



Getting Started With AWS

-Chad Smith



Getting Started With AWS

Cloud Basics

What is The Cloud?

*Someone
Else's
Computer*

What is AWS?

*Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over **165** fully featured services from data centers globally. Millions of customers—including the fastest-growing startups, largest enterprises, and leading government agencies—trust AWS to power their infrastructure, become more agile, and lower costs.*

Why AWS?

Better security

Higher resilience

Increased company agility

Lower cost - sorta**

AWS General Design Principles

1. Stop guessing your capacity needs
2. Test systems at production scale
3. Automate to make architectural experimentation easier
4. Allow for evolutionary infrastructures
5. Drive architectures using data
6. Improve through game days

AWS Security Principles

1. Implement a strong identity foundation
2. Enable traceability
3. Apply security at all layers
4. Automate security best practices
5. Protect data in transit and at rest
6. Keep people away from data
7. Prepare for security events

AWS Building Blocks - Full List

Analytics

Application Integration

AR & VR

AWS Cost Management

Blockchain

Business Applications

Compute

Customer Engagement

Database

Developer Tools

End User Computing

Game Tech

Internet of Things

Machine Learning

Management & Governance

Media Services

Migration & Transfer

Mobile

Networking & Content Delivery

Robotics

Satellite

Security, Identity & Compliance

Storage

AWS Building Blocks - Course Scope

Analytics

Application Integration

AR & VR

AWS Cost Management

Blockchain

Business Applications

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Satellite

Security, Identity & Compliance

Storage

Account Creation

Sign up here:

<https://portal.aws.amazon.com/billing/signup#/start>

Root account email choice is important!

You must provide billing details!

Learn about the free tier:

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

AWS Console Demo Steps

Account login using MFA

Building Block List

CloudWatch dashboard

AWS Config compliance dashboard

AWS SSM dashboards

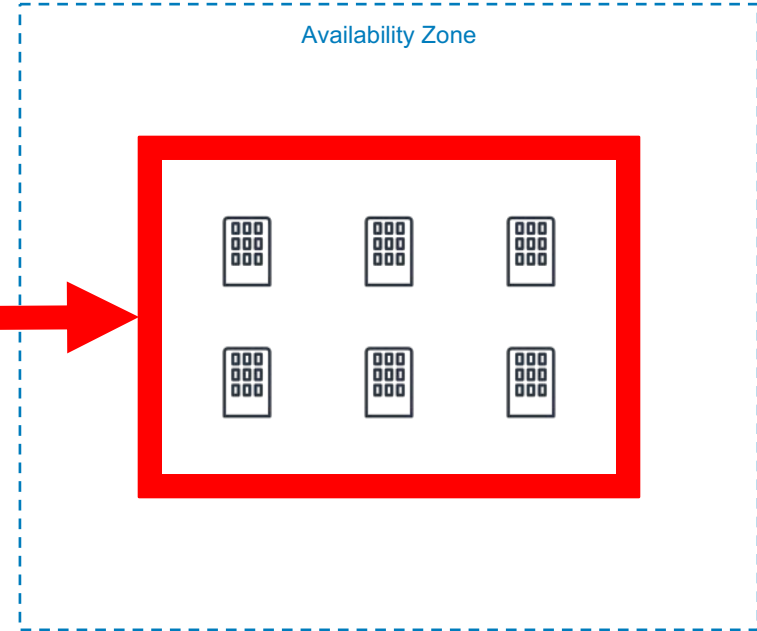


Getting Started With AWS

Global Infrastructure

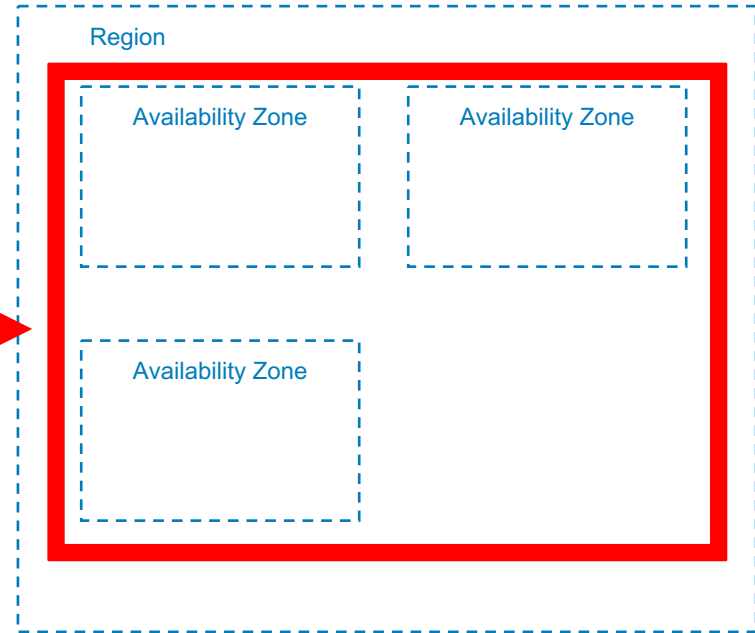
Service Scope - Availability Zone

2+ Data Centers
Colocated
Low latency



Service Scope - Region

3+ Availability Zones
Separated by 10s of
miles/km
Higher latency
100% independent



Service Scope - Global (sorta)

Usually us-east-1
Available globally
Can sometimes
change endpoint*



Service Scope - Global (for real)

Uses Edge Locations
Improve customer
experience
Avoid sensitive data



AWS WAF



Amazon Route 53



Amazon CloudFront



Getting Started With AWS

Network - VPC, Route53

VPC Summary



Virtual Private Network
Region scoped
Entirely virtualized
Full control over security
Many connectivity
options

VPC Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- **Networking & Content Delivery**
- **Security, Identity & Compliance**
- Storage

VPC Main Use Cases



Lift and shift migration
Application hosting
Protected workloads
Back office software
Legacy applications


VPC Resource Creation

Prerequisites

None!

VPC Resource Creation

Parameters

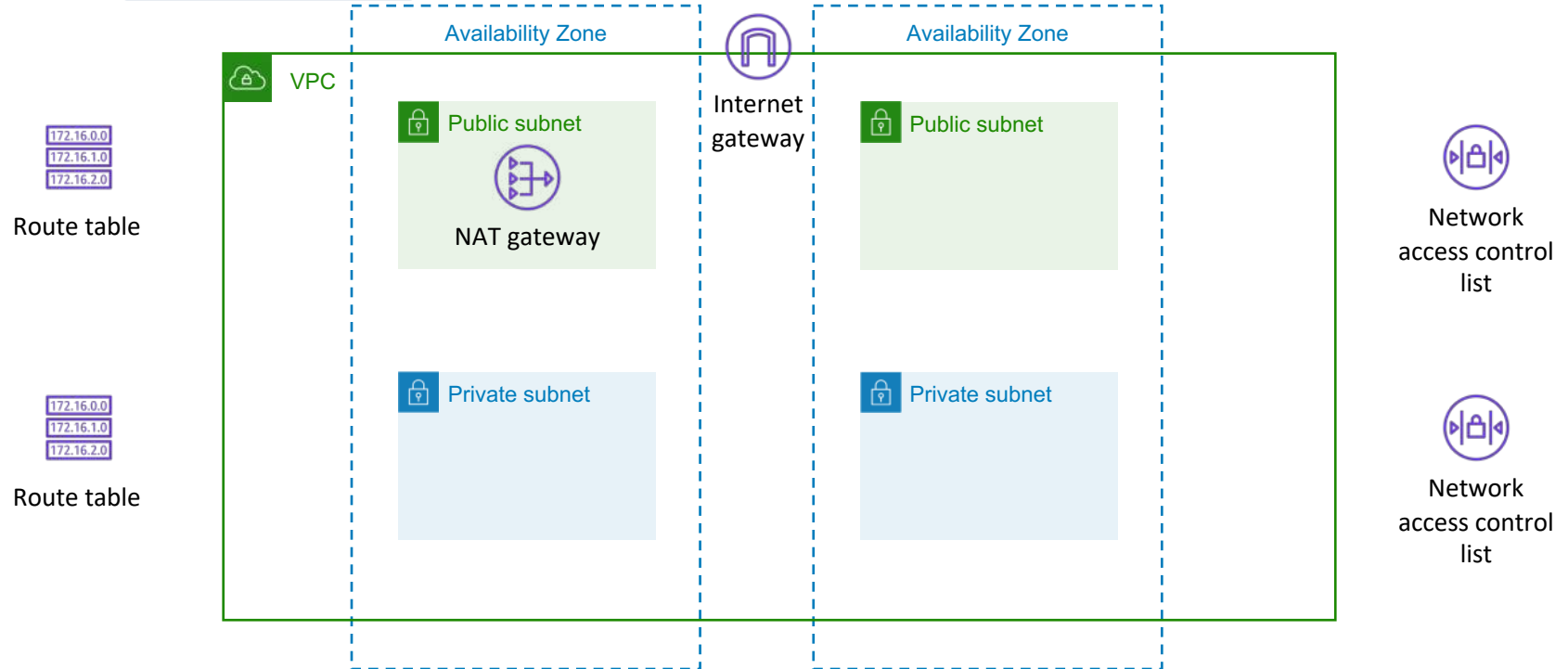
 VPC

CIDR RANGE
e.g. 10.0.0.0/16

That's it?

VPC Resource Creation

Parameters



VPC Operations Summary



Subnet create/update

NACL create/update

Route table create/update

Egress point creation

NAT GW creation

VPC Demo Steps

Create VPC manually using AWS Console

Create VPC using CloudFormation template

Route 53 Summary



Global scoped (for real)
Public DNS zones
Private DNS zones
Health checks
100% uptime SLA

Route 53 Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- **Networking & Content Delivery**
- Security, Identity & Compliance
- Storage

Route 53 Main Use Cases



DNS hosting

Traffic routing

Multi-region resilience

Route 53 Resource Creation

Domain Registration

Test domain
availability
Confirm choice
That's it!

Record Creation

Enter record name
Specify record type
Add further variables

Health Check Creation

Enter endpoint
Specify priority
Specify http/https
Other options

Route 53 Operations Summary



Domain renewal
Zone creation
Record
creation/updates
Health check
management

Route 53 Demo Steps

Show domain registration workflow

Create private dns zone

Allow resolution in new vpc

Create Route 53 Health Check



Getting Started With AWS

Compute - LightSail, EC2,
Cloud9, Lambda

LightSail Summary

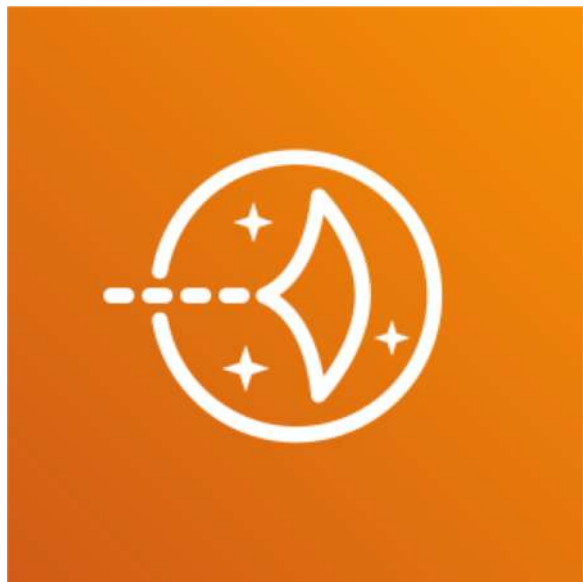


AZ Scoped
Simple virtualization
Great for new users

LightSail Building Blocks

- Application Integration
- **Compute**
- Database
- **Developer Tools**
- Management & Governance
- **Networking & Content Delivery**
- Security, Identity & Compliance
- Storage

LightSail Main Use Cases



“Infrastructure Lite”

Simple web applications

Websites

Dev environments

Proof of concept work

LightSail Resource Creation

Prerequisites

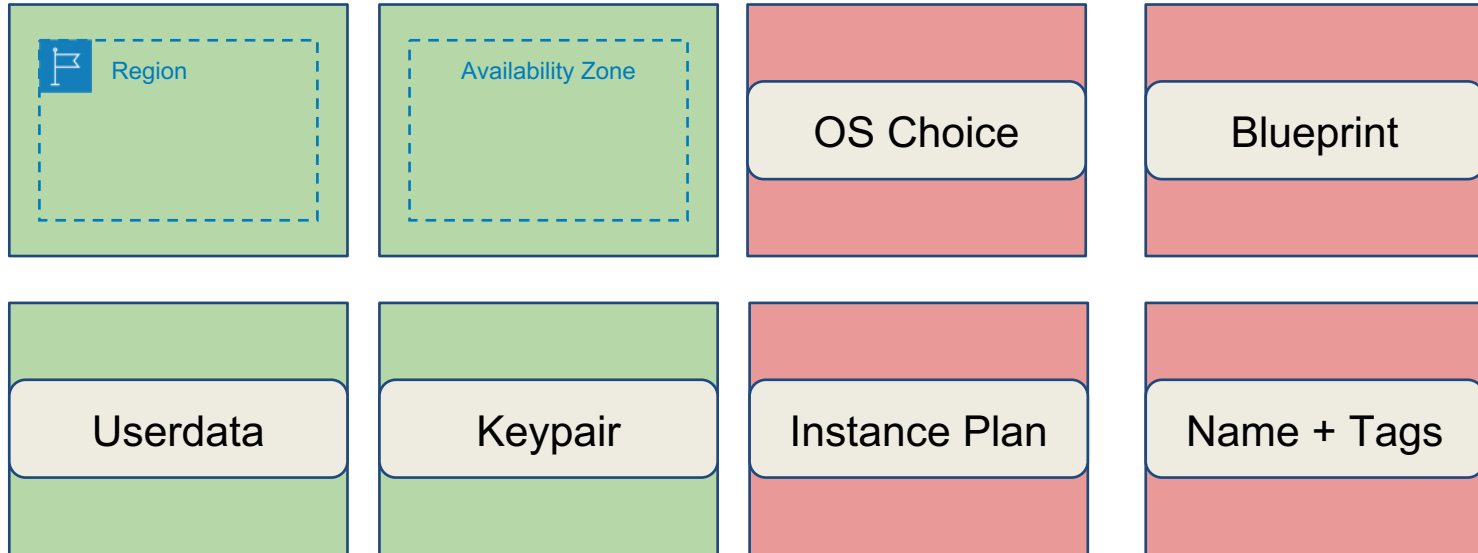
None!

LightSail Resource Creation

Parameters

Optional

Required



LightSail Operations Summary

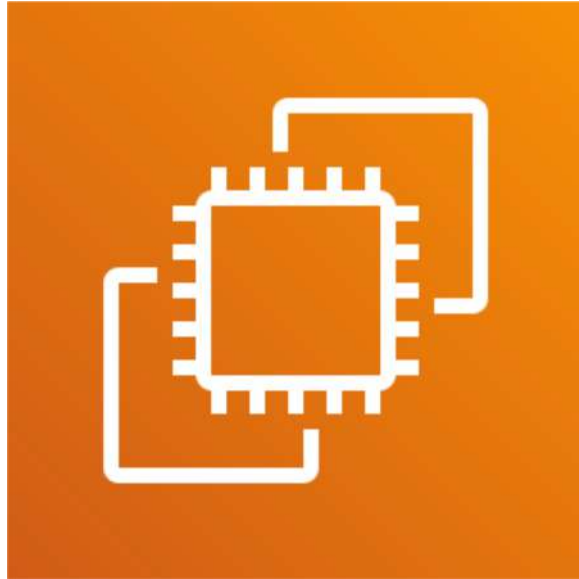


Enable outside service
connectivity

Change network port
settings

Manage static IP
addresses

EC2 Summary

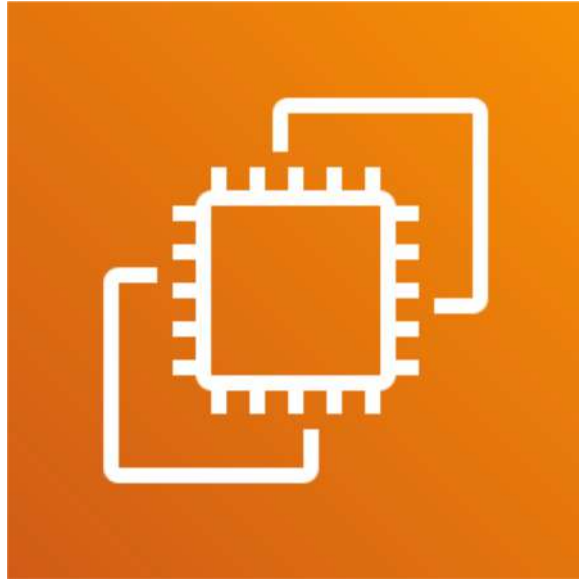


AZ Scoped
Virtual machines
Windows or Linux
Flexible cpu/mem/etc
The Multi-tool of AWS

EC2 Building Blocks

- Application Integration
- **Compute**
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

EC2 Main Use Cases



Web Applications

Container hosting

Back-office

Analytics

Protected workloads

Legacy applications

EC2 Resource Creation

Prerequisites

VPC Subnet

Security Group

EC2 Keypair

 Private subnet

OR

 Public subnet

Security group

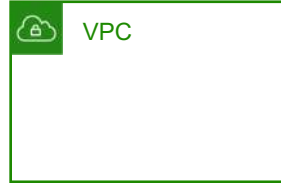
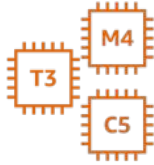


Keypair

EC2 Resource Creation

Parameters

Instance Type

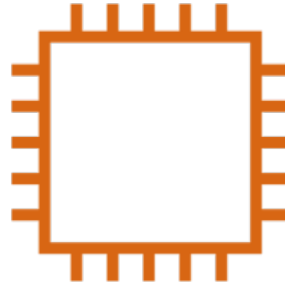


VPC/Subnet



IAM Role

AMI

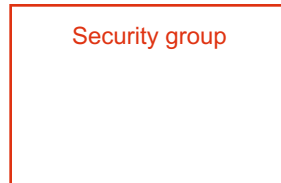


Userdata

Keypair



Security Group



Storage

EC2 Operations Summary



EVERYTHING in the OS
Network configuration
IAM Role updates
AMI management
AWS Events
Cost optimization

LightSail/EC2 Demo Steps

Show <https://www.ec2instances.info/>

Launch EC2 instance using AWS Console

Connect to EC2 instance and install applications

Launch Lightsail instance with applications

Cloud9 Summary



AZ scoped

IDE

No-hassle development

Real time collaboration

AWS ecosystem
integration

Cloud9 Building Blocks

- Application Integration
- **Compute**
- Database
- **Developer Tools**
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

Cloud9 Main Use Cases



Cloud-based
development
Team coding
collaboration

Cloud9 Resource Creation

Prerequisites

None!

Cloud9 Resource Creation

Parameters

Env Desc

Optional

Required

Env Name

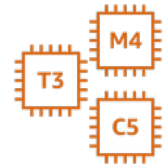


Env Type:
Dedicated
OR
Remote

Network Settings

Platform:
Amazon Linux
OR
Ubuntu

Instance Type



Cloud9 Operations Summary



Connect existing EC2 or
LightSail
Share Cloud9
environment with other
users

Lambda Summary



Region scoped
Serverless computing
Automated
deployments
Automated scaling
Multiple languages

Lambda Building Blocks

- **Application Integration**
- **Compute**
- Database
- **Developer Tools**
- **Management & Governance**
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

Lambda Main Use Cases



Serverless computing
Real-time processing
ETL
IOT
Web application
services

Lambda Resource Creation

Prerequisites

None!

Lambda Resource Creation Part 1

Parameters

Code Source

From Scratch

OR

From Blueprint

OR

Serverless
App Repo

Function Name

Runtime Language

Node.js

OR

Python

OR

Java

OR

Several
others!

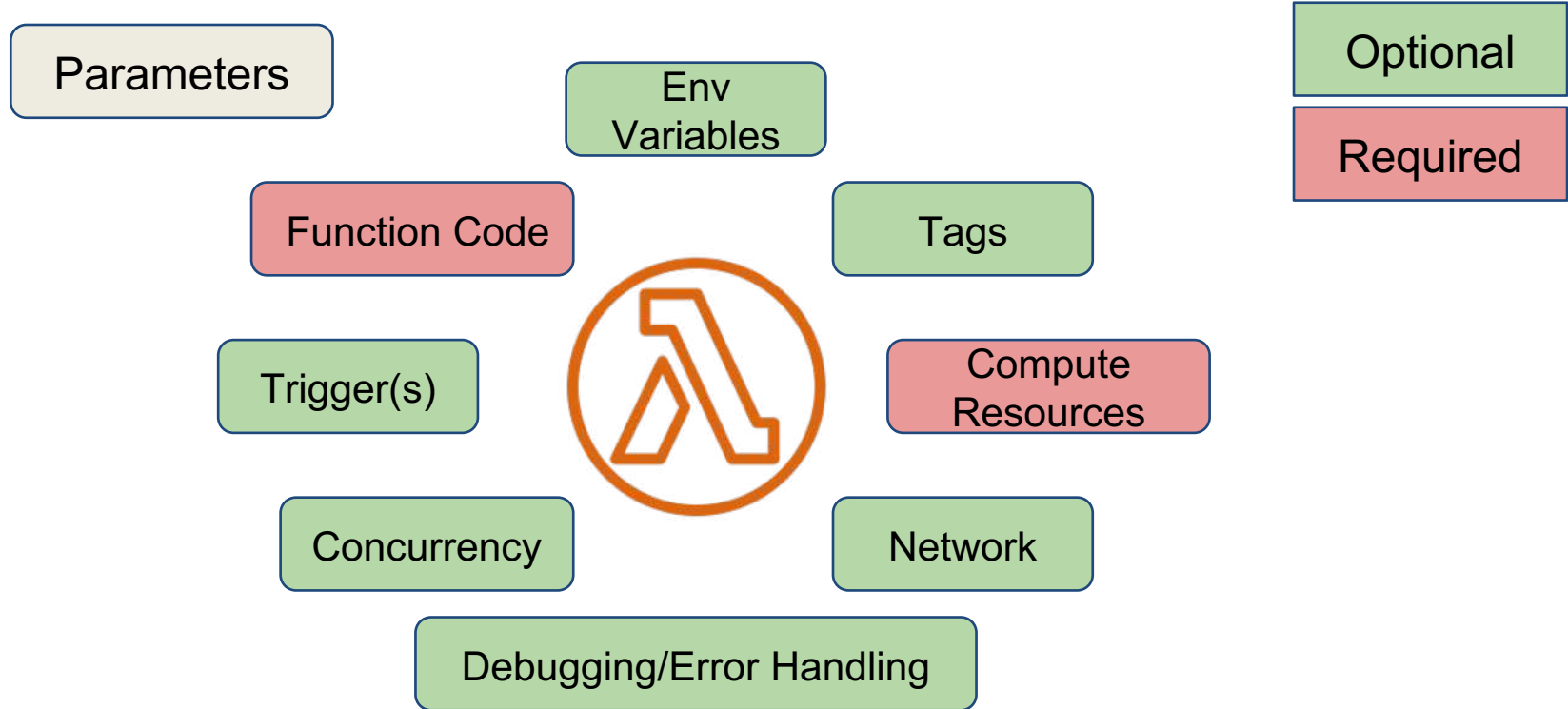
Permissions

Create new
IAM Role

OR

Use Pre-
existing

Lambda Resource Creation Part 2



Lambda Operations Summary



Function engine
upgrade

Code updates

Trigger management

Permissions
management

Resource and timeout
changes

Cloud9/Lambda Demo Steps

Launch Cloud9 and show IDE

Show Lambda function creation process



Getting Started With AWS

Storage - EBS, FSx, S3

EBS Summary



AZ scoped
Block storage
Transparent upsize
SSD or HDD

EBS Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- **Storage**

EBS Main Use Cases



Unstructured data

Binary objects

Database extent files

Clustered filesystems

Temporary storage

EBS Resource Creation

Prerequisites

None!

But an EC2 instance would be nice, since you can't view data without attaching the volume!

EBS Resource Creation

Parameters

Size

Optional

Required

Volume Type



Availability Zone

Encryption

Snapshot ID

EBS Operations Summary



Snapshot management
Disk upsizing
Performance
troubleshooting

FSx Summary



Region scoped
Filesystem storage
Secure and highly
performant
Gigabit throughput
Sub-millisecond latency
Integrated with S3

FSx Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- **Storage**

FSx Main Use Cases



Shared datasets

HPC

E2E encryption

S3 data sets on
filesystem

FSx Resource Creation

Prerequisites

VPC Subnet

Security Group



Private subnet



Public subnet

OR

Security group

FSx Resource Creation

Parameters

Storage Capacity

Optional

Required

FS Name



S3 Integration

FSx



VPC

Availability Zone

Security group



Private subnet

FSx Operations Summary



Create filesystem
Data import
Filesystem backups

S3 Summary



Simple Storage Service
Region scoped
Object storage
Each object has unique
URL
The “multi-tool” of
storage services

S3 Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- **Networking & Content Delivery**
- Security, Identity & Compliance
- **Storage**

S3 Main Use Cases



Backups

Data sets

Static website assets

Temporary storage

Underlying storage for
many other services

S3 Resource Creation

Prerequisites

None!

S3 Resource Creation Part 1

Parameters

Optional

Required

Region



Bucket name that is globally unique and conforms to DNS standards

There has to be more, right?

S3 Resource Creation Part 2, Options

Parameters

Default bucket
encryption

Optional

Required

Bucket access
policy

Static website

Bucket
versioning

Block Public
Access

Bucket
replication

Object storage
classes

Bucket ACL

Lifecycle
Policies

CORS
configuration

Object Lock



LOTS MORE

S3 Operations Summary



Bucket Policy
management

Lifecycle policy
management

Cross region replication

Storage management

EBS/S3 Demo Steps

Create EBS volumes and attach to EC2

Upsize EBS volume

Create EBS snapshot

Create S3 bucket

Add default SSE to S3 bucket

Create S3 bucket lifecycle policy

Access S3 bucket from EC2



Getting Started With AWS

Database - RDS/Aurora,
DynamoDB

RDS Summary



AZ scoped *

Managed relational
database

Small operational
overhead

Cross-region replicas

Auto Scaling **

Serverless **

RDS Building Blocks

- Application Integration
- Compute
- **Database**
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- **Security, Identity & Compliance**
- **Storage**

RDS Main Use Cases



Dev/test databases
(single AZ)

Prod databases (multi-AZ)

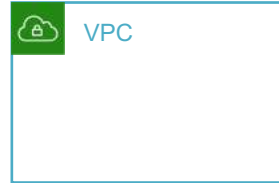
Big data workloads

Data lake ingestion

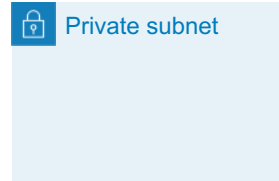
RDS Resource Creation

Prerequisites

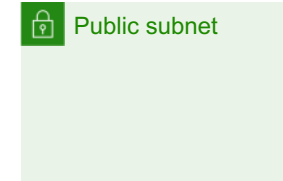
VPC



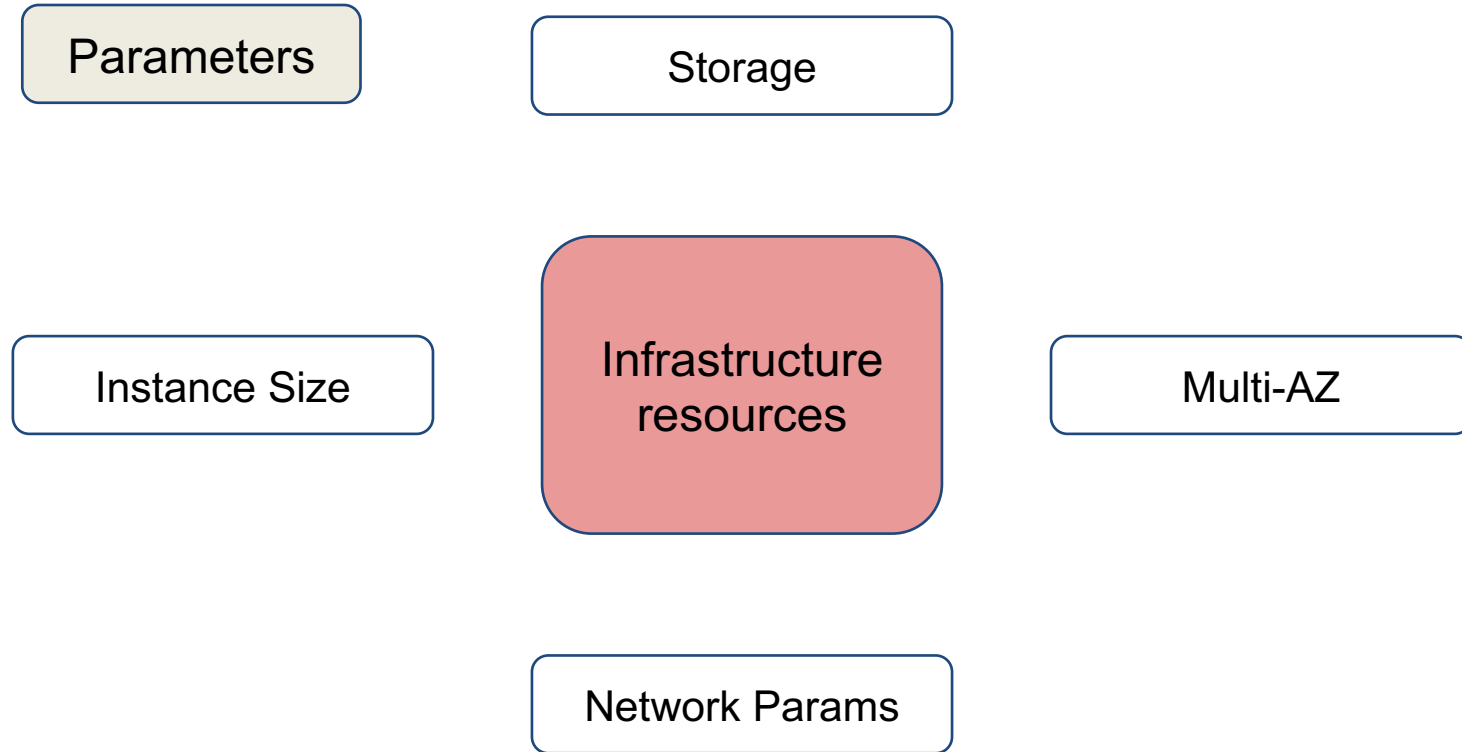
Subnet Group



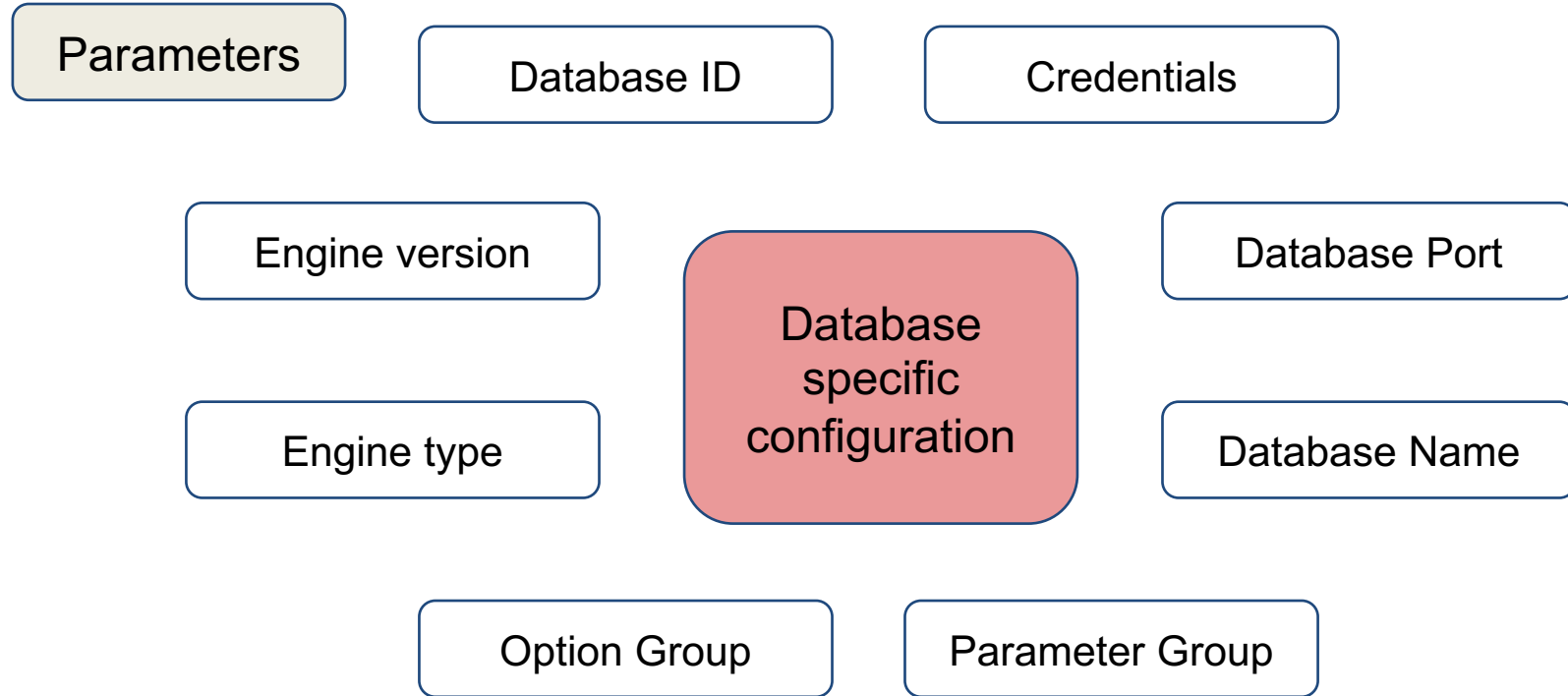
OR



RDS Resource Creation Part 1



RDS Resource Creation Part 2



RDS Resource Creation Part 3

Parameters

Encryption

Backups

Platform
Management

Monitoring

Maint. Window

RDS Operations Summary



Disk space upsizing
RDS instance rightsizing
Backup management
Parameter management
Replica management

DynamoDB Summary



Region scoped

Managed NoSQL
database

Serverless

Global table option

High performance

Static provisioning OR

Instant autoscaling

DynamoDB Building Blocks

- Application Integration
- Compute
- **Database**
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- **Storage**

DynamoDB Main Use Cases



Click tracks

Session data

Time series data

Document storage

Key/value data

DynamoDB Resource Creation

Prerequisites

None!

DynamoDB Resource Creation

Parameters

Optional

Required

Table name



Primary key*
This is a **BIG DEAL**.
Choose wisely.

DynamoDB Operations Summary



TTL management

Auto scaling
configuration

Global table
management

Index management

RDS Demo Steps

Launch RDS instance (MySQL engine)

Show RDS parameter change process

Launch Aurora serverless database

Create DynamoDB global table



Getting Started With AWS

Integration - ELB, Auto Scaling,
Beanstalk, ECS

ELB Summary



Region scoped*

Elastic Load Balancer

Distribute traffic to
instances or containers

Classic LB (layers 4,7)

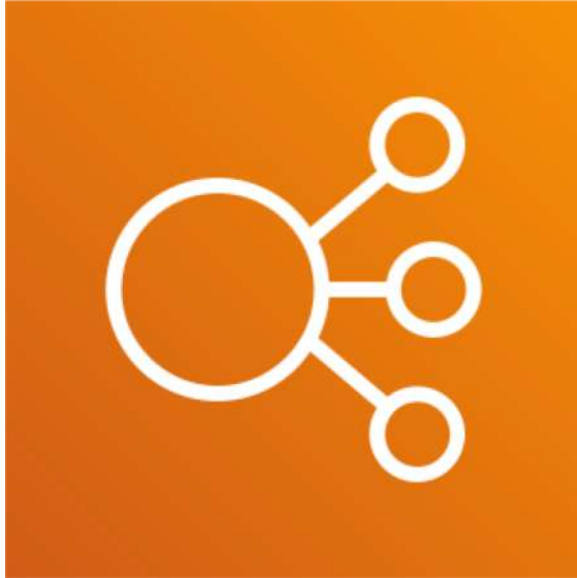
Application LB (layer 7)

Network LB (layer 4)

ELB Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- **Networking & Content Delivery**
- Security, Identity & Compliance
- Storage

ELB Main Use Cases



Web proxy

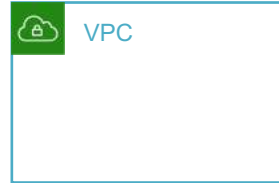
API front end

TCP/UDP endpoint

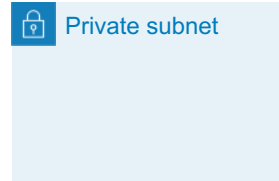
ELB Resource Creation

Prerequisites

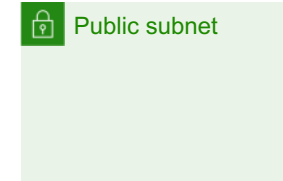
VPC



Subnet(s)



OR



ELB Resource Creation (CLB/ALB/NLB)

Parameters



Internet
Facing
(Y/N)

Optional

Required

Name



Listener(s)

Security group

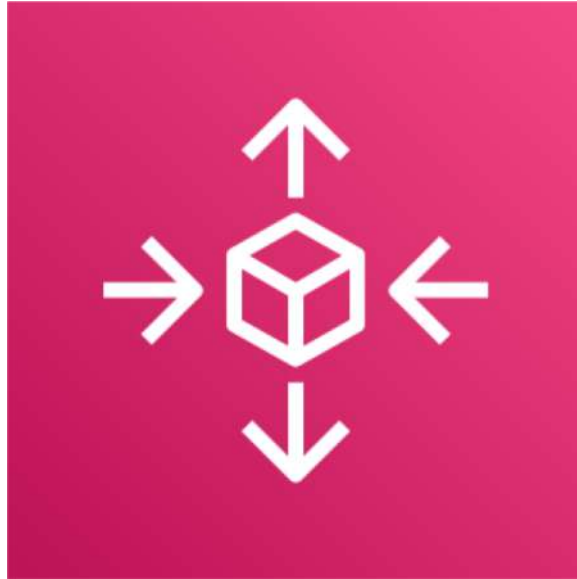
Private subnet

ELB Operations Summary



Listener rule
management
Target group
management
Health check
management

Auto Scaling Summary



Region scoped*

Multiple service options

Horizontal scaling

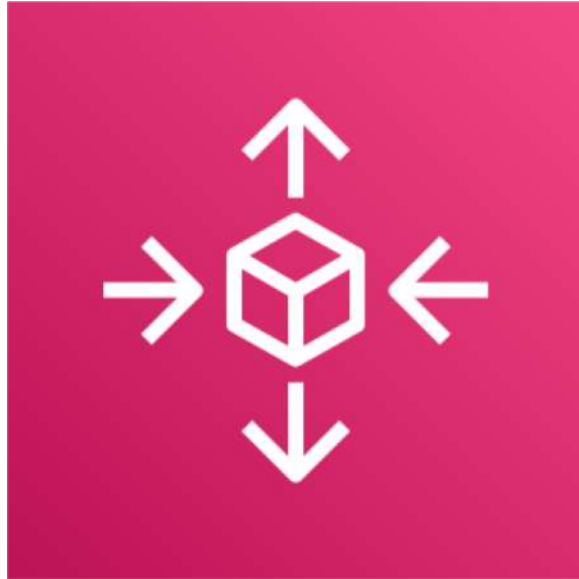
Predictive scaling option

Multiple best practices

Auto Scaling Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

Auto Scaling Main Use Cases



Web service fleet

Application servers

DynamoDB tables

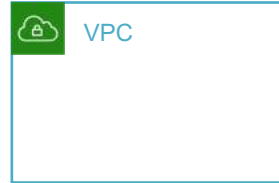
ECS container services

RDS Aurora endpoints

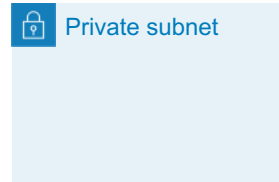
Auto Scaling Resource Creation

Prerequisites

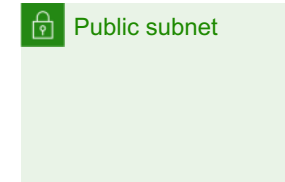
VPC



Subnet(s)



OR



Auto Scaling Resource Creation

Launch Template

WHAT to launch
EC2 instance type
Security Group
IAM Role
Pricing model

Auto Scaling Group

WHERE to launch
LIMITATIONS of launch
VPC subnets
ELB association

Auto Scaling Policy

WHEN to launch
Based on metrics
CloudWatch Alarm

Scheduled Actions

WHEN to launch
Based on calendar
Coexist with policies

Auto Scaling Operations Summary



Launch config/template
management

Min/Max updates

Auto Scaling policy
management

Scheduled Actions
creation

Elastic Beanstalk Summary



Region scoped*
Elastic Beanstalk
Application
environment
ELB, EC2, RDS
Auto Scaling optional
Fully managed

Elastic Beanstalk Building Blocks

- Application Integration
- **Compute**
- Database
- **Developer Tools**
- Management & Governance
- **Networking & Content Delivery**
- Security, Identity & Compliance
- Storage

Elastic Beanstalk Main Use Cases

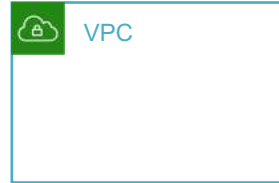


Application hosting
Dev environments
Web services

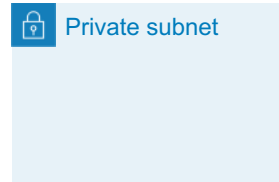
Elastic Beanstalk Resource Creation

Prerequisites

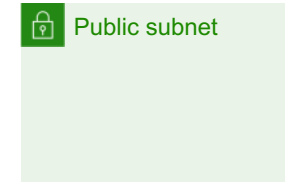
VPC



Subnet(s)

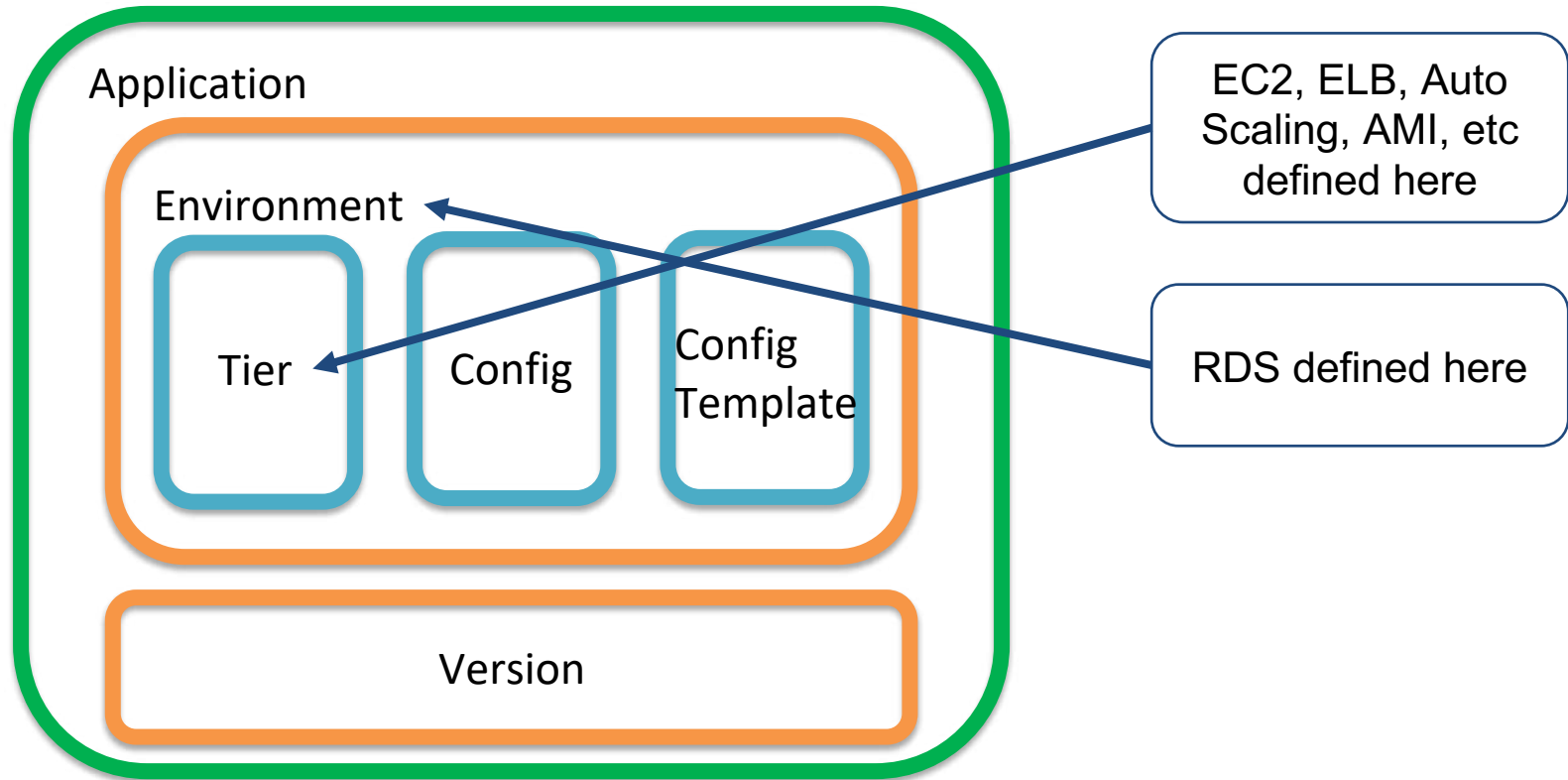


OR



Is this starting to look familiar?

Elastic Beanstalk Resource Creation



Elastic Beanstalk Operations Summary



Application updates

Application cloning

OS/AMI updates

Application container
version management

ECS Summary



Region scoped*

Elastic Container Service

Docker or Windows

EC2 or Fargate

Auto scaling

Automated deployment

ECS Building Blocks

- Application Integration
- **Compute**
- Database
- **Developer Tools**
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

ECS Main Use Cases

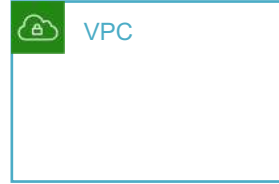


Webservice containers
Application back ends
Singleton applications

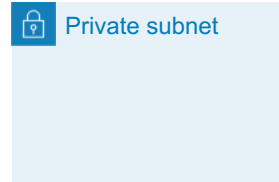
ECS Resource Creation

Prerequisites

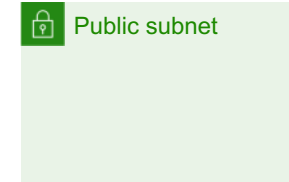
VPC



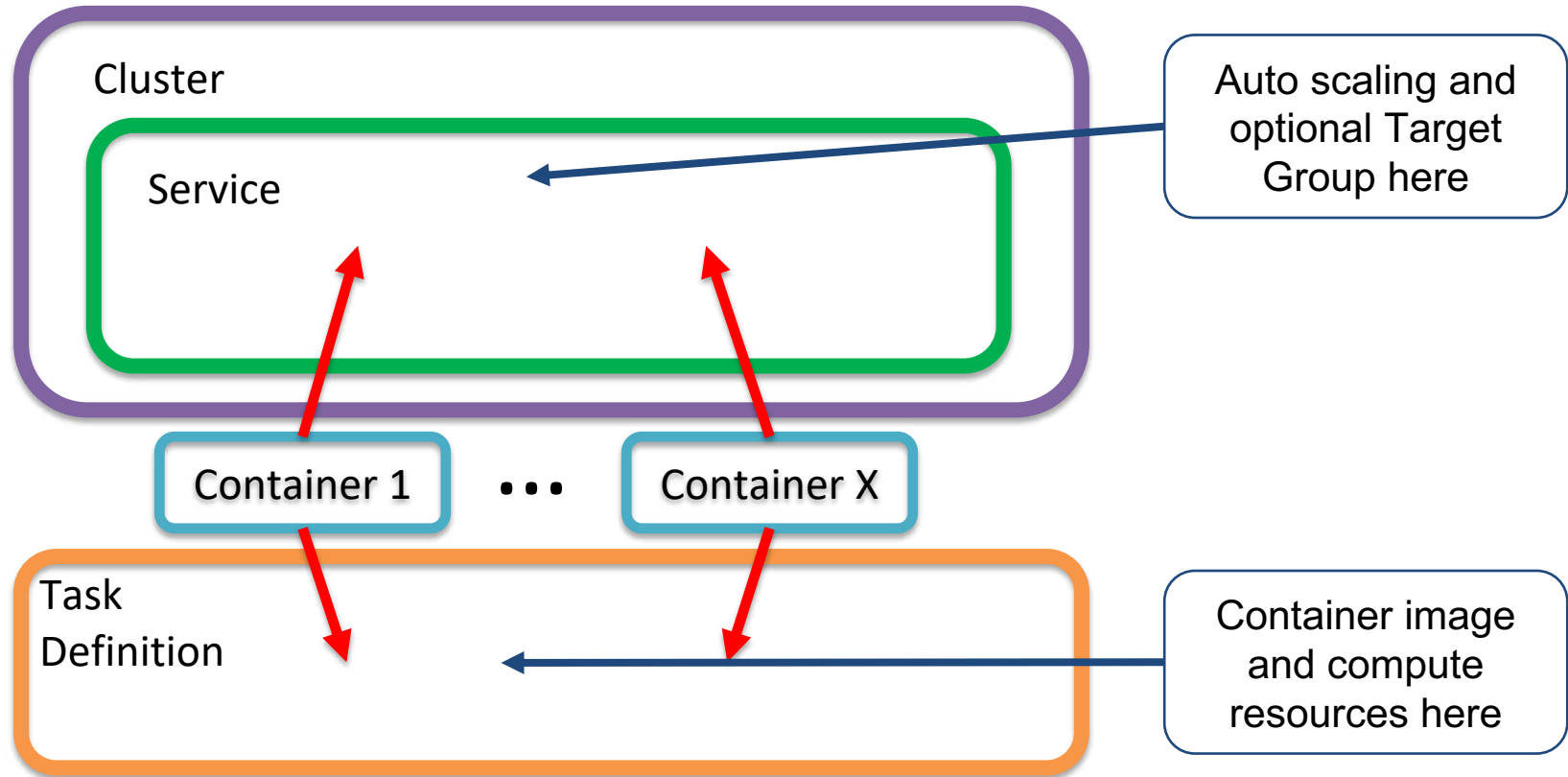
Subnet(s)



OR



ECS Resource Creation



ECS Operations Summary



Service deployment

EC2 instance
management**

Log management

Container repository
management

Beanstalk Demo Steps

Create Elastic Beanstalk application

Show process for cloning for new environment



Getting Started With AWS

Security Services - IAM,
CloudTrail, GuardDuty,
Inspector

IAM Summary



Global scoped (sorta)
Identity and Access
Management
Authentication
Authorization
Users & Groups
Roles & Policies

IAM Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- **Security, Identity & Compliance**
- Storage

IAM Main Use Cases



User-based access
Cross-account perms
Enable least privilege

IAM Resource Creation - User

Parameters



API key

OR

User/Pass



IAM Policy



IAM Group

Optional

Required

IAM Resource Creation - Group

Parameters



IAM Policy



IAM Policy



IAM Policy



IAM Policy

Optional

Required

IAM Resource Creation - Role

Parameters


Trust Policy

Optional

Required




Permissions Policy


Permissions Policy

IAM Resource Creation - Policy

Parameters

Action(s)

Optional

Required

Service(s)



Resource(s)

Condition(s)

IAM Operations Summary



Policy
management/updates
User management
Federation management
Role management

IAM Demo Steps

Create new IAM Policy for read-only

Create new IAM Group

Create new IAM User

Create new IAM Role and test read-only policy

CloudTrail Summary



Region scoped
Can enable globally
Account audit trail
Logging API actions

CloudTrail Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- **Security, Identity & Compliance**
- Storage

CloudTrail Main Use Cases



Governance

Compliance

Security controls

Troubleshooting/RCA

CloudTrail Resource Creation

Prerequisites

None!

CloudTrail Resource Creation

Parameters

Current
region

OR

All regions



S3 Bucket



CloudWatch
Logs

Optional

Required

CloudTrail Operations Summary



Trail management
Log management

GuardDuty Summary



Region scoped
Managed account
protection
Uses ML models
Generates findings of
abnormal behavior

GuardDuty Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- **Security, Identity & Compliance**
- Storage

GuardDuty Main Use Cases



Account monitoring

Detective controls on:

- CloudTrail logs
- VPC Flow logs
- DNS logs

GuardDuty Resource Creation

Prerequisites

Parameters

None! - you
just enable
per-region

GuardDuty Operations Summary



Forwarding findings

Finding mitigation

Finding notification
configuration

Trusted IP list mgmt

Threat IP list mgmt

Inspector Summary



Region scoped
EC2 OS security audit
Multiple rules packages

Inspector Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- **Security, Identity & Compliance**
- Storage

Inspector Main Use Cases



Facilitate golden AMI
Audit existing instances
On-demand rule
evaluation

Inspector Resource Creation

Prerequisites



Inspector Agent
Installed on EC2

Which can be
installed
automatically.....if:



Systems Manager
Agent Installed



You also need an
SNS topic

Inspector Resource Creation

Parameters

Assessment
Template

Which
contains 1
or more of
the
following:

1. Network Reachability
2. Security Best Practices
3. CVE
4. CIS OS Sec Benchmark
5. Runtime Behavior Analysis

and...

EC2
assessment
target(s)

Optional

Required

Inspector Operations Summary



Agent
installation/updates
Assessment run
configuration
Finding mitigation

CloudTrail/GuardDuty Demo Steps

Explore Cloudtrail logs in CloudWatch

Explore GuardDuty console and findings



Getting Started With AWS

Monitoring Services -
CloudWatch, SNS

CloudWatch Summary



Region scoped

Primary monitoring
service

Metrics

Alarms

Events

Logs

Highly customizable

CloudWatch Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

CloudWatch Main Use Cases



Performance monitoring
Availability monitoring
Log monitoring
Event monitoring

CloudWatch Alarm Resource Creation

Prerequisites



CloudWatch Alarm

Requires

A number-based metric, either intrinsic to an AWS resource or custom

CloudWatch Alarm Resource Creation

Parameters

Condition

Optional

Required

Metric



Notification(s)

EC2 Action

Auto Scaling
Action

CloudWatch Operations Summary



Alarm management

Dashboard management

Log group management

Event management

SNS Summary



Region scoped
Simple Notification
Service
Topics and subscribers

SNS Building Blocks

- **Application Integration**
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

SNS Main Use Cases



Email subscribers

HTTP/HTTPS endpoints

SMS subscribers

Mobile push subscribers

SQS subscribers

SNS Resource Creation

Prerequisites

None!

SNS Resource Creation

Parameters

Encryption

Optional

Required

Topic Name



Access Policy

Delivery Status

Delivery Retry

SNS Operations Summary



Topic policy
management

Topic subscription
management

Access policy
management

CloudWatch/SNS Demo Steps

Create SNS Topic

Subscribe to SNS Topic

Create CloudWatch alarm with notifications



Getting Started With AWS

Management Tools - AWS
Backup, EC2 Launch
Templates, AWS SSM

AWS Backup Summary



Region scoped
Managed backup service
No direct resources
Reduce operational
overhead

AWS Backup Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- Security, Identity & Compliance
- **Storage**

AWS Backup Main Use Cases



EFS

DynamoDB

RDS

EBS

Storage Gateway

AWS Backup Plan Resource Creation

Prerequisites

It is nice to have resources
that need to be backed up,
but not required!

AWS Backup Plan Resource Creation

Parameters

Use Backup Plan
Template

OR

Build Backup Plan
using Wizard

OR

Upload JSON
Backup Plan

+

Backup Plan Name

=



AWS Backup Operations Summary



Backup plan
management
Backup job
management
Resource tagging

EC2 Launch Templates Summary



Region scoped
Configuration for
launching EC2
Version controlled

EC2 Launch Templates Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- Management & Governance
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

EC2 Launch Templates Main Use Cases



Reduce overhead of EC2 launch

Consistent launch across regions and accounts

Just like launching an EC2 instance, except you supply the Launch Template name and version name!

EC2 Launch Templates Operations Summary



Launch template
creation

Launch template version
updates

AWS SSM Summary



Region scoped
AWS Systems Manager
Automate operational
tasks
Commands
Patches
Inventory
Dashboard

AWS SSM Building Blocks

- Application Integration
- Compute
- Database
- Developer Tools
- **Management & Governance**
- Networking & Content Delivery
- Security, Identity & Compliance
- Storage

AWS SSM Main Use Cases



Regular tasks on EC2
Patch management
OS configuration
management
License management

AWS SSM Resource Creation

This is a large suite of individual tools. EACH TOOL has their own resource creation process. Start simple!

AWS SSM Operations Summary



Literally too many to list

AWS SSM Demo Steps

Use Run Command to execute linux command

Explore Patch Manager

Explore Dashboard

(If there's enough time)

Create AWS Backup Plan



Q&A Wrap Up