CS 4037
Introduction to Cloud Computing
Lecture 30

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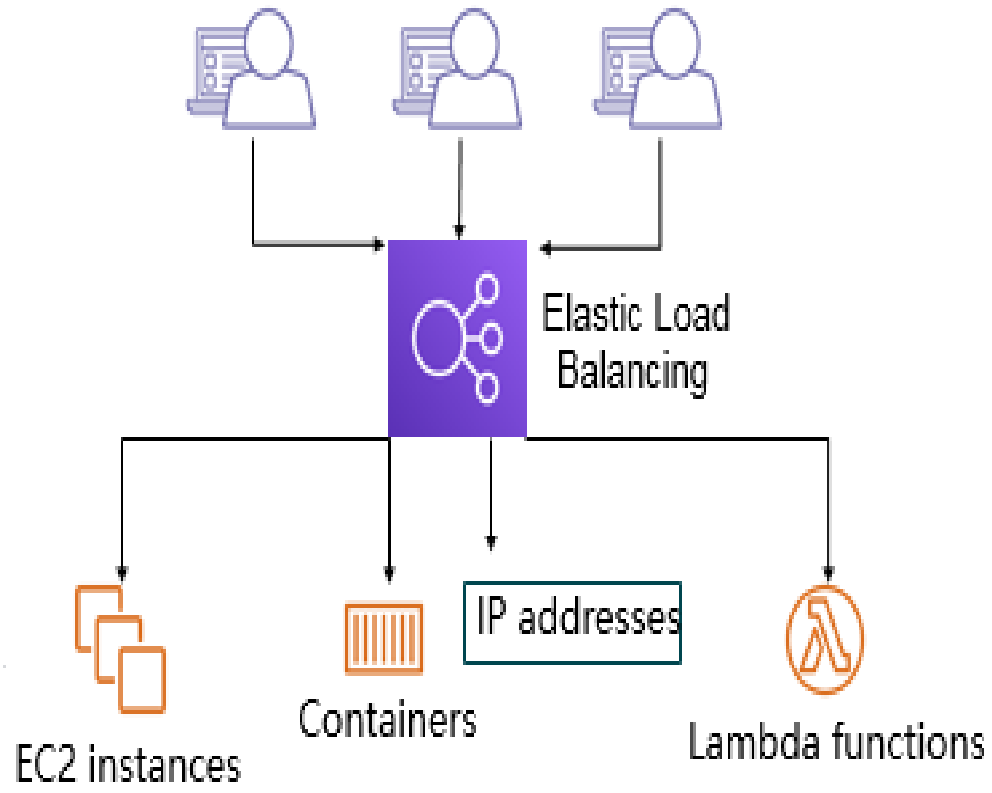
AWS Auto Scaling and Monitoring

Lecture's Agenda

- **Elastic Load Balancing**
- Amazon CloudWatch
- Amazon EC2 Auto Scaling
- Certification Exams

Elastic Load Balancing

- **Distributes incoming application or network traffic across multiple targets in a single Availability Zone or across multiple Availability Zones**
- **Scales load balancer as traffic to application changes over time**



Types of Load Balancers

Application Load Balancer	Network Load Balancer	Classic Load Balancer (Previous Generation)
• Load balancing of HTTP and HTTPS traffic	• Load balancing of TCP, UDP, and TLS traffic where extreme performance is required	• Load balancing of HTTP, HTTPS, TCP, and SSL traffic
• Routes traffic to targets based on content of request • Provides advanced request routing targeted at the delivery of modern application architectures, including microservices and containers	• Routes traffic to targets based on IP protocol data • Can handle millions of requests per second while maintaining ultra-low latencies • Is optimized to handle sudden and volatile traffic patterns	• Load balancing across multiple EC2 instances
• Operates at the application layer (OSI model layer 7)	• Operates at the transport layer (OSI model layer 4)	• Operates at both the application and transport layers.

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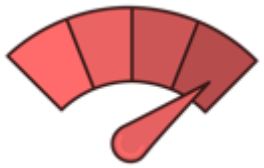
Amazon CloudWatch

- **Monitors:**
  - **AWS resources**
  - **Applications that run on AWS**
- **Collects and tracks:**
  - **Standard metrics**
    - ✓ **CPU Utilization (GHz and %)**
    - ✓ **RAM Utilization (GBs and %)**
    - ✓ **Storage Utilization (GBs and %)**
    - ✓ **Network Inbound Throughput (IGW) (Mbps or Gbps)**
    - ✓ **Network Outbound Throughput (IGW) (Mbps or Gbps)**
  - **Custom metrics**
    - ✓ **Network Inbound Throughput (NAT-GW) (Mbps or Gbps)**
    - ✓ **Network Outbound Throughput (NAT-GW) (Mbps or Gbps)**

Amazon CloudWatch

Amazon CloudWatch (Cont.)

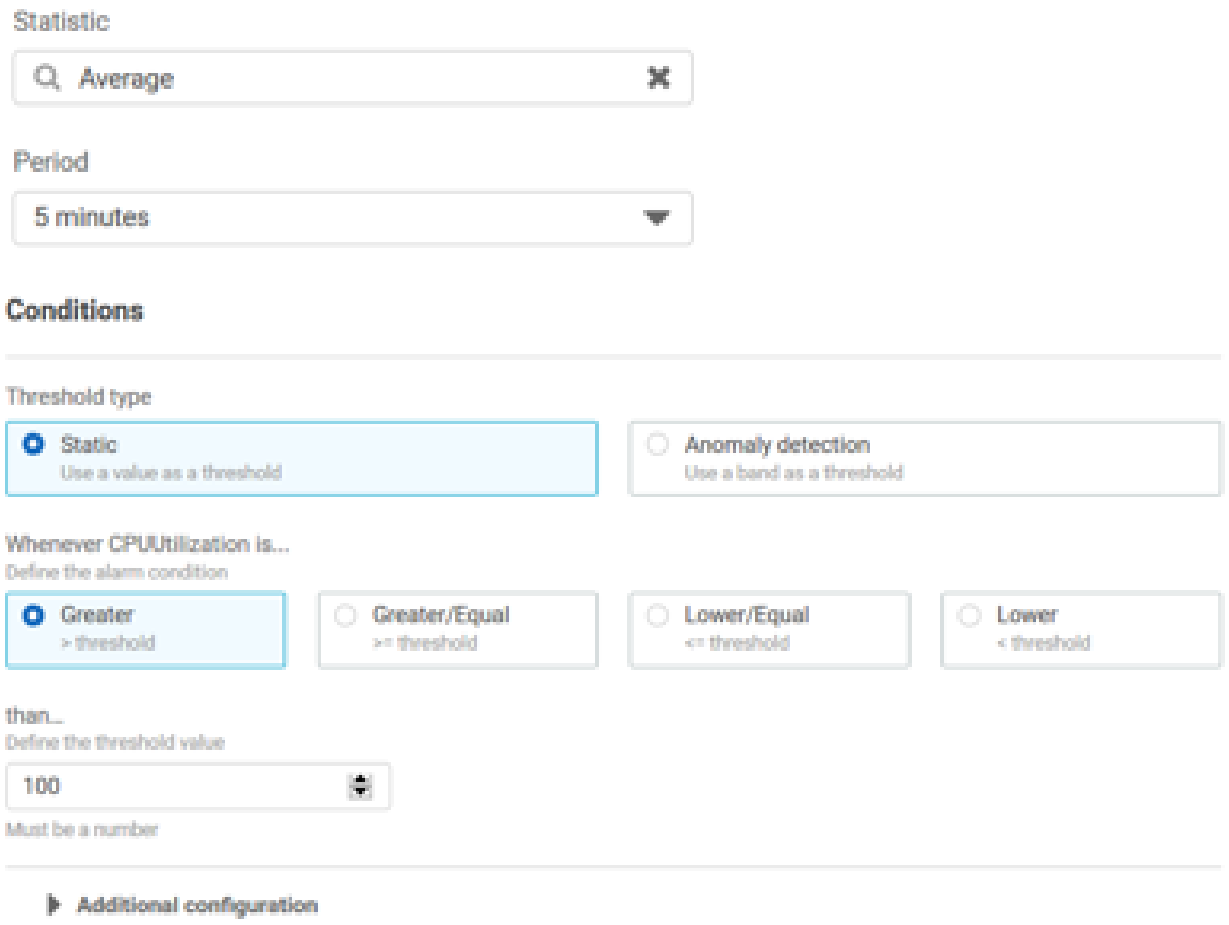
- **Alarms:**
  - Send notifications to an Amazon SNS topic
  - Perform Amazon EC2 Auto Scaling or Amazon EC2 actions



- **Events:**
  - Define rules to match changes in AWS environment and route these events to one or more target functions or streams for processing

Amazon CloudWatch Alarms

- **Create alarms based on:**
  - **Static threshold**
  - **Anomaly detection**
  - **Metric math expression**
- **Specify:**
  - **Namespace**
  - **Metric (CPU, RAM, Storage)**
  - **Statistic (Avg., Max, Min)**
  - **Period**
  - **Conditions (>, >=, <=, <)**
  - **Additional configuration**
  - **Actions**



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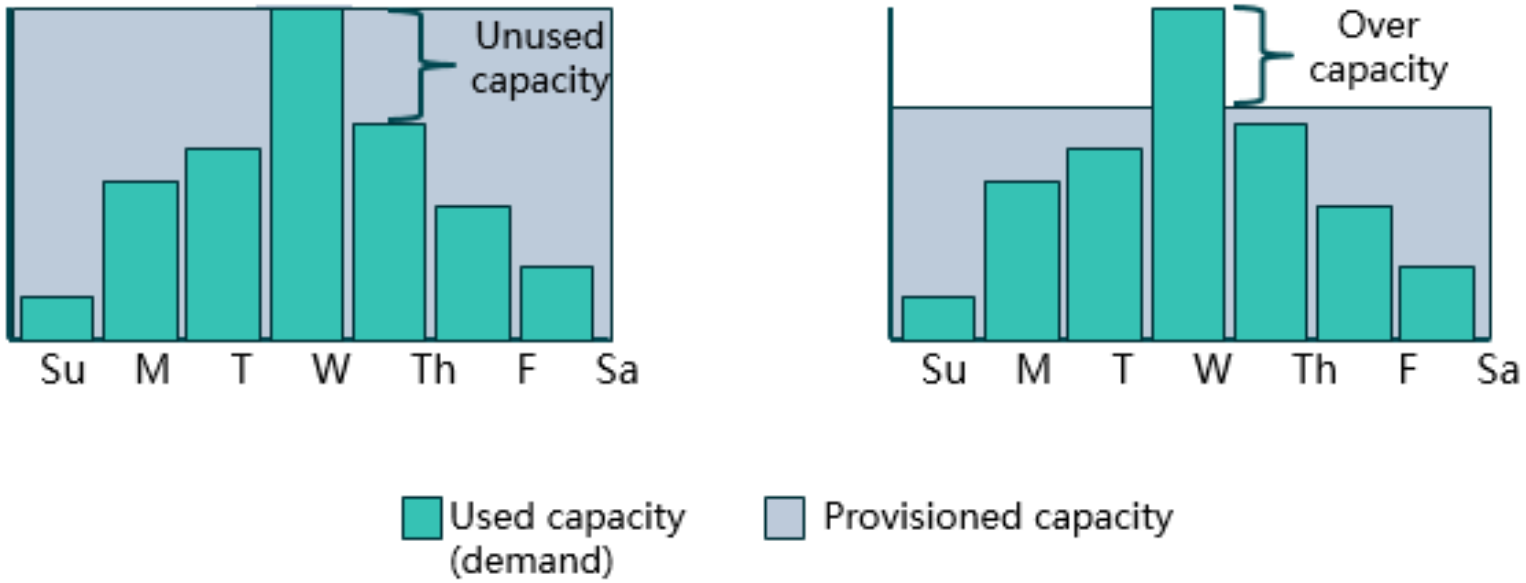
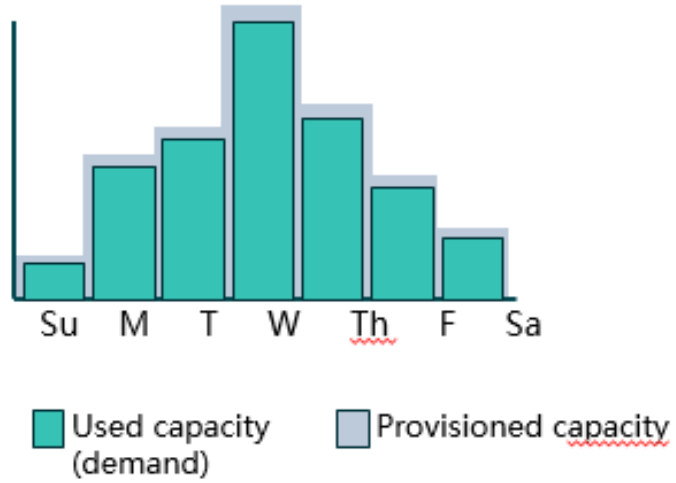
Why is Scaling Important?



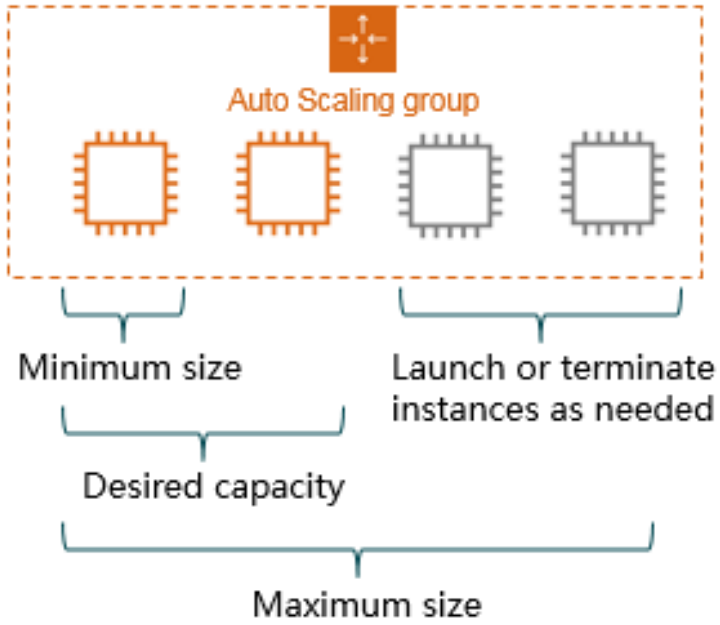
Amazon EC2 Auto Scaling

- **Helps to maintain application availability**
- **Enables to automatically add or remove EC2 instances according to the conditions defined by the customer**
- **Detects impaired EC2 instances and unhealthy applications, and replaces the instances without user intervention**
- **Provides several scaling options**
  - **Manual**
  - **Scheduled**
  - **Dynamic**
  - **On-demand**
  - **Predictive**

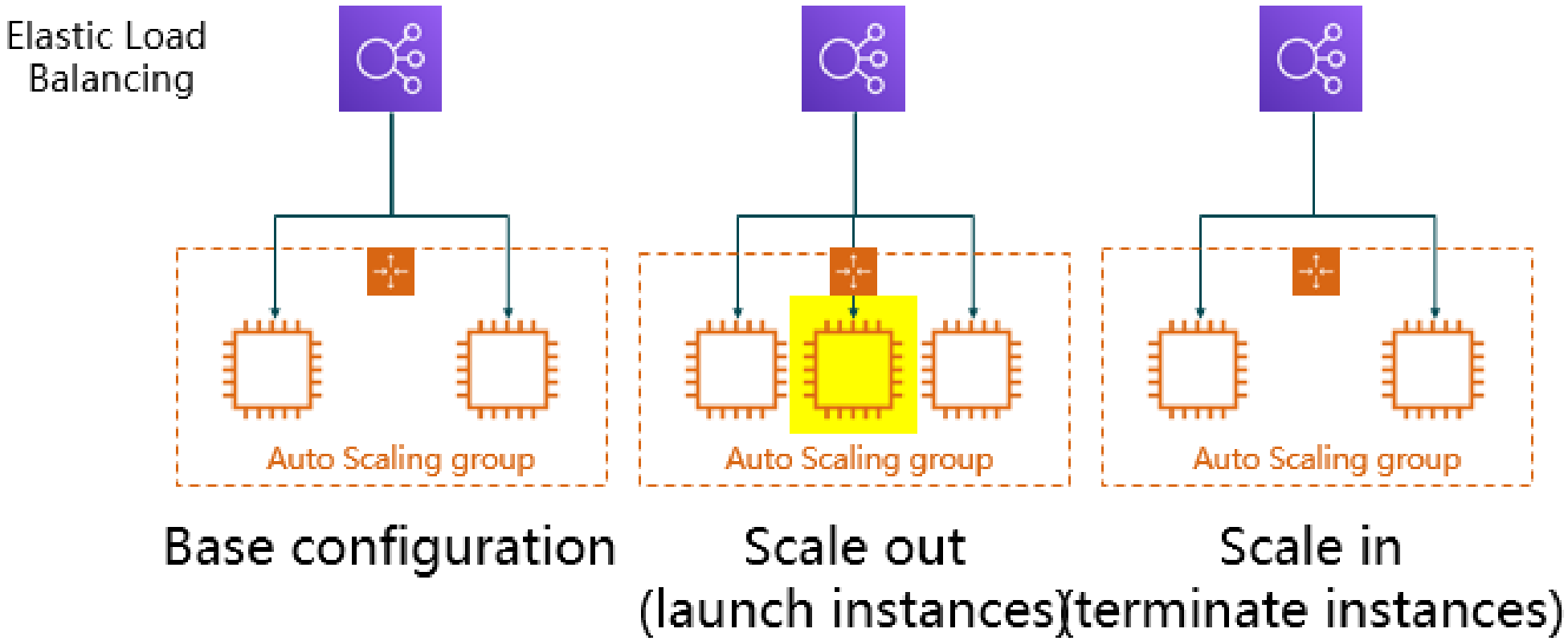


Auto Scaling Groups

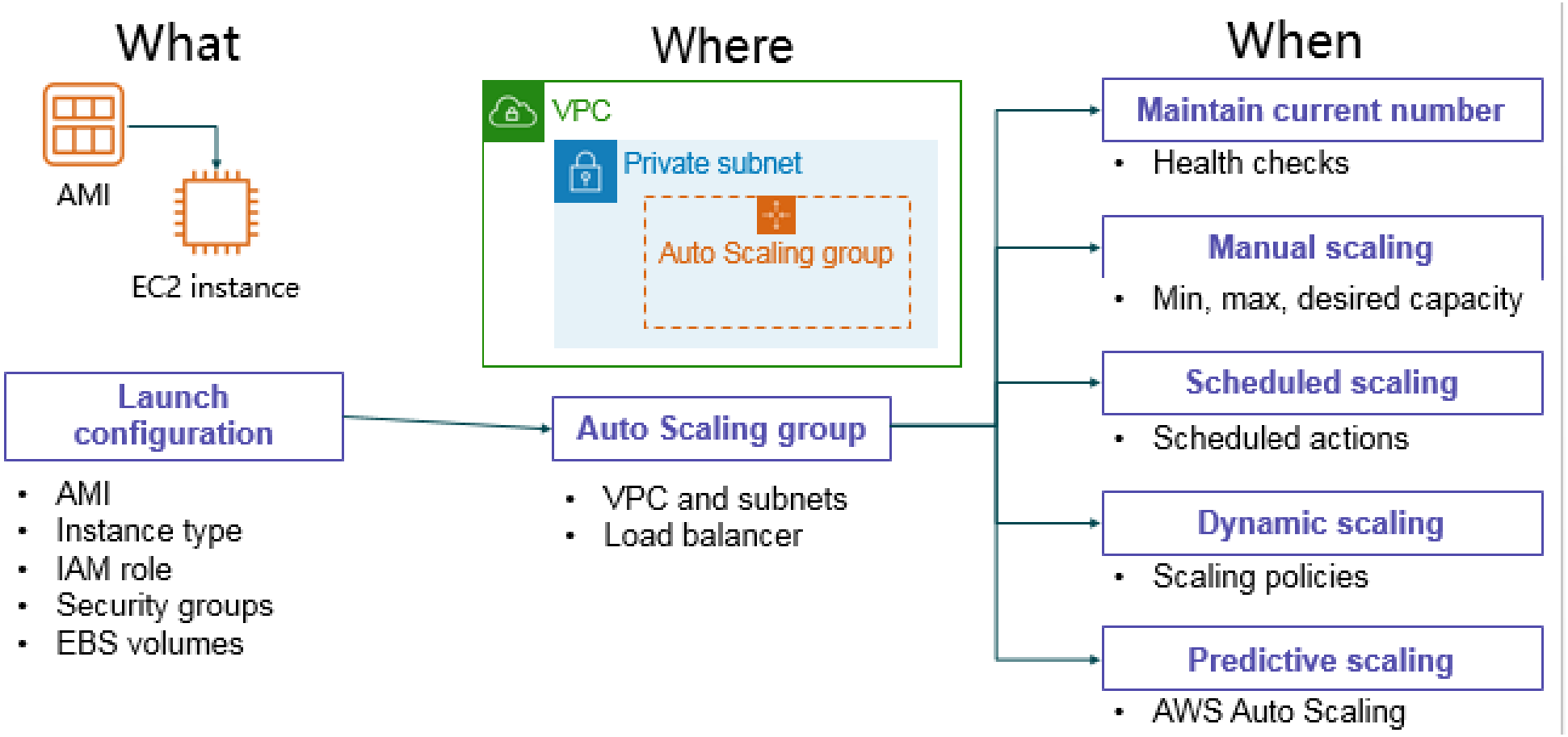
- **"An Auto Scaling group is a collection of EC2 instances that are treated as a logical grouping for the purposes of automatic scaling and management."**



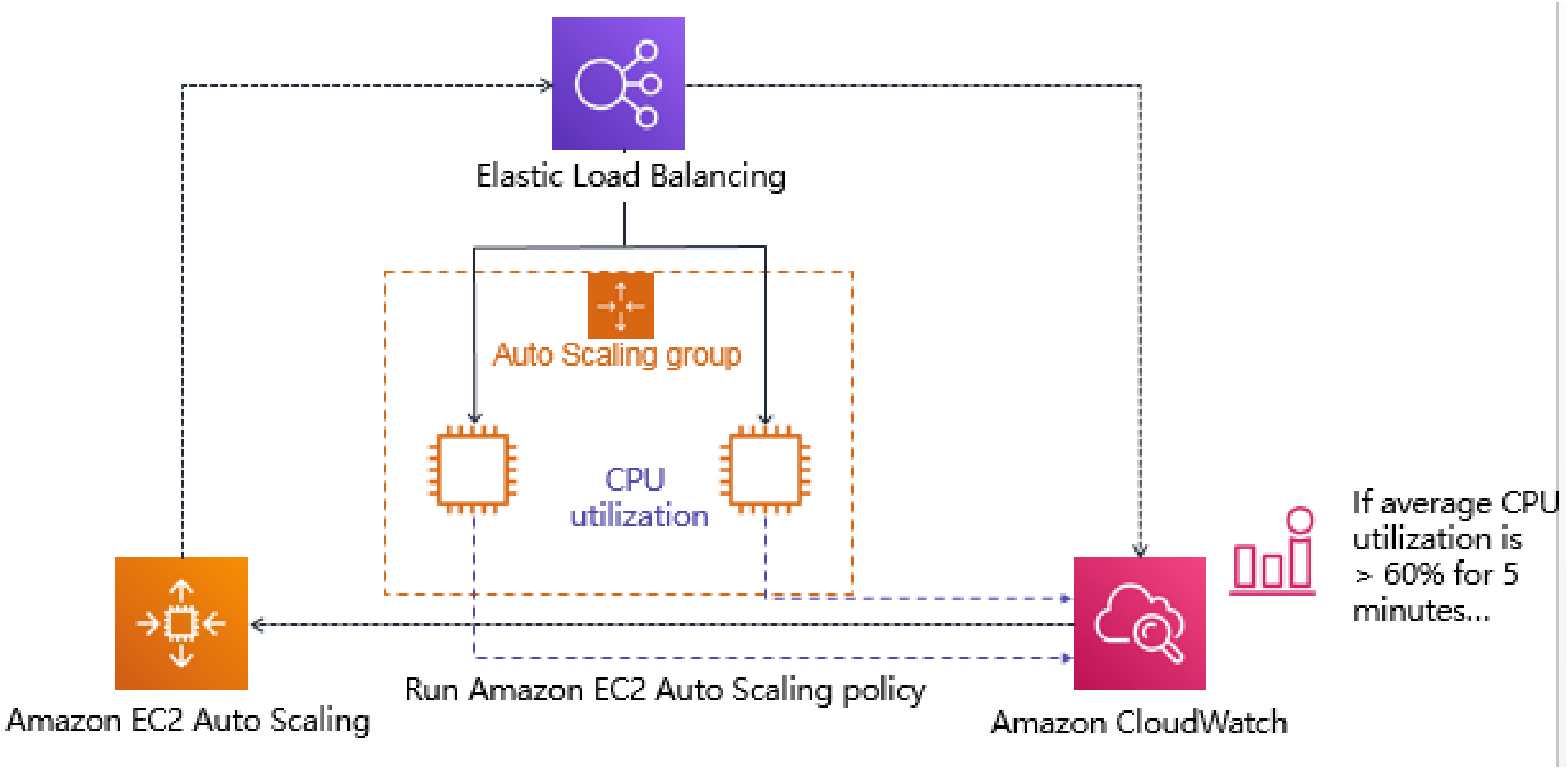
Scaling Out vs. Scaling In



How Amazon EC2 Auto Scaling Works

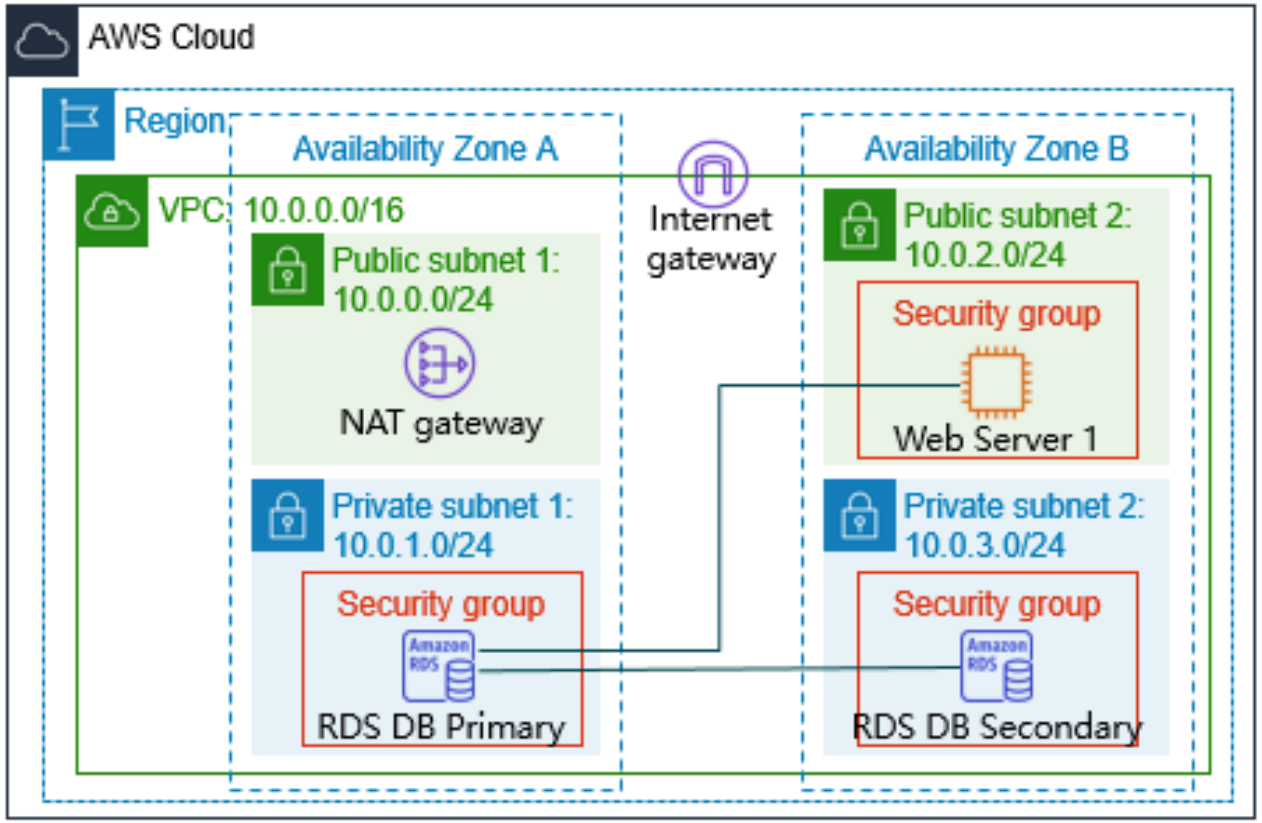


Implementing Dynamic Scaling



Lab 6: Scale and Load Balance Your Architecture

Lab Scenario: **In this lab, you will use Elastic Load Balancing and Amazon EC2 Auto Scaling to load balance and scale your infrastructure. You will start with the given infrastructure.**



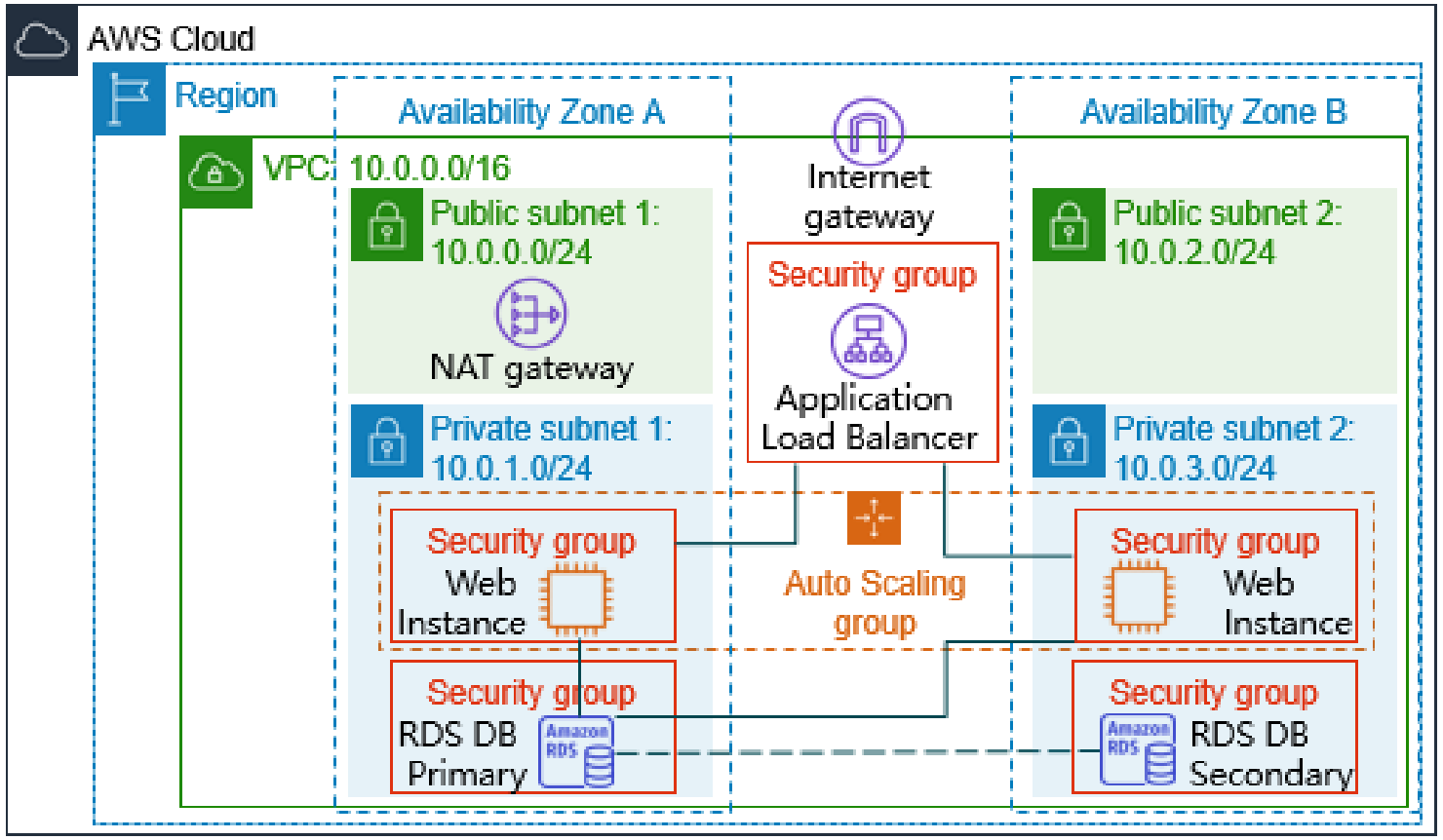
Lab 6: Scale and Load Balance Your Architecture (Cont.)

Lab Tasks:

- **Task 1 – Create an AMI from a running instance**
- **Task 2 – Create an Application Load Balancer**
- **Task 3 – Create a launch configuration and an Auto Scaling group**
- **Task 4 – Automatically scale new instances within a private subnet**
- **Task 5 – Create Amazon CloudWatch alarms and monitor performance of your infrastructure**

Lab 6: Scale and Load Balance Your Architecture (Cont.)

Final Product:



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AWS Certification Exams

*This course helps prepare you for the AWS **Cloud Practitioner** certification exam*

Additional Resources

- **Details about the exam—including how to register for it**
  - **https://aws.amazon.com/certification/certified-cloud-practitioner/**

- **Practice Questions Sites**
  - **https://www.examtopics.com/exams/amazon/aws-certified-cloud-practitioner/**
  - **https://www.daypo.com/buscar.php?t=CLF-C01**

Questions?