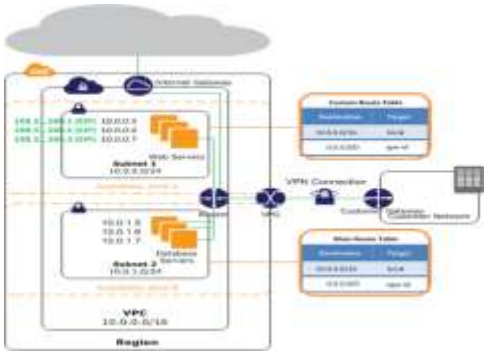
Introduction to Amazon Virtual Private Cloud (VPC) Architecture

2013



- Amazon **Virtual Private Cloud** (**VPC**) fundamentals
- Four **VPC Architecture** scenarios
- VPC to corporate network **connectivity**

VPC Fundamentals

- Amazon VPC is an isolated network within the AWS cloud that you define
- In your VPC you can
  - Create multiple public and/or private subnets
  - Launch resources with your own private IP address into a subnet
  - Define VPC security groups, Access Control Lists (ACL), Subnet Route Tables and Routes

VPC Fundamentals - Drivers

- **Drivers** for the use of a **VPC architecture** are
  - The network isolation from other accounts
  - The extra network security available in VPC
  - As an extension of the corporate network – access through a VPN
  - Static private IP address don’t change on instance stop/start

VPC Fundamentals - Subnets

- If a subnet has a route to an AWS Internet Gateway it is called a ***public subnet***
- If there is no route from a subnet to an AWS Internet Gateway it is a ***private subnet***. If an instance in an private subnet wants to access the internet it needs to use a **NAT** in a public subnet
- Each subnet must reside entirely within ***one Availability Zone***
- Instances in a VPC communicate based on Route Table, VPC Security Groups and Access Control Lists

VPC Fundamentals – Security Groups, ACLs, Routes

- **VPC Security Groups** control both inbound and outbound access between instances (EC2 Security Groups can only define inbound rules). A firewall at the instance level
- **VPC Access Control Lists** (ACLs) control access between subnets – firewall at the subnet level, an extra level of security over VPC Security Groups
- **Subnet Route Table** specifies subnet IP routing

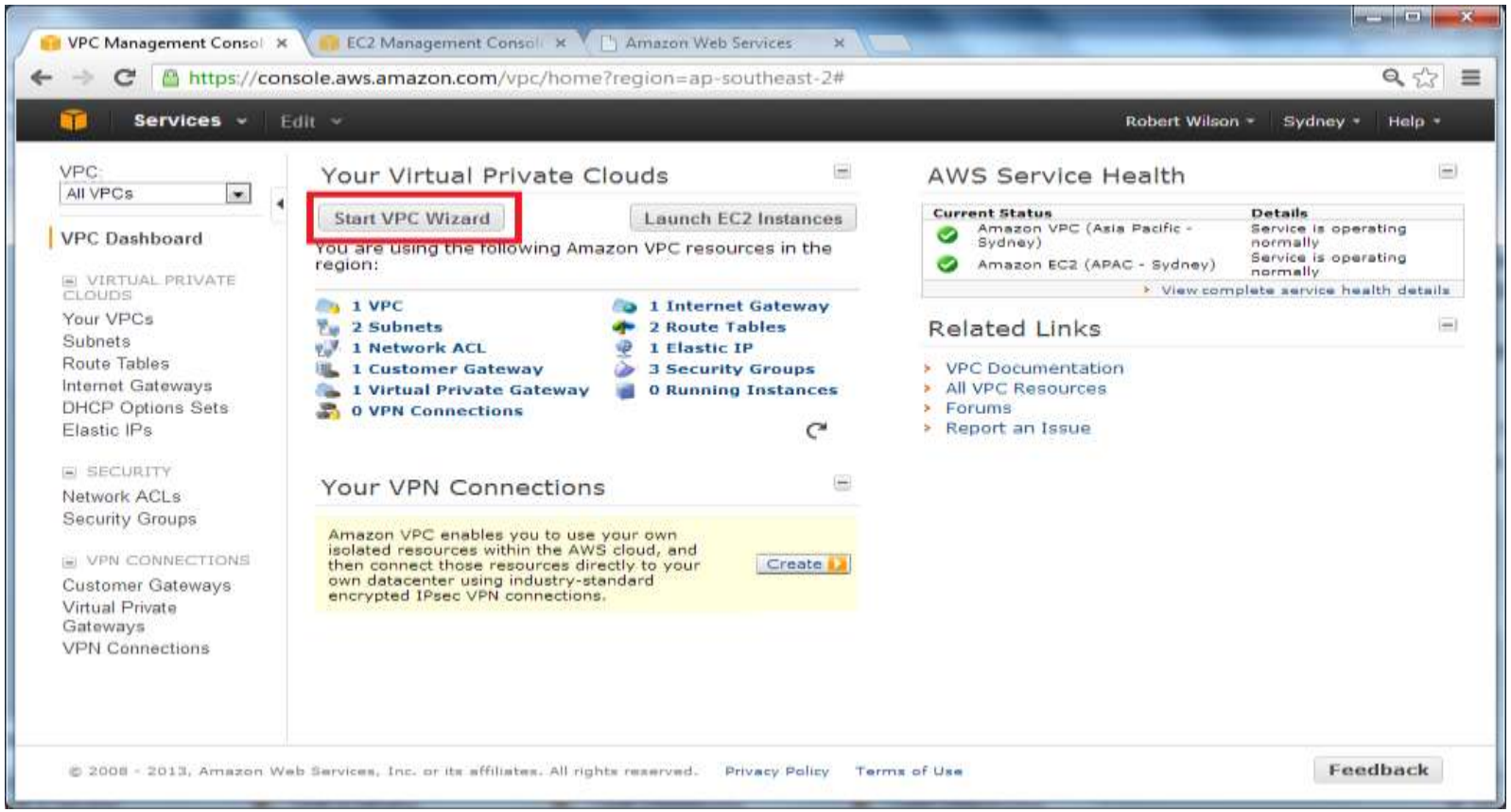
VPC Architecture Scenarios

– AWS VPC documentation has **four architecture scenarios**, these are the options available in the ***AWS management console*** in the ***VPC Wizard***:

1. VPC with a Public Subnet Only
2. VPC with Public and Private Subnets
3. VPC with Public and Private Subnets and Hardware VPN Access
4. VPC with a Private Subnet Only and Hardware VPN Access

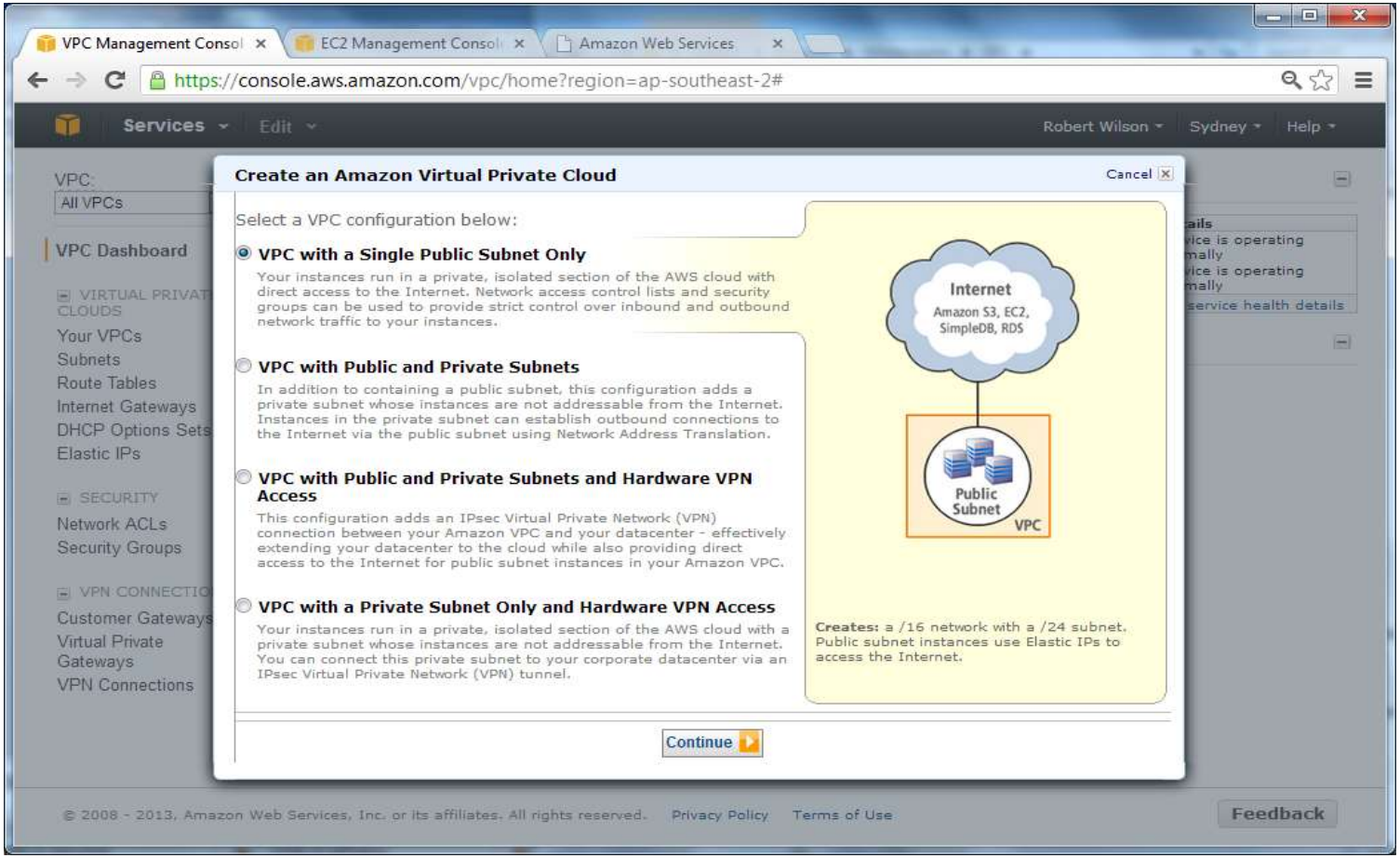
Amazon VPC Architecture Scenarios

AWS management console VPC Wizard Start VPC



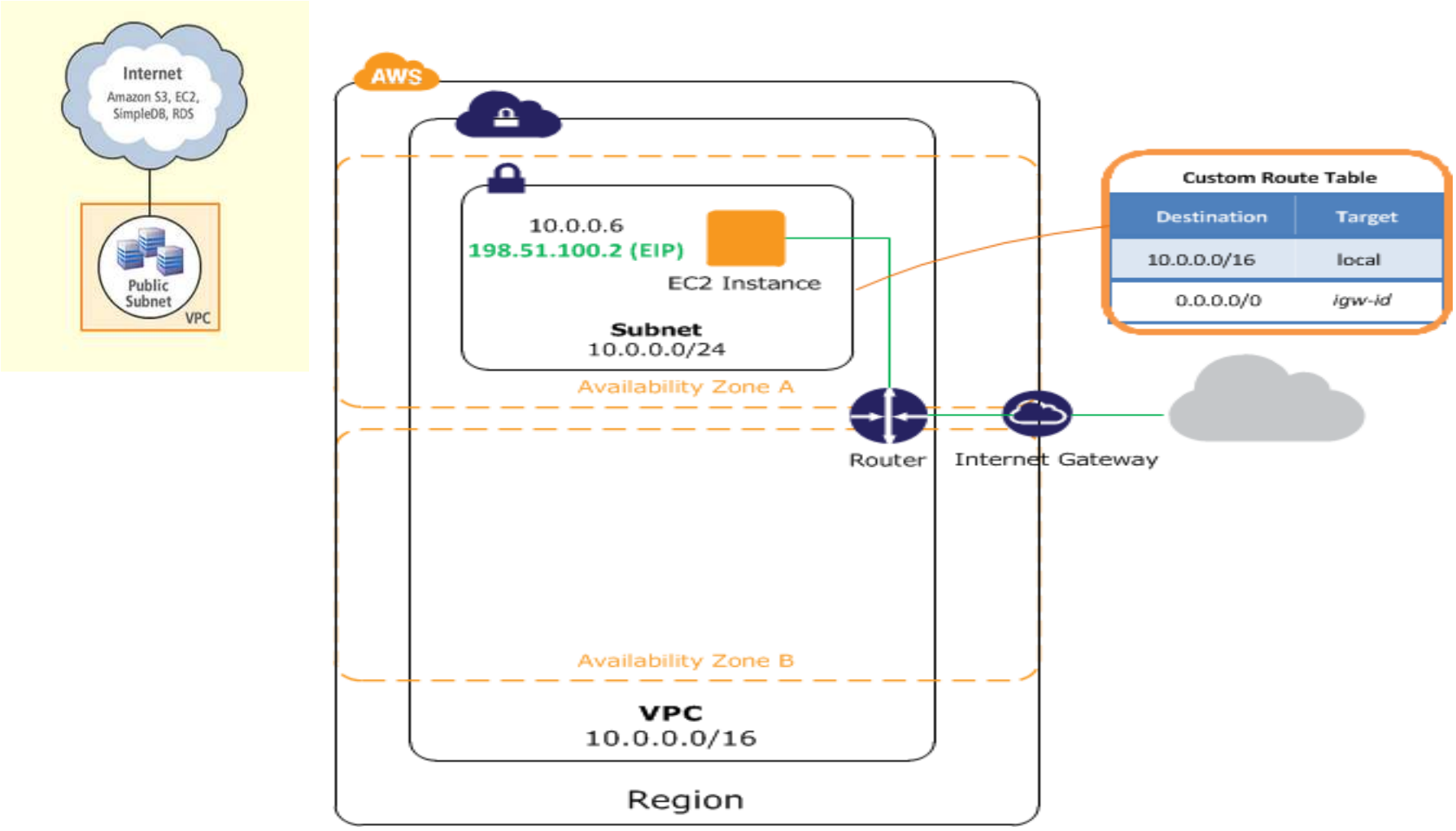
Amazon VPC Architecture Scenarios

AWS management console VPC Wizard Start VPC Options



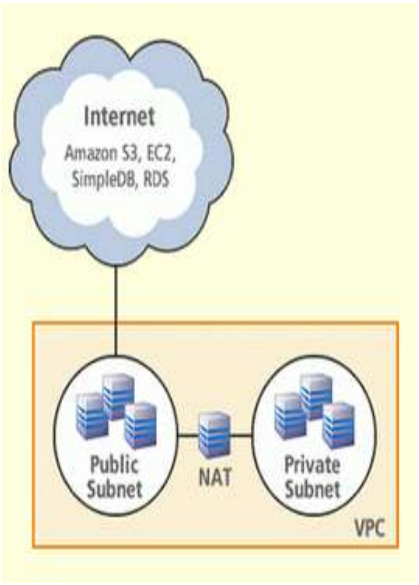
VPC Architecture Scenarios

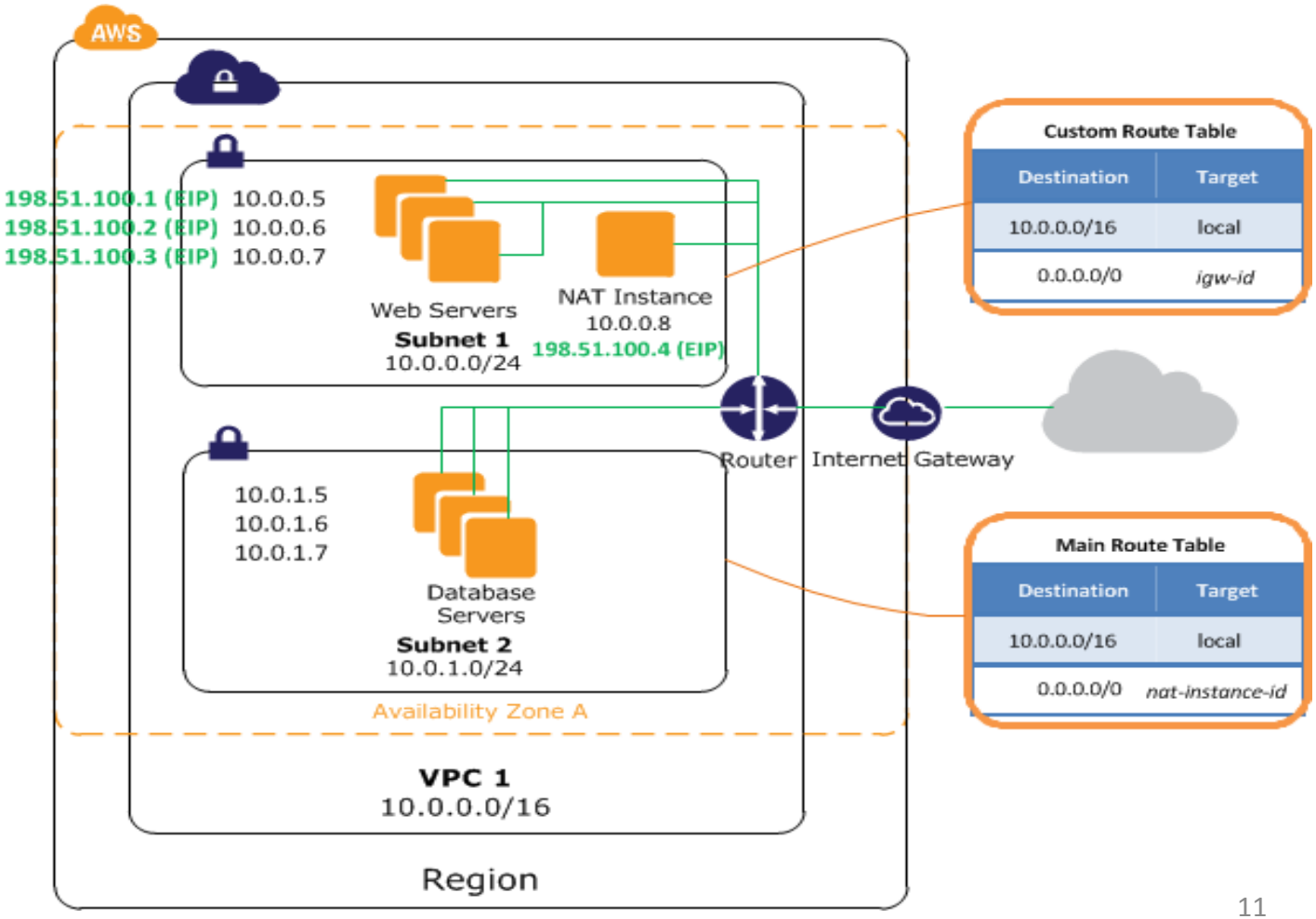
1. VPC with a Public Subnet Only



VPC Architecture Scenarios

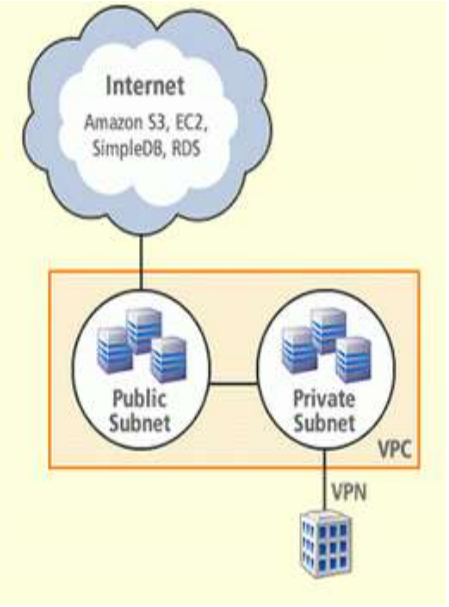
2. VPC with Public and Private Subnets

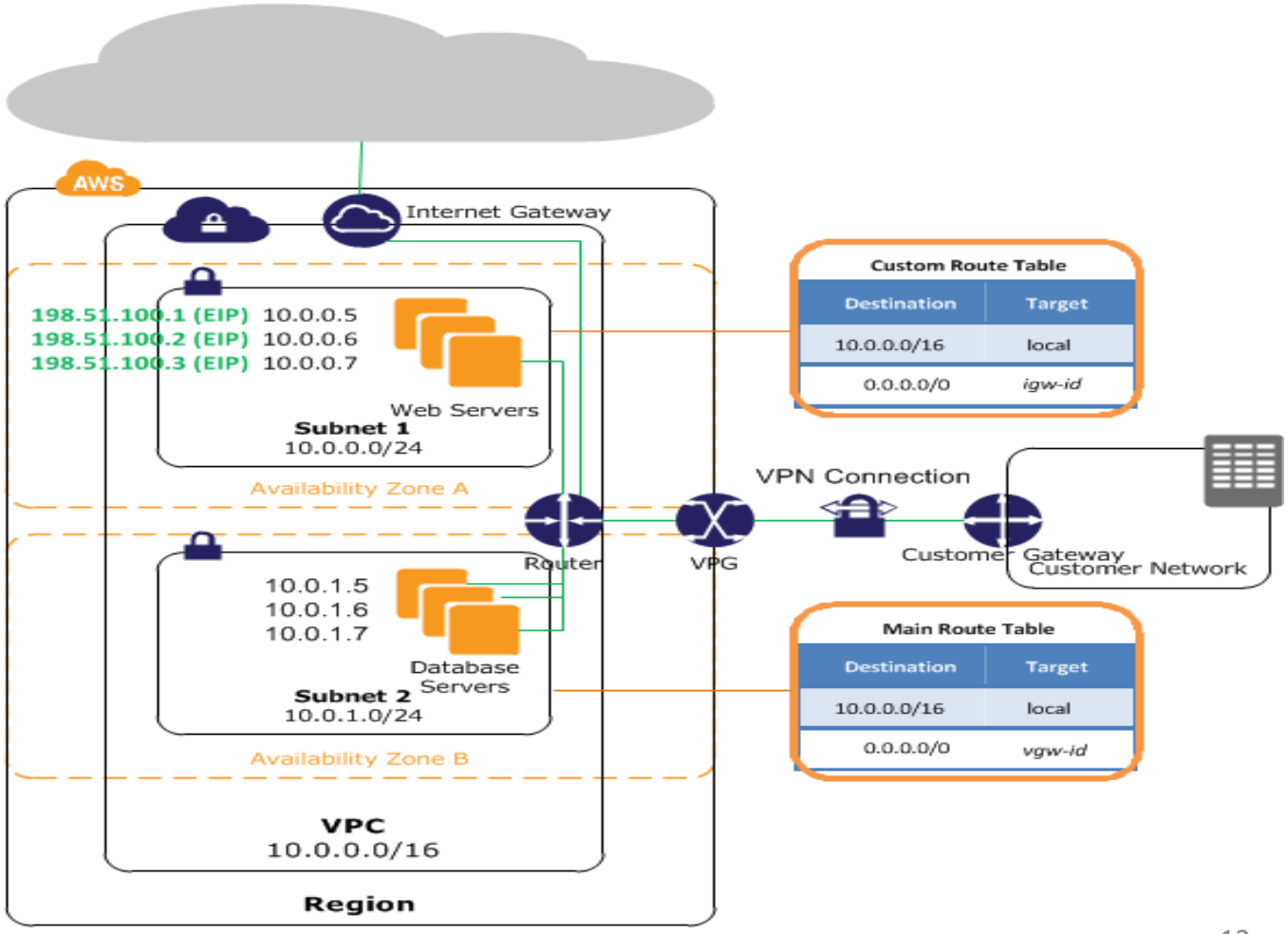




VPC Architecture Scenarios

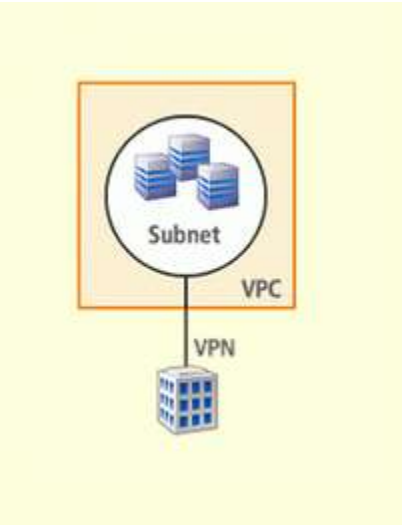
3. VPC with Public and Private Subnets and Hardware VPN Access

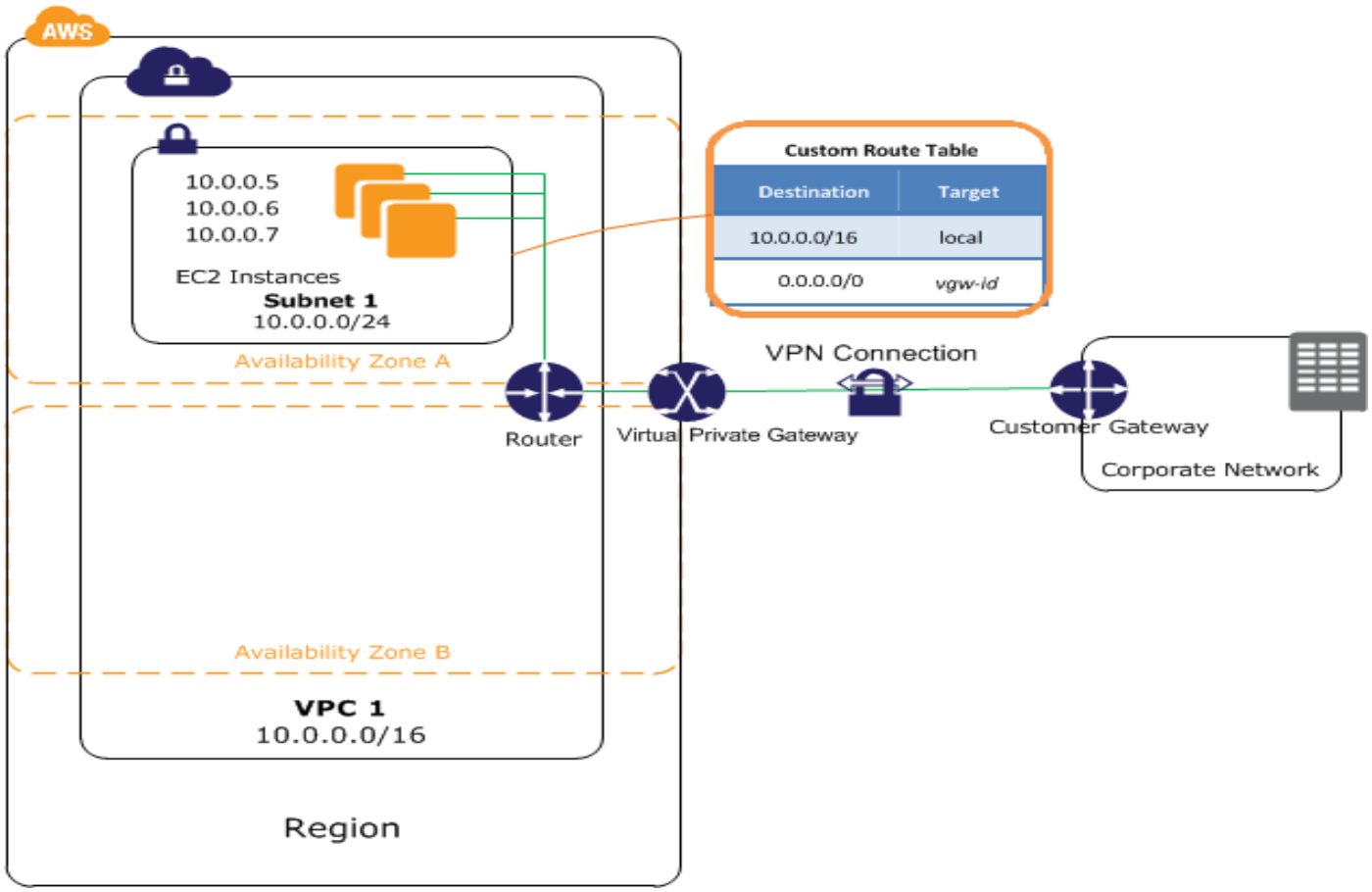




VPC Architecture Scenarios

4. VPC with a Private Subnet Only and Hardware VPN Access





Amazon VPC Architecture - Connectivity

- Architecture scenarios 3 & 4 were extending an existing on premise corporate network to the Amazon VPC with a VPN

- **"Amazon Virtual Private Cloud Connectivity Options"*** documents connectivity patterns for on premise corporate network to VPC connectivity (as well as VPC to VPC connectivity)

*** http://media.amazonwebservices.com/AWS_Amazon_VPC_Connectivity_Options.pdf**

Amazon VPC Architecture – Patterns for Corporate network to VPC Connectivity

- Hardware VPN, IPSec hardware VPN connection
- AWS Direct Connect, 802.1q VLAN 1Gbps or 10Gbps
- AWS Direct Connect + VPN, combination of the first two – IPSec VPN and AWS Direct Connect
- AWS VPN CloudHub, VPN connectivity to multiple customer premises
- Software VPN, EC2 instance running software VPN, eg OpenVPN

*** http://media.amazonwebservices.com/AWS_Amazon_VPC_Connectivity_Options.pdf**

Amazon VPC Architecture – AWS Products

Products ***currently*** available ***in*** Amazon VPC are

- Amazon EC2
- Amazon RDS[1] – can deploy RDS to a private subnet
- Auto Scaling
- Elastic Load Balancing[2] – in a VPC, ELB is also available internally, unlike public cloud EC2, where ELB is only available as internet facing
- Amazon EMR
- Elastic Beanstalk[3]
- ElastiCache

1. http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_VPC.html
2. http://docs.aws.amazon.com/ElasticLoadBalancing/latest/DeveloperGuide/UserScenariosForVPC.html
3. http://docs.aws.amazon.com/elasticbeanstalk/latest/dg/AWSHowTo-vpc-requirements.html
   http://docs.aws.amazon.com/elasticbeanstalk/latest/dg/AWSHowTo-vpc-basic.html

- In conclusion, consider a **VPC Architecture** in your adoption of AWS for the extra security and network isolation

- However don't forget you are in the cloud so architect for the cloud
  - Architect for failure, High Availability and resilience
  - Scalability
  - etc

- Thank You