws --region us-east-2 ec2 create-route --route-table-id rtb-0aea04f9f05b5ad26 --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-0de3025821ed9f3f1  
{  
  "Return": true  
}  
aws --region us-east-2 ec2 create-route-table --vpc-id vpc-0cc3840b608a13cd0  
aws --region us-east-2 ec2 create-tags --resources rtb-0fb95a92dbdcfcbecc --tags Key=Name,Value=ret-  
vpc-use2-prd-01-rtb  
aws --region us-east-2 ec2 create-route --route-table-id rtb-0fb95a92dbdcfcbecc --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-0789249c8b244bf9f  
{  
  "Return": true  
}  
aws --region us-east-1 ec2 create-route-table --vpc-id vpc-0ea6d4d20c96e57ce  
aws --region us-east-1 ec2 create-tags --resources rtb-089bd7b74f4760dc8 --tags Key=Name,Value=whs-  
vpc-use1-dev-01-rtb  
aws --region us-east-1 ec2 create-route --route-table-id rtb-089bd7b74f4760dc8 --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-09978af3aae1241dd  
{  
  "Return": true  
}  
aws --region us-east-1 ec2 create-route-table --vpc-id vpc-027033927d9d2d785  
aws --region us-east-1 ec2 create-tags --resources rtb-0f17c6bc2b9e06d35 --tags Key=Name,Value=whs-  
vpc-use1-prd-01-rtb  
aws --region us-east-1 ec2 create-route --route-table-id rtb-0f17c6bc2b9e06d35 --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-0edc0ac3a03c46ba0  
{  
  "Return": true  
}  
aws --region us-east-2 ec2 create-route-table --vpc-id vpc-06f5a908f92f5a65a  
aws --region us-east-2 ec2 create-tags --resources rtb-053ffa00f8080f83e --tags Key=Name,Value=whs-  
vpc-use2-dev-01-rtb  
aws --region us-east-2 ec2 create-route --route-table-id rtb-053ffa00f8080f83e --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-0fd386810ee0105a9  
{  
  "Return": true  
}  
aws --region us-east-2 ec2 create-route-table --vpc-id vpc-0e7b331700dce4da7
```

```
aws --region us-east-2 ec2 create-tags --resources rtb-0a28f38700238dc4e --tags Key=Name,Value=whs-  
vpc-use2-prd-01-rtb  
aws --region us-east-2 ec2 create-route --route-table-id rtb-0a28f38700238dc4e --destination-cidr-block  
0.0.0.0/0 --gateway-id igw-04b7f9a6476c03b24  
{  
  "Return": true  
}
```

Creating VCP Security Groups

Creating SG for remote access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-dev-01-sg-remote --  
description ret-vpc-use1-dev-01-sg-remote --vpc-id vpc-006b7736bb15f3ef2
```

Creating SG for web access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-dev-01-sg-web --  
description ret-vpc-use1-dev-01-sg-web --vpc-id vpc-006b7736bb15f3ef2
```

Creating SG for database access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-dev-01-sg-dbs --description  
ret-vpc-use1-dev-01-sg-dbs --vpc-id vpc-006b7736bb15f3ef2
```

Creating SG for remote access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-prd-01-sg-remote --  
description ret-vpc-use1-prd-01-sg-remote --vpc-id vpc-092757791ff4f8c53
```

Creating SG for web access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-prd-01-sg-web --description  
ret-vpc-use1-prd-01-sg-web --vpc-id vpc-092757791ff4f8c53
```

Creating SG for database access

```
aws --region us-east-1 ec2 create-security-group --group-name ret-vpc-use1-prd-01-sg-dbs --description  
ret-vpc-use1-prd-01-sg-dbs --vpc-id vpc-092757791ff4f8c53
```

Creating SG for remote access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-dev-01-sg-remote --  
description ret-vpc-use2-dev-01-sg-remote --vpc-id vpc-072f6cb31eceb356d
```

Creating SG for web access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-dev-01-sg-web --  
description ret-vpc-use2-dev-01-sg-web --vpc-id vpc-072f6cb31eceb356d
```

Creating SG for database access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-dev-01-sg-dbs --description  
ret-vpc-use2-dev-01-sg-dbs --vpc-id vpc-072f6cb31eceb356d
```

Creating SG for remote access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-prd-01-sg-remote --  
description ret-vpc-use2-prd-01-sg-remote --vpc-id vpc-0cc3840b608a13cd0
```

Creating SG for web access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-prd-01-sg-web --description  
ret-vpc-use2-prd-01-sg-web --vpc-id vpc-0cc3840b608a13cd0
```

Creating SG for database access

```
aws --region us-east-2 ec2 create-security-group --group-name ret-vpc-use2-prd-01-sg-dbs --description  
ret-vpc-use2-prd-01-sg-dbs --vpc-id vpc-0cc3840b608a13cd0
```

Creating SG for remote access

AWS Cloud Foundation Build Automation – Part 1

```
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-dev-01-sg-remote --
description whs-vpc-use1-dev-01-sg-remote --vpc-id vpc-0ea6d4d20c96e57ce
Creating SG for web access
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-dev-01-sg-web --
description whs-vpc-use1-dev-01-sg-web --vpc-id vpc-0ea6d4d20c96e57ce
Creating SG for database access
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-dev-01-sg-dbs --
description whs-vpc-use1-dev-01-sg-dbs --vpc-id vpc-0ea6d4d20c96e57ce
Creating SG for remote access
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-prd-01-sg-remote --
description whs-vpc-use1-prd-01-sg-remote --vpc-id vpc-027033927d9d2d785
Creating SG for web access
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-prd-01-sg-web --
description whs-vpc-use1-prd-01-sg-web --vpc-id vpc-027033927d9d2d785
Creating SG for database access
aws --region us-east-1 ec2 create-security-group --group-name whs-vpc-use1-prd-01-sg-dbs --
description whs-vpc-use1-prd-01-sg-dbs --vpc-id vpc-027033927d9d2d785
Creating SG for remote access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-dev-01-sg-remote --
description whs-vpc-use2-dev-01-sg-remote --vpc-id vpc-06f5a908f92f5a65a
Creating SG for web access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-dev-01-sg-web --
description whs-vpc-use2-dev-01-sg-web --vpc-id vpc-06f5a908f92f5a65a
Creating SG for database access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-dev-01-sg-dbs --
description whs-vpc-use2-dev-01-sg-dbs --vpc-id vpc-06f5a908f92f5a65a
Creating SG for remote access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-prd-01-sg-remote --
description whs-vpc-use2-prd-01-sg-remote --vpc-id vpc-0e7b331700dce4da7
Creating SG for web access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-prd-01-sg-web --
description whs-vpc-use2-prd-01-sg-web --vpc-id vpc-0e7b331700dce4da7
Creating SG for database access
aws --region us-east-2 ec2 create-security-group --group-name whs-vpc-use2-prd-01-sg-dbs --
description whs-vpc-use2-prd-01-sg-dbs --vpc-id vpc-0e7b331700dce4da7
```

Creating Key Pairs

```
aws --region us-east-1 create-key-pair --key-name ret-vpc-use1-dev-01-keypair
aws --region us-east-1 create-key-pair --key-name ret-vpc-use1-prd-01-keypair
aws --region us-east-2 create-key-pair --key-name ret-vpc-use2-dev-01-keypair
aws --region us-east-2 create-key-pair --key-name ret-vpc-use2-prd-01-keypair
aws --region us-east-1 create-key-pair --key-name whs-vpc-use1-dev-01-keypair
aws --region us-east-1 create-key-pair --key-name whs-vpc-use1-prd-01-keypair
aws --region us-east-2 create-key-pair --key-name whs-vpc-use2-dev-01-keypair
aws --region us-east-2 create-key-pair --key-name whs-vpc-use2-prd-01-keypair
```

Making Public Subnets

```
aws --region us-east-1 ec2 associate-route-table --subnet-id subnet-0defa327929e500c5 --route-table-id
rtb-0fc28defbd524fba1
{
  "AssociationId": "rtbassoc-00bf59a9895013233"
}
aws --region us-east-1 ec2 modify-subnet-attribute --subnet-id subnet-0defa327929e500c5 --map-
public-ip-on-launch
aws --region us-east-1 ec2 associate-route-table --subnet-id subnet-05efc54a7a2481464 --route-table-id
rtb-0680baba728d98093
{
  "AssociationId": "rtbassoc-0eae967f8ca3fc3b4"
}
aws --region us-east-1 ec2 modify-subnet-attribute --subnet-id subnet-05efc54a7a2481464 --map-
public-ip-on-launch
aws --region us-east-2 ec2 associate-route-table --subnet-id subnet-0362e8e4a2c703d21 --route-table-
id rtb-0aea04f9f05b5ad26
{
  "AssociationId": "rtbassoc-0ce34c6a3941756c8"
}
aws --region us-east-2 ec2 modify-subnet-attribute --subnet-id subnet-0362e8e4a2c703d21 --map-
public-ip-on-launch
aws --region us-east-2 ec2 associate-route-table --subnet-id subnet-02676fe4cc68cc076 --route-table-id
rtb-0fb95a92dbdcfcbec
{
  "AssociationId": "rtbassoc-09ed239a1e9d3abd1"
}
aws --region us-east-2 ec2 modify-subnet-attribute --subnet-id subnet-02676fe4cc68cc076 --map-public-
ip-on-launch
aws --region us-east-1 ec2 associate-route-table --subnet-id subnet-0c2f9d240bdd06347 --route-table-id
rtb-089bd7b74f4760dc8
{
  "AssociationId": "rtbassoc-035b696275e5a3686"
}
aws --region us-east-1 ec2 modify-subnet-attribute --subnet-id subnet-0c2f9d240bdd06347 --map-
public-ip-on-launch
aws --region us-east-1 ec2 associate-route-table --subnet-id subnet-00282bc317559b870 --route-table-
id rtb-0f17c6bc2b9e06d35
{
  "AssociationId": "rtbassoc-0b20a04224f6fbc07"
}
aws --region us-east-1 ec2 modify-subnet-attribute --subnet-id subnet-00282bc317559b870 --map-
public-ip-on-launch
aws --region us-east-2 ec2 associate-route-table --subnet-id subnet-09930bdf9f414a16b --route-table-id
rtb-053ffa00f8080f83e
{
  "AssociationId": "rtbassoc-0a4aa2a07cd8558fe"
```

```
}  
aws --region us-east-2 ec2 modify-subnet-attribute --subnet-id subnet-09930bdf9f414a16b --map-  
public-ip-on-launch  
aws --region us-east-2 ec2 associate-route-table --subnet-id subnet-07f4a116a6609f07e --route-table-id  
rtb-0a28f38700238dc4e  
{  
  "AssociationId": "rtbassoc-0ba0b453161909ce7"  
}  
aws --region us-east-2 ec2 modify-subnet-attribute --subnet-id subnet-07f4a116a6609f07e --map-  
public-ip-on-launch
```

Launching instances in public subnets

```
aws --region us-east-1 ec2 run-instances --image-id ami-0080e4c5bc078760e --count 1 --instance-type  
t2.micro --key-name ret-vpc-use1-dev-01-keypair --security-group-ids sg-025c32144119efc8b --subnet-  
id subnet-0defa327929e500c5  
aws --region us-east-1 ec2 run-instances --image-id ami-0080e4c5bc078760e --count 1 --instance-type  
t2.micro --key-name ret-vpc-use1-prd-01-keypair --security-group-ids sg-03a8c0cff1064eac5 --subnet-id  
subnet-05efc54a7a2481464  
aws --region us-east-2 ec2 run-instances --image-id ami-0cd3dfa4e37921605 --count 1 --instance-type  
t2.micro --key-name ret-vpc-use2-dev-01-keypair --security-group-ids sg-0e5927c477012f167 --subnet-  
id subnet-0362e8e4a2c703d21  
aws --region us-east-2 ec2 run-instances --image-id ami-0cd3dfa4e37921605 --count 1 --instance-type  
t2.micro --key-name ret-vpc-use2-prd-01-keypair --security-group-ids sg-0cd64b5c0c97bcc98 --subnet-id  
subnet-02676fe4cc68cc076  
aws --region us-east-1 ec2 run-instances --image-id ami-0080e4c5bc078760e --count 1 --instance-type  
t2.micro --key-name whs-vpc-use1-dev-01-keypair --security-group-ids sg-0ed04fbe8ecf4e03a --subnet-  
id subnet-0c2f9d240bdd06347  
aws --region us-east-1 ec2 run-instances --image-id ami-0080e4c5bc078760e --count 1 --instance-type  
t2.micro --key-name whs-vpc-use1-prd-01-keypair --security-group-ids sg-0ae5bd39c8c9baa34 --subnet-  
id subnet-00282bc317559b870  
aws --region us-east-2 ec2 run-instances --image-id ami-0cd3dfa4e37921605 --count 1 --instance-type  
t2.micro --key-name whs-vpc-use2-dev-01-keypair --security-group-ids sg-061b765f3ac0376f3 --subnet-  
id subnet-09930bdf9f414a16b  
aws --region us-east-2 ec2 run-instances --image-id ami-0cd3dfa4e37921605 --count 1 --instance-type  
t2.micro --key-name whs-vpc-use2-prd-01-keypair --security-group-ids sg-0c14b51c8dcc656d7 --subnet-  
id subnet-07f4a116a6609f07e
```

Tagging launched instances

```
aws --region us-east-1 ec2 create-tags --resources i-0062b104894ad7f24 --tags Key=Name,Value=ret-  
vpc-use1-dev-01-f-sn000-ip-10-10-5-161  
aws --region us-east-1 ec2 create-tags --resources i-012906116a5cc6f01 --tags Key=Name,Value=ret-  
vpc-use1-prd-01-f-sn000-ip-10-12-5-102  
aws --region us-east-2 ec2 create-tags --resources i-08c7feec14864aea2 --tags Key=Name,Value=ret-vpc-  
use2-dev-01-c-sn000-ip-10-14-2-150
```

AWS Cloud Foundation Build Automation – Part 1

```
aws --region us-east-2 ec2 create-tags --resources i-06983f394bce10da5 --tags Key=Name,Value=ret-
vpc-use2-prd-01-c-sn000-ip-10-16-2-90
aws --region us-east-1 ec2 create-tags --resources i-0cf76348fe2bab587 --tags Key=Name,Value=whs-
vpc-use1-dev-01-f-sn000-ip-10-11-5-52
aws --region us-east-1 ec2 create-tags --resources i-086929b4d9abf0ae5 --tags Key=Name,Value=whs-
vpc-use1-prd-01-f-sn000-ip-10-13-5-184
aws --region us-east-2 ec2 create-tags --resources i-0da40ae8c4e3c1c57 --tags Key=Name,Value=whs-
vpc-use2-dev-01-c-sn000-ip-10-15-2-226
aws --region us-east-2 ec2 create-tags --resources i-0f5eb832e05ec7e7c --tags Key=Name,Value=whs-
vpc-use2-prd-01-c-sn000-ip-10-17-2-33
```

Instances are initializing.

Please wait for instance connection commands to display on your screen

.....

Displaying EC2 Linux instance ssh connection commands

```
ssh -i /home/awdsllcadmin/.aws/ret-vpc-use1-dev-01-keypair ec2-user@34.231.109.151
ssh -i /home/awdsllcadmin/.aws/ret-vpc-use1-prd-01-keypair ec2-user@34.231.243.69
ssh -i /home/awdsllcadmin/.aws/ret-vpc-use2-dev-01-keypair ec2-user@13.58.98.113
ssh -i /home/awdsllcadmin/.aws/ret-vpc-use2-prd-01-keypair ec2-user@52.14.174.92
ssh -i /home/awdsllcadmin/.aws/whs-vpc-use1-dev-01-keypair ec2-user@100.24.210.168
ssh -i /home/awdsllcadmin/.aws/whs-vpc-use1-prd-01-keypair ec2-user@18.232.124.63
ssh -i /home/awdsllcadmin/.aws/whs-vpc-use2-dev-01-keypair ec2-user@18.217.133.201
ssh -i /home/awdsllcadmin/.aws/whs-vpc-use2-prd-01-keypair ec2-user@3.16.164.18
```

Connecting to instances

Connecting to ret-vpc-use1-dev-01-f-sn000-ip-10-10-5-161

```
[awdsllcadmin@linux721 ~]$ ssh -i /home/awdsllcadmin/.aws/ret-vpc-use1-dev-01-keypair ec2-
user@34.231.109.151
```

The authenticity of host '34.231.109.151 (34.231.109.151)' can't be established.

ECDSA key fingerprint is SHA256:fjyOomcl6ns0fAdwquRORtVBftmEMIXjLwONceHh+Io.

ECDSA key fingerprint is MD5:0f:10:fa:ab:b0:0c:c0:8e:90:d0:75:a8:85:b9:4f:43.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '34.231.109.151' (ECDSA) to the list of known hosts.

```
_ | _ | _ )
_| ( / Amazon Linux AMI
_| \ | _ |
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

AWS Cloud Foundation Build Automation – Part 1

Connecting to ret-vpc-use1-prd-01-f-sn000-ip-10-12-5-102

```
[awsdsllcadmin@linux721 ~]$ ssh -i /home/awsdsllcadmin/.aws/ret-vpc-use1-prd-01-keypair ec2-user@34.231.243.69
```

The authenticity of host '34.231.243.69 (34.231.243.69)' can't be established.

ECDSA key fingerprint is SHA256:J8wmUfQgPWWmX78Wg2IEHVKzs7sM2mVUDnEcOYnS430.

ECDSA key fingerprint is MD5:10:96:96:b5:c7:54:03:58:3c:e7:bc:b2:45:85:be:35.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '34.231.243.69' (ECDSA) to the list of known hosts.

```
__| __|_ )  
_| ( / Amazon Linux AMI  
__|\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

```
[ec2-user@ip-10-12-5-102 ~]$ exit
```

logout

Connection to 34.231.243.69 closed.

```
[awsdsllcadmin@linux721 ~]$
```

Connecting to ret-vpc-use2-dev-01-c-sn000-ip-10-14-2-150

```
[awsdsllcadmin@linux721 ~]$ ssh -i /home/awsdsllcadmin/.aws/ret-vpc-use2-dev-01-keypair ec2-user@13.58.98.113
```

The authenticity of host '13.58.98.113 (13.58.98.113)' can't be established.

ECDSA key fingerprint is SHA256:dIW/JwDOgFeR2vVvvgNUWc4TaSr88LZF2+VZiTrTw5I.

ECDSA key fingerprint is MD5:4e:ce:ae:31:26:26:1c:4e:a8:df:c4:a2:ab:ca:10:dc.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '13.58.98.113' (ECDSA) to the list of known hosts.

```
__| __|_ )  
_| ( / Amazon Linux AMI  
__|\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

```
[ec2-user@ip-10-14-2-150 ~]$ exit
```

logout

Connection to 13.58.98.113 closed.

```
[awsdsllcadmin@linux721 ~]$
```

Connecting to ret-vpc-use2-prd-01-c-sn000-ip-10-16-2-90

```
[awsdsllcadmin@linux721 ~]$ ssh -i /home/awsdsllcadmin/.aws/ret-vpc-use2-prd-01-keypair ec2-user@52.14.174.92
```

The authenticity of host '52.14.174.92 (52.14.174.92)' can't be established.

ECDSA key fingerprint is SHA256:isSIKCvC4czpKxQy7oKj7Rt15xvDIDyGBtD3Lo9wR+g.

AWS Cloud Foundation Build Automation – Part 1

ECDSA key fingerprint is MD5:8a:1b:8f:1e:04:45:d2:57:4c:24:fc:6b:a5:fa:e7:ca.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '52.14.174.92' (ECDSA) to the list of known hosts.

```
__| __|_ )  
_| ( / Amazon Linux AMI  
__|\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-10-16-2-90 ~]\$ exit

logout

Connection to 52.14.174.92 closed.

[awsdsllcadmin@linux721 ~]\$

Connecting to whs-vpc-use1-dev-01-f-sn000-ip-10-11-5-52

[awsdsllcadmin@linux721 ~]\$ ssh -i /home/awsdsllcadmin/.aws/whs-vpc-use1-dev-01-keypair ec2-user@100.24.210.168

The authenticity of host '100.24.210.168 (100.24.210.168)' can't be established.

ECDSA key fingerprint is SHA256:iD7DuZSumSWPRKThW5pC/53UMdX+AsdUaOh/T9btcmE.

ECDSA key fingerprint is MD5:3b:31:e0:bc:44:c5:a2:07:0a:e3:ca:52:94:c3:90:9b.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '100.24.210.168' (ECDSA) to the list of known hosts.

```
__| __|_ )  
_| ( / Amazon Linux AMI  
__|\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-10-11-5-52 ~]\$ exit

logout

Connection to 100.24.210.168 closed.

[awsdsllcadmin@linux721 ~]\$

Connecting to whs-vpc-use1-prd-01-f-sn000-ip-10-13-5-184

[awsdsllcadmin@linux721 ~]\$ ssh -i /home/awsdsllcadmin/.aws/whs-vpc-use1-prd-01-keypair ec2-user@18.232.124.63

The authenticity of host '18.232.124.63 (18.232.124.63)' can't be established.

ECDSA key fingerprint is SHA256:uXgXVeboiCqaunr0QQ6d4y5+HliyU702XewFQCmmq5g.

ECDSA key fingerprint is MD5:05:a4:7a:fb:1b:ff:6b:8c:d4:b2:36:ad:89:9c:bc:ed.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '18.232.124.63' (ECDSA) to the list of known hosts.

```
__| __|_ )  
_| ( / Amazon Linux AMI
```

AWS Cloud Foundation Build Automation – Part 1

```
__| \__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-10-13-5-184 ~]\$ exit

logout

Connection to 18.232.124.63 closed.

[awsdsllcadmin@linux721 ~]\$

Connecting to whs-vpc-use2-dev-01-c-sn000-ip-10-15-2-226

[awsdsllcadmin@linux721 ~]\$ ssh -i /home/awsdsllcadmin/.aws/whs-vpc-use2-dev-01-keypair ec2-user@18.217.133.201

The authenticity of host '18.217.133.201 (18.217.133.201)' can't be established.

ECDSA key fingerprint is SHA256:xcORHZ3kks/4gwyNyqtO29KxA9M1k8mpeOn35kV8a1o.

ECDSA key fingerprint is MD5:a9:83:e2:ad:5f:97:a0:26:24:66:fe:8a:96:cc:24:4a.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '18.217.133.201' (ECDSA) to the list of known hosts.

```
__| __|_ )
```

```
_| ( / Amazon Linux AMI
```

```
__| \__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-10-15-2-226 ~]\$ exit

logout

Connection to 18.217.133.201 closed.

[awsdsllcadmin@linux721 ~]\$

Connecting to whs-vpc-use2-prd-01-c-sn000-ip-10-17-2-33

[awsdsllcadmin@linux721 ~]\$ ssh -i /home/awsdsllcadmin/.aws/whs-vpc-use2-prd-01-keypair ec2-user@3.16.164.18

The authenticity of host '3.16.164.18 (3.16.164.18)' can't be established.

ECDSA key fingerprint is SHA256:iFgReMScEOOoVEwRa5wndXzqbpWcb9dwGT4diHO67yw.

ECDSA key fingerprint is MD5:aa:29:6d:45:51:18:23:60:15:90:17:11:5e:f0:7a:85.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added '3.16.164.18' (ECDSA) to the list of known hosts.

```
__| __|_ )
```

```
_| ( / Amazon Linux AMI
```

```
__| \__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/>

10 package(s) needed for security, out of 12 available

Run "sudo yum update" to apply all updates.

[ec2-user@ip-10-17-2-33 ~]\$ exit

AWS Cloud Foundation Build Automation – Part 1

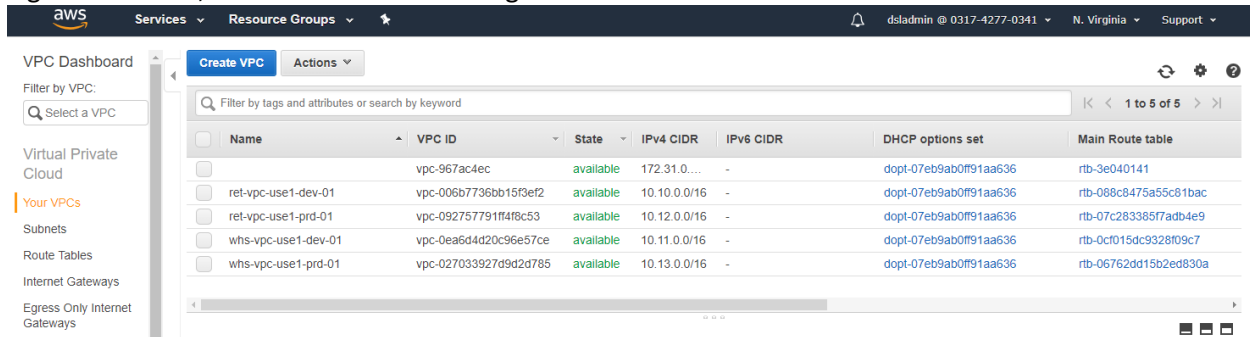
logout

Connection to 3.16.164.18 closed.

[awsdsllcadmin@linux721 ~]\$

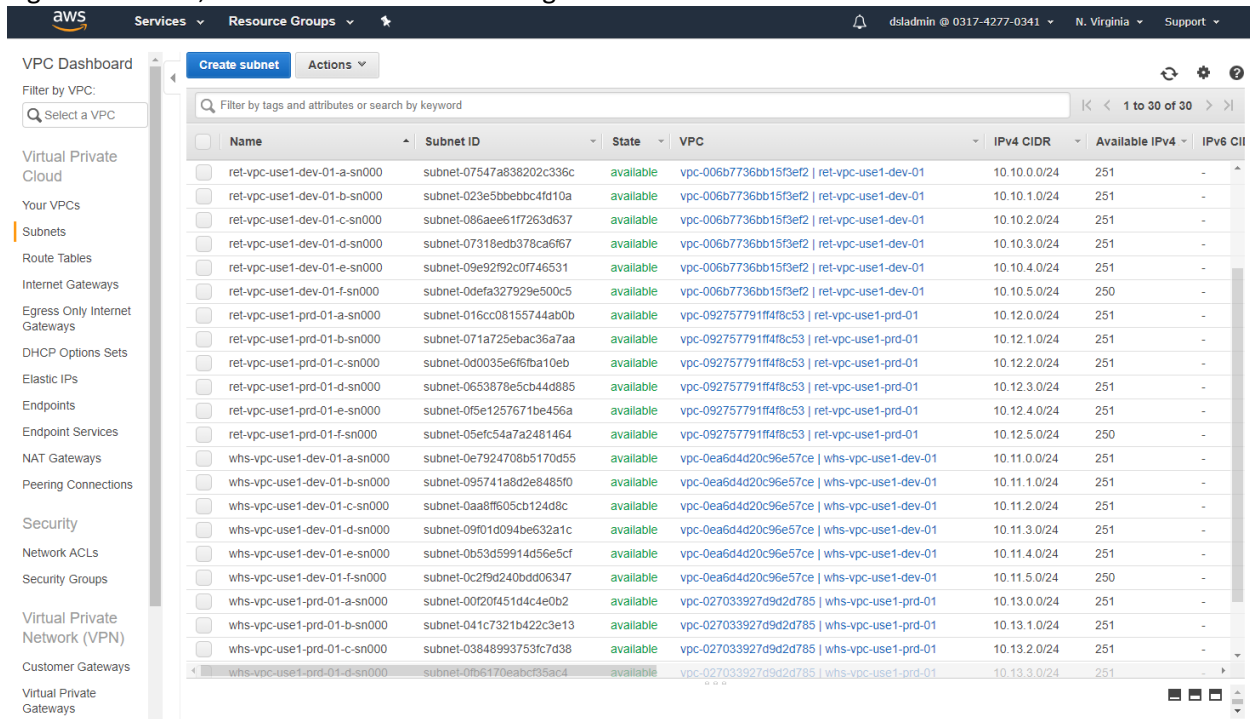
Verifying FB creation in AWS Portal

Figure 1 – Retail, Wholesale VPCs in N. Virginia



Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Main Route table
	vpc-967ac4ec	available	172.31.0.0/16	-	dopt-07eb9ab0f91aa636	rtb-3e040141
ret-vpc-use1-dev-01	vpc-006b7736bb15f3ef2	available	10.10.0.0/16	-	dopt-07eb9ab0f91aa636	rtb-088c8475a55c81bac
ret-vpc-use1-prd-01	vpc-092757791ff4f8c53	available	10.12.0.0/16	-	dopt-07eb9ab0f91aa636	rtb-07c283385f7adb4e9
whs-vpc-use1-dev-01	vpc-0ea6d4d20c96e57ce	available	10.11.0.0/16	-	dopt-07eb9ab0f91aa636	rtb-0cf015dc9328f09c7
whs-vpc-use1-prd-01	vpc-027033927d9d2d785	available	10.13.0.0/16	-	dopt-07eb9ab0f91aa636	rtb-06762dd15b2ed830a

Figure 2 – Retail, Wholesale Subnets in N. Virginia



Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR
ret-vpc-use1-dev-01-a-sv000	subnet-07547a838202c336c	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.0.0/24	251	-
ret-vpc-use1-dev-01-b-sv000	subnet-023e5b5ebbc4fd10a	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.1.0/24	251	-
ret-vpc-use1-dev-01-c-sv000	subnet-086aee61f7263d637	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.2.0/24	251	-
ret-vpc-use1-dev-01-d-sv000	subnet-07318ed378ca6f67	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.3.0/24	251	-
ret-vpc-use1-dev-01-e-sv000	subnet-09e2f92c0f746531	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.4.0/24	251	-
ret-vpc-use1-dev-01-f-sv000	subnet-0defa327929e500c5	available	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01	10.10.5.0/24	250	-
ret-vpc-use1-prd-01-a-sv000	subnet-016cc08155744ab0b	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.0.0/24	251	-
ret-vpc-use1-prd-01-b-sv000	subnet-071a725ebac36a7aa	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.1.0/24	251	-
ret-vpc-use1-prd-01-c-sv000	subnet-0d0035e6f6ba10eb	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.2.0/24	251	-
ret-vpc-use1-prd-01-d-sv000	subnet-0653878e5cb4d885	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.3.0/24	251	-
ret-vpc-use1-prd-01-e-sv000	subnet-0f5e1257671be456a	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.4.0/24	251	-
ret-vpc-use1-prd-01-f-sv000	subnet-05efc54a7a2481464	available	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01	10.12.5.0/24	250	-
whs-vpc-use1-dev-01-a-sv000	subnet-0e7924708b5170d55	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.0.0/24	251	-
whs-vpc-use1-dev-01-b-sv000	subnet-095741a8d2e8485f0	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.1.0/24	251	-
whs-vpc-use1-dev-01-c-sv000	subnet-0aa8ff605cb124d8c	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.2.0/24	251	-
whs-vpc-use1-dev-01-d-sv000	subnet-09f01d094be632a1c	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.3.0/24	251	-
whs-vpc-use1-dev-01-e-sv000	subnet-0b53d59914d56e5cf	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.4.0/24	251	-
whs-vpc-use1-dev-01-f-sv000	subnet-0c2f9d240bd06347	available	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01	10.11.5.0/24	250	-
whs-vpc-use1-prd-01-a-sv000	subnet-00f20f451d4c4e0b2	available	vpc-027033927d9d2d785 whs-vpc-use1-prd-01	10.13.0.0/24	251	-
whs-vpc-use1-prd-01-b-sv000	subnet-041c7321b4d22c3e13	available	vpc-027033927d9d2d785 whs-vpc-use1-prd-01	10.13.1.0/24	251	-
whs-vpc-use1-prd-01-c-sv000	subnet-03848993753fc7d38	available	vpc-027033927d9d2d785 whs-vpc-use1-prd-01	10.13.2.0/24	251	-
whs-vpc-use1-prd-01-d-sv000	subnet-0fb6170eabc35ac4	available	vpc-027033927d9d2d785 whs-vpc-use1-prd-01	10.13.3.0/24	251	-

Figure 3 – Retail, Wholesale VPC Route Tables in N. Virginia

AWS Cloud Foundation Build Automation – Part 1

Name	Route Table ID	Explicitly Associated with	Main	VPC ID
	rtb-07c283385f7adb4e9	-	Yes	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01
	rtb-0cf015dc9328f09c7	-	Yes	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01
	rtb-06762dd15b2ed830a	-	Yes	vpc-027033927d9d2d785 whs-vpc-use1-prd-01
	rtb-088c8475a55c81bac	-	Yes	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01
	rtb-3e040141	-	Yes	vpc-967ac4ec
ret-vpc-use1-dev-01-rtb	rtb-0fc28defbd524fba1	subnet-0defa327929e500c5	No	vpc-006b7736bb15f3ef2 ret-vpc-use1-dev-01
ret-vpc-use1-prd-01-rtb	rtb-0680baba728d98093	subnet-05efc54a7a2481464	No	vpc-092757791ff4f8c53 ret-vpc-use1-prd-01
whs-vpc-use1-dev-01-rtb	rtb-089bd7b74f4760dc8	subnet-0c2f9d240bdd06347	No	vpc-0ea6d4d20c96e57ce whs-vpc-use1-dev-01
whs-vpc-use1-prd-01-rtb	rtb-0f17c6bc2b9e06d35	subnet-00282bc317559b870	No	vpc-027033927d9d2d785 whs-vpc-use1-prd-01

Figure 4 – Retail, Wholesale VPC Internet Gateways in N. Virginia

Name	ID	State	VPC	Owner
whs-vpc-use1-dev-01-igw	igw-09978af3aae1...	attached	vpc-0ea6d4d20c9...	031742770341
ret-vpc-use1-dev-01-igw	igw-09fd100a901f...	attached	vpc-006b7736bb1...	031742770341
ret-vpc-use1-prd-01-igw	igw-0ba058d0289...	attached	vpc-092757791ff4...	031742770341
whs-vpc-use1-prd-01-igw	igw-0edc0ac3a03...	attached	vpc-027033927d9...	031742770341
	igw-e5a14c9e	attached	vpc-967ac4ec	031742770341

Figure 5 – Retail, Wholesale VPC Security Groups in N. Virginia

Name	Group ID	Group Name	VPC ID	Type
	sg-03f28f5e07a0bd1ae	default	vpc-092757791ff4f8c53	EC2-VPC
	sg-09f814ebfb967d5e8	default	vpc-0ea6d4d20c96e57ce	EC2-VPC
	sg-0a5714f6f1f683dc5	default	vpc-006b7736bb15f3ef2	EC2-VPC
	sg-0ed865c7d639cb6fa	default	vpc-027033927d9d2d785	EC2-VPC
	sg-525fa016	default	vpc-967ac4ec	EC2-VPC
ret-vpc-use1-dev-01-sg-dbs	sg-0f25c464e8060bf08	ret-vpc-use1-dev-01-sg-dbs	vpc-006b7736bb15f3ef2	EC2-VPC
ret-vpc-use1-dev-01-sg-remote	sg-025c32144119efc8b	ret-vpc-use1-dev-01-sg-remote	vpc-006b7736bb15f3ef2	EC2-VPC
ret-vpc-use1-dev-01-sg-web	sg-03c671ce2b24667fb	ret-vpc-use1-dev-01-sg-web	vpc-006b7736bb15f3ef2	EC2-VPC
ret-vpc-use1-prd-01-sg-dbs	sg-0f29031c8fda5ea1a	ret-vpc-use1-prd-01-sg-dbs	vpc-092757791ff4f8c53	EC2-VPC
ret-vpc-use1-prd-01-sg-remote	sg-03a8c0cff1064eac5	ret-vpc-use1-prd-01-sg-remote	vpc-092757791ff4f8c53	EC2-VPC
ret-vpc-use1-prd-01-sg-web	sg-00030859a15176206	ret-vpc-use1-prd-01-sg-web	vpc-092757791ff4f8c53	EC2-VPC
whs-vpc-use1-dev-01-sg-dbs	sg-020ceb0ed32255a4	whs-vpc-use1-dev-01-sg-dbs	vpc-0ea6d4d20c96e57ce	EC2-VPC
whs-vpc-use1-dev-01-sg-remote	sg-0ed04f8e8ecf4e03a	whs-vpc-use1-dev-01-sg-remote	vpc-0ea6d4d20c96e57ce	EC2-VPC
whs-vpc-use1-dev-01-sg-web	sg-014fe6a0adc011254	whs-vpc-use1-dev-01-sg-web	vpc-0ea6d4d20c96e57ce	EC2-VPC
whs-vpc-use1-prd-01-sg-dbs	sg-00a9986dd43aa99d7	whs-vpc-use1-prd-01-sg-dbs	vpc-027033927d9d2d785	EC2-VPC
whs-vpc-use1-prd-01-sg-remote	sg-0ae5bd39c8c9baa34	whs-vpc-use1-prd-01-sg-remote	vpc-027033927d9d2d785	EC2-VPC
whs-vpc-use1-prd-01-sg-web	sg-040c7bf7e7f696433c	whs-vpc-use1-prd-01-sg-web	vpc-027033927d9d2d785	EC2-VPC

Figure 6 – Retail, Wholesale EC2 Linux Instances in N. Virginia

AWS Cloud Foundation Build Automation – Part 1

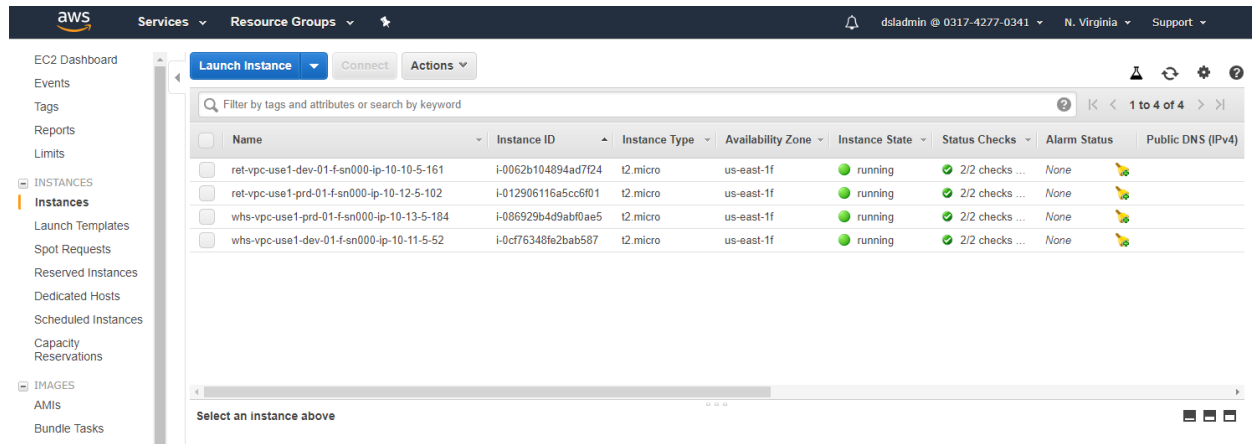


Figure 7 – Retail, Wholesale VPCs in Ohio

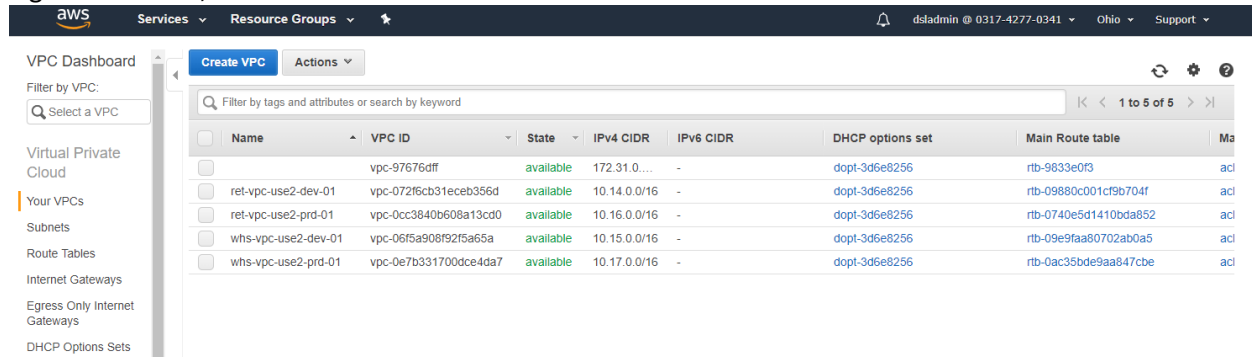


Figure 8 – Retail, Wholesale Subnets in Ohio

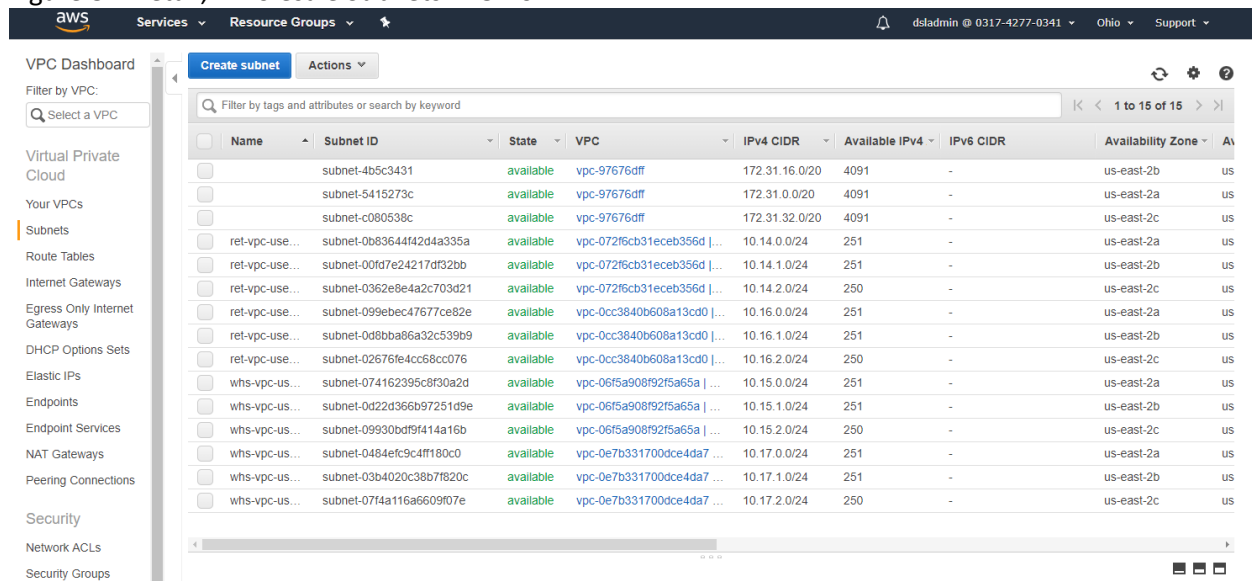
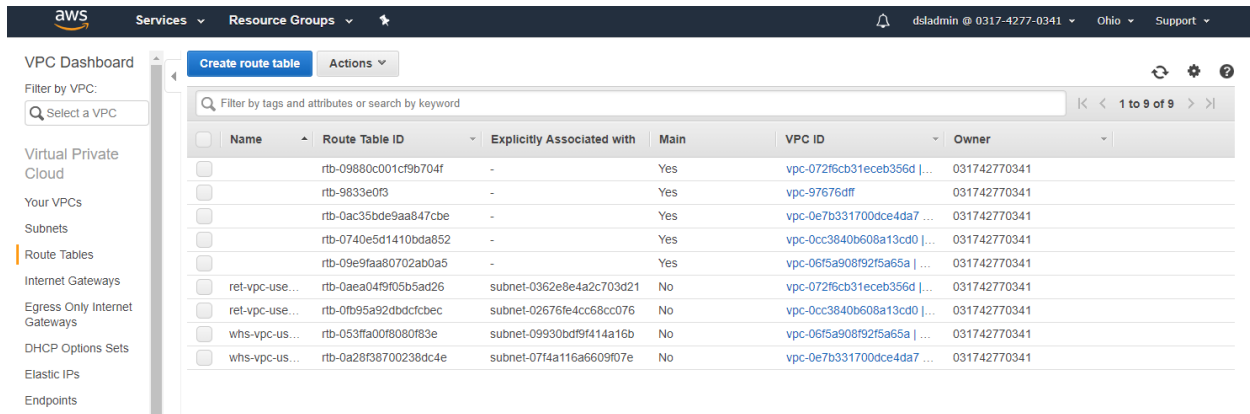


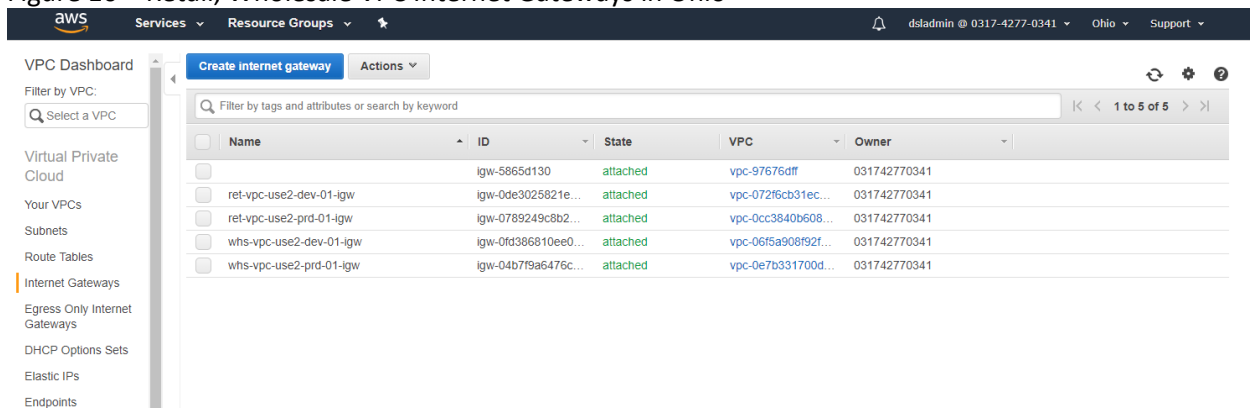
Figure 9 – Retail, Wholesale VPC Route Tables in Ohio

AWS Cloud Foundation Build Automation – Part 1



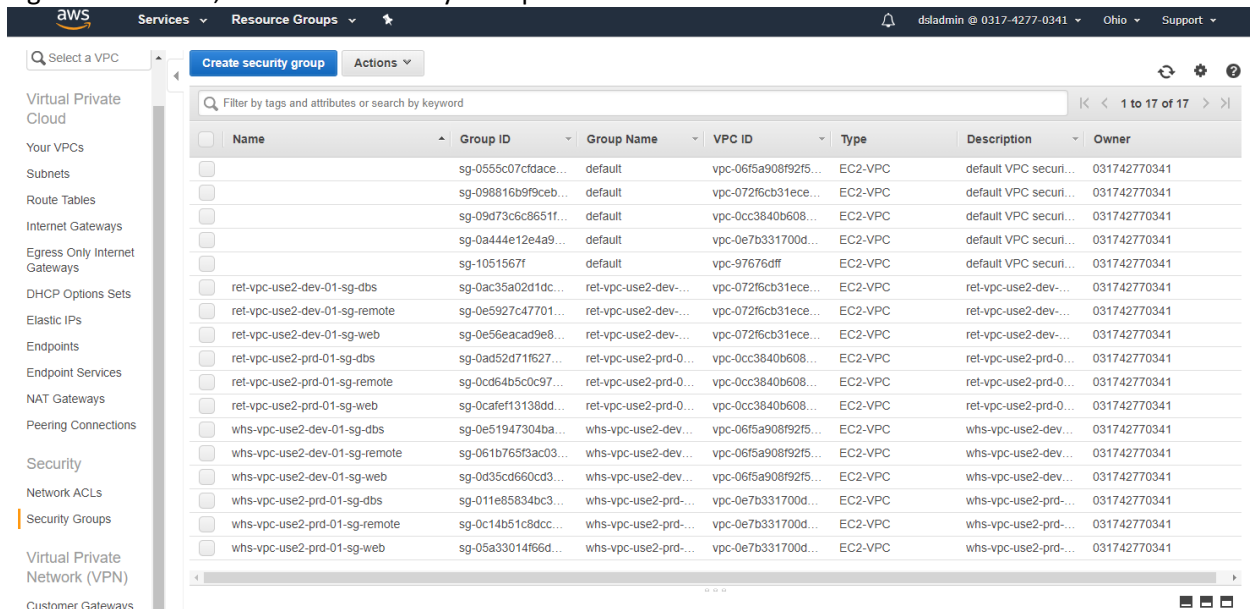
	Name	Route Table ID	Explicitly Associated with	Main	VPC ID	Owner
☐	rtb-09880c001cf9b704f		-	Yes	vpc-072f6cb31eceb356d	031742770341
☐	rtb-9833e0f3		-	Yes	vpc-97676dff	031742770341
☐	rtb-0ac35bde9aa847cbe		-	Yes	vpc-0e7b331700dce4da7	031742770341
☐	rtb-0740e5d1410bda852		-	Yes	vpc-0cc3840b608a13cd0	031742770341
☐	rtb-09e9faa80702ab0a5		-	Yes	vpc-06f5a908f92f5a65a	031742770341
☐	ret-vpc-use...	rtb-0aea04f9f05b5ad26	subnet-0362e8e4a2c703d21	No	vpc-072f6cb31eceb356d	031742770341
☐	ret-vpc-use...	rtb-0fb95a92dbdcfcbe	subnet-02676fe4cc68cc076	No	vpc-0cc3840b608a13cd0	031742770341
☐	whs-vpc-us...	rtb-053ffa0f8080f83e	subnet-09930bd9f414a16b	No	vpc-06f5a908f92f5a65a	031742770341
☐	whs-vpc-us...	rtb-0a28f38700238dc4e	subnet-0714a116a6609f07e	No	vpc-0e7b331700dce4da7	031742770341

Figure 10 – Retail, Wholesale VPC Internet Gateways in Ohio



	Name	ID	State	VPC	Owner
☐	igw-5865d130		attached	vpc-97676dff	031742770341
☐	ret-vpc-use2-dev-01-igw	igw-0de3025821e...	attached	vpc-072f6cb31ec...	031742770341
☐	ret-vpc-use2-prd-01-igw	igw-0789249c8b2...	attached	vpc-0cc3840b608...	031742770341
☐	whs-vpc-use2-dev-01-igw	igw-0fd386810ee0...	attached	vpc-06f5a908f92f...	031742770341
☐	whs-vpc-use2-prd-01-igw	igw-04b7f9a6476c...	attached	vpc-0e7b331700d...	031742770341

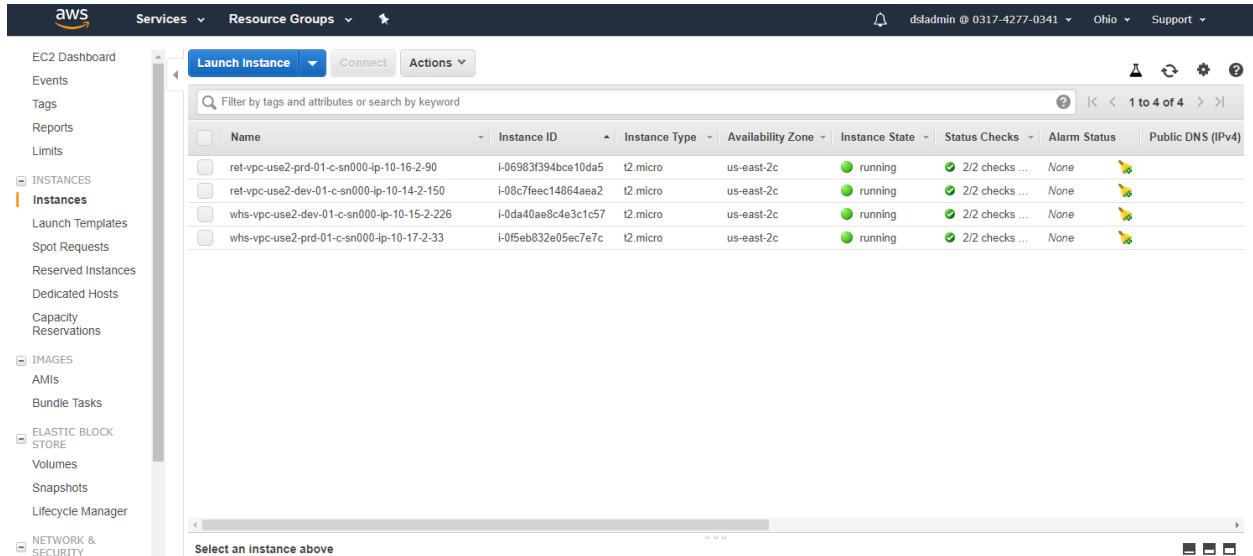
Figure 11 – Retail, Wholesale Security Groups in Ohio



	Name	Group ID	Group Name	VPC ID	Type	Description	Owner
☐		sg-0555c07cfdace...	default	vpc-06f5a908f92f5...	EC2-VPC	default VPC securi...	031742770341
☐		sg-098816b9f9ceb...	default	vpc-072f6cb31ece...	EC2-VPC	default VPC securi...	031742770341
☐		sg-09d73c6c8651f...	default	vpc-0cc3840b608...	EC2-VPC	default VPC securi...	031742770341
☐		sg-0a444e12e4a9...	default	vpc-0e7b331700d...	EC2-VPC	default VPC securi...	031742770341
☐		sg-1051567f	default	vpc-97676dff	EC2-VPC	default VPC securi...	031742770341
☐	ret-vpc-use2-dev-01-sg-dbs	sg-0ac35a02d1dc...	ret-vpc-use2-dev...	vpc-072f6cb31ece...	EC2-VPC	ret-vpc-use2-dev...	031742770341
☐	ret-vpc-use2-dev-01-sg-remote	sg-0e5927c47701...	ret-vpc-use2-dev...	vpc-072f6cb31ece...	EC2-VPC	ret-vpc-use2-dev...	031742770341
☐	ret-vpc-use2-dev-01-sg-web	sg-0e56eacadb9e8...	ret-vpc-use2-dev...	vpc-072f6cb31ece...	EC2-VPC	ret-vpc-use2-dev...	031742770341
☐	ret-vpc-use2-prd-01-sg-dbs	sg-0ad52d71f627...	ret-vpc-use2-prd-0...	vpc-0cc3840b608...	EC2-VPC	ret-vpc-use2-prd-0...	031742770341
☐	ret-vpc-use2-prd-01-sg-remote	sg-0cd64b5c0c97...	ret-vpc-use2-prd-0...	vpc-0cc3840b608...	EC2-VPC	ret-vpc-use2-prd-0...	031742770341
☐	ret-vpc-use2-prd-01-sg-web	sg-0cafe1f1318dd...	ret-vpc-use2-prd-0...	vpc-0cc3840b608...	EC2-VPC	ret-vpc-use2-prd-0...	031742770341
☐	whs-vpc-use2-dev-01-sg-dbs	sg-0e51947304ba...	whs-vpc-use2-dev...	vpc-06f5a908f92f5...	EC2-VPC	whs-vpc-use2-dev...	031742770341
☐	whs-vpc-use2-dev-01-sg-remote	sg-061b765f3ac03...	whs-vpc-use2-dev...	vpc-06f5a908f92f5...	EC2-VPC	whs-vpc-use2-dev...	031742770341
☐	whs-vpc-use2-dev-01-sg-web	sg-0d35cd660dc3...	whs-vpc-use2-dev...	vpc-06f5a908f92f5...	EC2-VPC	whs-vpc-use2-dev...	031742770341
☐	whs-vpc-use2-prd-01-sg-dbs	sg-011e85834bc3...	whs-vpc-use2-prd...	vpc-0e7b331700d...	EC2-VPC	whs-vpc-use2-prd...	031742770341
☐	whs-vpc-use2-prd-01-sg-remote	sg-0c14b51c8dc...	whs-vpc-use2-prd...	vpc-0e7b331700d...	EC2-VPC	whs-vpc-use2-prd...	031742770341
☐	whs-vpc-use2-prd-01-sg-web	sg-05a33014f66d...	whs-vpc-use2-prd...	vpc-0e7b331700d...	EC2-VPC	whs-vpc-use2-prd...	031742770341

Figure 12 – Retail, Wholesale EC2 Linux Instances in Ohio

AWS Cloud Foundation Build Automation – Part 1



Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
ret-vpc-use2-prd-01-c-sn000-1p-10-16-2-90	i-06983f394bce10da5	t2.micro	us-east-2c	running	2/2 checks ...	None	
ret-vpc-use2-dev-01-c-sn000-1p-10-14-2-150	i-08c7feec14864aea2	t2.micro	us-east-2c	running	2/2 checks ...	None	
whs-vpc-use2-dev-01-c-sn000-1p-10-15-2-226	i-0da40ae8c4e3c1c57	t2.micro	us-east-2c	running	2/2 checks ...	None	
whs-vpc-use2-prd-01-c-sn000-1p-10-17-2-33	i-0f5eb832e05ec7e7c	t2.micro	us-east-2c	running	2/2 checks ...	None	

Figure 13 – Web site running on Retail Dev instance in N. Virginia

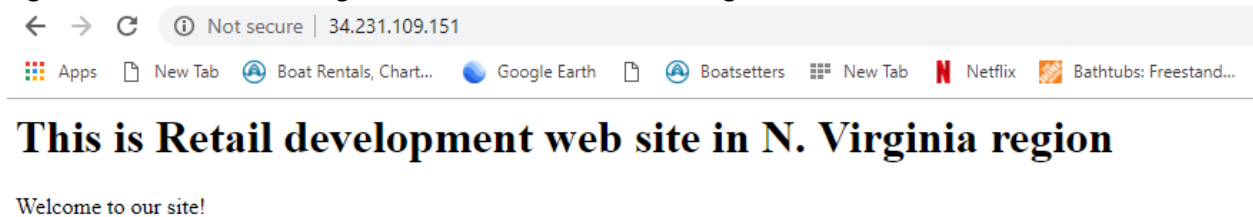


Figure 14 – Web site running Wholesale Prod instance in Ohio



FB Removal

To remove FB, simply run this command:

```
[awsdsllcadmin@linux721 ~]$ t1 DeleteConstructs
```

Terminating instances in public subnets ...

```
aws --region us-east-1 ec2 terminate-instances --instance-id i-0062b104894ad7f24
```

```
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-012906116a5cc6f01",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
```

```
aws --region us-east-1 ec2 terminate-instances --instance-id i-012906116a5cc6f01
```

```
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-012906116a5cc6f01",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
```

```
aws --region us-east-2 ec2 terminate-instances --instance-id i-08c7feec14864aea2
```

```
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
    }
  ]
}
```

```
    "InstanceId": "i-08c7feec14864aea2",
    "PreviousState": {
      "Code": 16,
      "Name": "running"
    }
  }
]
}
aws --region us-east-2 ec2 terminate-instances --instance-id i-06983f394bce10da5
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-06983f394bce10da5",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
aws --region us-east-1 ec2 terminate-instances --instance-id i-0cf76348fe2bab587
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-0cf76348fe2bab587",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
aws --region us-east-1 ec2 terminate-instances --instance-id i-086929b4d9abf0ae5
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
    }
  ]
}
```

```
    "InstanceId": "i-086929b4d9abf0ae5",
    "PreviousState": {
      "Code": 16,
      "Name": "running"
    }
  }
]
}
aws --region us-east-2 ec2 terminate-instances --instance-id i-0da40ae8c4e3c1c57
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-0da40ae8c4e3c1c57",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
aws --region us-east-2 ec2 terminate-instances --instance-id i-0f5eb832e05ec7e7c
{
  "TerminatingInstances": [
    {
      "CurrentState": {
        "Code": 32,
        "Name": "shutting-down"
      },
      "InstanceId": "i-0f5eb832e05ec7e7c",
      "PreviousState": {
        "Code": 16,
        "Name": "running"
      }
    }
  ]
}
```

Instances are shutting down ...

Please wait ...

.....

Deleting Key Pairs

```
aws --region us-east-1 ec2 delete-key-pair --key-name ret-vpc-use1-dev-01-keypair
aws --region us-east-1 ec2 delete-key-pair --key-name ret-vpc-use1-prd-01-keypair
aws --region us-east-2 ec2 delete-key-pair --key-name ret-vpc-use2-dev-01-keypair
aws --region us-east-2 ec2 delete-key-pair --key-name ret-vpc-use2-prd-01-keypair
aws --region us-east-1 ec2 delete-key-pair --key-name whs-vpc-use1-dev-01-keypair
aws --region us-east-1 ec2 delete-key-pair --key-name whs-vpc-use1-prd-01-keypair
aws --region us-east-2 ec2 delete-key-pair --key-name whs-vpc-use2-dev-01-keypair
aws --region us-east-2 ec2 delete-key-pair --key-name whs-vpc-use2-prd-01-keypair
```

Deleting VPC Security Groups

Deleting SG for remote access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-025c32144119efc8b
```

Deleting SG for remote access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-03a8c0cff1064eac5
```

Deleting SG for remote access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0e5927c477012f167
```

Deleting SG for remote access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0cd64b5c0c97bcc98
```

Deleting SG for remote access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-0ed04fbe8ecf4e03a
```

Deleting SG for remote access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-0ae5bd39c8c9baa34
```

Deleting SG for remote access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-061b765f3ac0376f3
```

Deleting SG for remote access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0c14b51c8dcc656d7
```

Deleting SG for web access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-03c671ce2b24667fb
```

Deleting SG for web access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-00030859a15176206
```

Deleting SG for web access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0e56eacad9e8d04ae
```

Deleting SG for web access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0cafef13138dd67e3
```

Deleting SG for web access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-014fe6a0adc011254
```

Deleting SG for web access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-040cfb7ef7696433c
```

Deleting SG for web access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0d35cd660cd31fe44
```

Deleting SG for web access ...

```
aws --regions us-east-2 ec2 delete-security-group --group-id sg-05a33014f66daa97f
```

Deleting SG for database access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-0f25c464e8060bf08
```

Deleting SG for database access ...

```
aws --regions us-east-1 ec2 delete-security-group --group-id sg-0f29031c8fda5ea1a
Deleting SG for database access ...
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0ac35a02d1dc1de80
Deleting SG for database access ...
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0ad52d71f62767742
Deleting SG for database access ...
aws --regions us-east-1 ec2 delete-security-group --group-id sg-020cebc0ed32255a4
Deleting SG for database access ...
aws --regions us-east-1 ec2 delete-security-group --group-id sg-00a9986dd43aa99d7
Deleting SG for database access ...
aws --regions us-east-2 ec2 delete-security-group --group-id sg-0e51947304ba70a93
Deleting SG for database access ...
aws --regions us-east-2 ec2 delete-security-group --group-id sg-011e85834bc30f37d
```

Deleting Subnets

```
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-07547a838202c336c
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-023e5bbebbc4fd10a
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-086aee61f7263d637
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-07318edb378ca6f67
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-09e92f92c0f746531
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0defa327929e500c5
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-016cc08155744ab0b
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-071a725ebac36a7aa
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0d0035e6f6fba10eb
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0653878e5cb44d885
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0f5e1257671be456a
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-05efc54a7a2481464
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-0b83644f42d4a335a
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-00fd7e24217df32bb
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-0362e8e4a2c703d21
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-099ebec47677ce82e
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-0d8bba86a32c539b9
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-02676fe4cc68cc076
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0e7924708b5170d55
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-095741a8d2e8485f0
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0aa8ff605cb124d8c
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-09f01d094be632a1c
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0b53d59914d56e5cf
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0c2f9d240bdd06347
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-00f20f451d4c4e0b2
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-041c7321b422c3e13
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-03848993753fc7d38
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-0fb6170eabcf35ac4
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-08732b9b9836f9132
aws --region us-east-1 ec2 delete-subnet --subnet-id subnet-00282bc317559b870
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-074162395c8f30a2d
```

```
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-0d22d366b97251d9e
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-09930bdf9f414a16b
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-0484efc9c4ff180c0
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-03b4020c38b7f820c
aws --region us-east-2 ec2 delete-subnet --subnet-id subnet-07f4a116a6609f07e
```

Deleting VPC Route Tables

```
aws --region us-east-1 ec2 delete-route-table --route-table-id rtb-0fc28defbd524fba1
aws --region us-east-1 ec2 delete-route-table --route-table-id rtb-0680baba728d98093
aws --region us-east-2 ec2 delete-route-table --route-table-id rtb-0aea04f9f05b5ad26
aws --region us-east-2 ec2 delete-route-table --route-table-id rtb-0fb95a92dbdcfcbec
aws --region us-east-1 ec2 delete-route-table --route-table-id rtb-089bd7b74f4760dc8
aws --region us-east-1 ec2 delete-route-table --route-table-id rtb-0f17c6bc2b9e06d35
aws --region us-east-2 ec2 delete-route-table --route-table-id rtb-053ffa00f8080f83e
aws --region us-east-2 ec2 delete-route-table --route-table-id rtb-0a28f38700238dc4e
```

Deleting VPC Internet Gateways

```
aws --region us-east-1 ec2 detach-internet-gateway --internet-gateway-id igw-09fd100a901f417f3 --vpc-id vpc-006b7736bb15f3ef2
aws --region us-east-1 ec2 delete-internet-gateway --internet-gateway-id igw-09fd100a901f417f3
aws --region us-east-1 ec2 detach-internet-gateway --internet-gateway-id igw-0ba058d0289406f23 --vpc-id vpc-092757791ff4f8c53
aws --region us-east-1 ec2 delete-internet-gateway --internet-gateway-id igw-0ba058d0289406f23
aws --region us-east-2 ec2 detach-internet-gateway --internet-gateway-id igw-0de3025821ed9f3f1 --vpc-id vpc-072f6cb31eceb356d
aws --region us-east-2 ec2 delete-internet-gateway --internet-gateway-id igw-0de3025821ed9f3f1
aws --region us-east-2 ec2 detach-internet-gateway --internet-gateway-id igw-0789249c8b244bf9f --vpc-id vpc-0cc3840b608a13cd0
aws --region us-east-2 ec2 delete-internet-gateway --internet-gateway-id igw-0789249c8b244bf9f
aws --region us-east-1 ec2 detach-internet-gateway --internet-gateway-id igw-09978af3aae1241dd --vpc-id vpc-0ea6d4d20c96e57ce
aws --region us-east-1 ec2 delete-internet-gateway --internet-gateway-id igw-09978af3aae1241dd
aws --region us-east-1 ec2 detach-internet-gateway --internet-gateway-id igw-0edc0ac3a03c46ba0 --vpc-id vpc-027033927d9d2d785
aws --region us-east-1 ec2 delete-internet-gateway --internet-gateway-id igw-0edc0ac3a03c46ba0
aws --region us-east-2 ec2 detach-internet-gateway --internet-gateway-id igw-0fd386810ee0105a9 --vpc-id vpc-06f5a908f92f5a65a
aws --region us-east-2 ec2 delete-internet-gateway --internet-gateway-id igw-0fd386810ee0105a9
aws --region us-east-2 ec2 detach-internet-gateway --internet-gateway-id igw-04b7f9a6476c03b24 --vpc-id vpc-0e7b331700dce4da7
aws --region us-east-2 ec2 delete-internet-gateway --internet-gateway-id igw-04b7f9a6476c03b24
```

Deleting VPCs

```
aws --region us-east-1 ec2 delete-vpc --vpc-id vpc-006b7736bb15f3ef2
aws --region us-east-1 ec2 delete-vpc --vpc-id vpc-092757791ff4f8c53
aws --region us-east-2 ec2 delete-vpc --vpc-id vpc-072f6cb31eceb356d
aws --region us-east-2 ec2 delete-vpc --vpc-id vpc-0cc3840b608a13cd0
aws --region us-east-1 ec2 delete-vpc --vpc-id vpc-0ea6d4d20c96e57ce
aws --region us-east-1 ec2 delete-vpc --vpc-id vpc-027033927d9d2d785
aws --region us-east-2 ec2 delete-vpc --vpc-id vpc-06f5a908f92f5a65a
aws --region us-east-2 ec2 delete-vpc --vpc-id vpc-0e7b331700dce4da7
[awsdsllcadmin@linux721 ~]$
```

Verifying FB removal in AWS Portal

Figure 15 – All FB created VPCs were removed from N. Virginia, only AWS created default VPC remains

The screenshot shows the AWS Management Console VPC Dashboard for the N. Virginia region. The dashboard displays a single VPC, vpc-967ac4ec, in an available state. The left sidebar lists various VPC-related services. The main content area displays the VPC details for vpc-967ac4ec, including its CIDR blocks, flow logs, and tags.

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Main Route table
	vpc-967ac4ec	available	172.31.0...	-	dopt-07eb9ab0f91aa636	rtb-3e040141

VPC: vpc-967ac4ec

Description	CIDR Blocks	Flow Logs	Tags
VPC ID	vpc-967ac4ec		
State	available		
IPv4 CIDR	172.31.0.0/16		
IPv6 CIDR	-		
Network ACL	acl-58dd3c25		
DHCP options set	dopt-07eb9ab0f91aa636		
Route table	rtb-3e040141		
Tenancy	default		
Default VPC	Yes		
Classic link	Disabled		
DNS resolution	Enabled		
DNS hostnames	Enabled		
ClassicLink DNS Support	Disabled		
Owner	031742770341		

Figure 16 – All FB created VPCs were removed from Ohio, only AWS created default VPC remains

The screenshot shows the AWS Management Console VPC Dashboard for the Ohio region. The dashboard displays a single VPC, vpc-97676dff, in an available state. The left sidebar lists various VPC-related services. The main content area displays the VPC details for vpc-97676dff, including its CIDR blocks, flow logs, and tags.

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Main Route table
	vpc-97676dff	available	172.31.0...	-	dopt-3d6e8256	rtb-9833e0f3

VPC: vpc-97676dff

Description	CIDR Blocks	Flow Logs	Tags
VPC ID	vpc-97676dff		
State	available		
IPv4 CIDR	172.31.0.0/16		
DNS resolution	Enabled		
DNS hostnames	Enabled		
Route table	rtb-9833e0f3		
Tenancy	default		
Default VPC	Yes		
IPv6 CIDR	-		
Network ACL	acl-e4c1308f		
DHCP options set	dopt-3d6e8256		
Owner	031742770341		

Conclusion

FBA demonstrated in this article employs AWS CLI behind the scene. AWS CLI is the native tool that AWS provides for user to code cloud. When coded right, the process to plan for and build a desired IaaS infrastructure foundation in AWS can be a simple, easy, and quick one, as evidenced in the sections of this article that you have seen so far. In comparison with CloudFormation, FBA allows you to avoid taking on a steep learning curve to master how to correctly create and customize CloudFormation JSON templates for CloudFormation to work for you. In comparison with third party tools such as Terraform and Ansible, the advantages are also obvious because you do not have to purchase third party licensed products and support to use them, in addition, you and your IT staff don't have to spend valuable time that is often not there to learn those products as extra tools. Admittedly, AWS CLI is not perfect. From time to time, it is found not able to adequately cover new services or upgrades that AWS offers. One example is EKS, AWS version of Kubernetes. At the writing of this article, to build an EKS cluster, both AWS CLI and CloudFormation in AWS Portal have to be used to accomplish the task, as AWS CLI alone does not cut it. Having said that, any insufficiency one may encounter in using AWS CLI is likely to be resolved soon in future as AWS diligently supports this staple IaC tool by keeping updating it, and adding more features and capabilities to it. The best part of using AWS CLI is that it is native, and it is free.