CS 651 – Web Systems
Project 1 – Part 2 – Group 7

Special Issues

Special Issue 1:

When we shut down an EC2 instance, the data stored on the instance store is lost, but data on EBS volumes persists if they're not deleted on termination. To "freeze" an instance, that is, to save it as an AMI and later reinstate or duplicate it, it involves a few cost components:

1. Amazon EBS (Elastic Block Store) Storage

- When we create an AMI from our instance, AWS takes a snapshot of our EBS volumes and stores it in Amazon S3 (managed internally by AWS).
- We will pay for the EBS snapshot storage, not direct S3 storage.
- Typical price is around $0.05 per GB-month. Example: a 20 GB root volume AMI snapshot costs roughly $1/month to store.

2. EBS Volume Storage (if instance is running or stopped)

- Even if our instance is stopped (not terminated), our EBS volumes will continue to incur costs.
- Cost around $0.08–$0.10 per GB-month depending on volume type (gp3, gp2, etc.).
- We can detach or delete EBS volumes to stop being billed.

3. S3 Storage (if we export the image manually)

- If we export the instance image to S3 (for example, as a. VMDK, .VHD, or .OVA file using the EC2 VM Import/Export service), we'll pay for standard S3 storage.
- Cost is roughly $0.023 per GB-month for S3 Standard.
- Plus data transfer costs if we download it outside AWS.

4. Data Transfer

- If we download or transfer our exported AMI out of AWS, outbound data transfer fees apply.
- First 1 GB per month is free, then about $0.09 per GB thereafter.

5. EC2 Storage for Reinstated Instances

When we launch a new EC2 instance from the saved AMI, we'll again pay for: EC2 compute (instance hours), new EBS volumes created from that AMI.

Therefore, if we're just trying to pause and resume our site later, the simplest and cheapest method is:

- Stop the EC2 instance (keeps EBS volume, no compute cost),
- Create an AMI snapshot for backup,
- Restart or launch from AMI when needed.

Special Issue 2:

When an EC2 instance stops and restarts, its public IP address changes (unless we assign a static one). If we want to publish a stable URL that people can always reach, we need a fixed public IP address or a domain name that stays the same.

Options:	Costs involved
1. Use an Elastic IP Address (EIP) • An Elastic IP is a static IPv4 address that we can associate with any EC2 instance in our account. • It stays the same even if we stop or restart the instance. • We can reassign it to another instance anytime (for example, if we launch a new one from an AMI). • This is the most common method for hosting a public website.	• Free for one Elastic IP that is actively attached to a running instance. • Charged about $0.005 per hour (about $3.60/month) if the Elastic IP is not attached to any instance, or we have more than one EIP per region.
2. Use a Domain Name with Route 53 (DNS) • Register a domain (e.g. mywebsite.com) using Amazon Route 53 or another registrar. • Point the domain (DNS A record) to our Elastic IP. • If we don't use an Elastic IP and the instance's IP changes, we must manually update the DNS record each time.	• Domain registration: about $12–$15 per year. • Route 53 hosted zone: $0.50 per month per hosted zone. • DNS queries: very low cost (fractions of a cent).
3. Use a Load Balancer (for larger deployments) • AWS Elastic Load Balancer (ELB) provides a stable DNS name that routes traffic to one or more EC2 instances. • The load balancer handles IP changes automatically.	ELB pricing starts around $0.0225 per hour plus data processing charges.

The AWS Learner Lab typically does not allow us to allocate Elastic IPs or register domains due to account restrictions, so we can't do it in the AWS Learner Lab.

We can still access the instance using its temporary public IP while the lab is active, but once we stop the instance or the lab expires, the IP will change or be released.