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Assignment 3

1. **Amazon EC2 On-Demand Instances:** You pay by the hour or second with no long-term commitments, making this option flexible for unpredictable workloads. Ideal for applications with varying traffic, it allows you to scale up or down based on your needs without worrying about upfront costs. Billing is based on the instance type and operating system you choose.

1. **Reserved Instances in Amazon EC2:** These helps save costs by offering up to 72% discounts compared to On-Demand pricing. You commit to a 1-year or 3-year term, which is ideal for steady-state applications. Flexible payment options include All Upfront, Partial Upfront, and No Upfront, helping you manage your budget better. Additionally, Convertible RIs offer the flexibility to change instance types during the term, adding more value.

1. **Spot Instances in Amazon EC2:** These instances allow you to bid for unused EC2 capacity at up to 90% discounts compared to On-Demand pricing. Suitable for fault-tolerant and flexible applications, you only pay the Spot price in effect for the duration your instances run. However, instances can be terminated by AWS when they need the capacity back, so they're best for workloads that can handle interruptions.

1. **AWS Lambda Pricing:** Lambda is priced based on the number of requests and the duration your code runs. The first one million requests and 400,000 GB-seconds of compute time are free each month. Beyond the free tier, you are charged based on the number of requests and the compute time, making it cost-effective for event-driven applications. This pricing model encourages efficient use of resources as you're billed only for what you use.
2. **Amazon S3 Standard Storage:** Storing data in Amazon S3 Standard costs $0.023 per GB per month. This storage class is designed for frequently accessed data and provides high durability, availability, and performance. It is ideal for a wide variety of use cases including backups, big data analytics, and content distribution.

1. **Amazon S3 Infrequent Access vs Glacier:** S3 Standard-IA costs $0.0125 per GB per month and is ideal for data that is accessed less frequently but requires rapid access when needed. S3 Glacier, on the other hand, costs $0.004 per GB per month and is designed for long-term archival of data that is rarely accessed. Glacier also offers various retrieval options ranging from minutes to hours, depending on your needs.
2. **General Purpose SSD (gp3) in Amazon EBS:** This storage option costs $0.08 per GB per month. You can provision additional IOPS and throughput independently, allowing you to balance performance and cost effectively. This flexibility makes gp3 ideal for a variety of applications, including boot volumes, transactional workloads, and more.

1. **Provisioned IOPS SSD (io2) in Amazon EBS:** The pricing for io2 is $0.125 per GB per month and $0.065 per provisioned IOPS per month, up to 32,000 IOPS. This storage class is designed for mission-critical applications that require high performance and durability. It is suitable for databases, large transactional workloads, and other I/O-intensive applications.

1. **Amazon RDS Pricing Options:** With RDS, you can choose between On-Demand Instances, where you pay for compute capacity per hour, and Reserved Instances, where you commit to a 1-year or 3-year term for significant cost savings. The free tier includes 750 hours of usage per month for one year, making it a good option for small-scale applications or testing.

1. **Amazon DynamoDB On-Demand Capacity Mode:** In this mode, you pay for the data reads and writes your application performs without having to manage capacity. This pricing model is ideal for applications with unpredictable traffic, allowing you to handle sudden spikes in demand without over-provisioning. You are billed based on the number of read and write requests, making it a flexible and cost-effective option for varying workloads.

1. **Amazon DynamoDB's Provisioned Capacity Mode**: In this mode, you specify the number of reads and writes per second required for your application. You are charged based on the hourly provisioned throughput capacity, not on actual usage. Costs include Read Capacity Units (RCUs), Write Capacity Units (WCUs), and optional features like DynamoDB Streams and Global Tables.

1. **Charges for Creating and Using Amazon VPC**: There are no additional charges for creating and using an Amazon Virtual Private Cloud (VPC) itself. However, you pay for optional VPC capabilities with usage-based charges, such as NAT gateways, VPN connections, and data transfer charges.

1. **Data Transfer Pricing in Amazon VPC**: Data transfer within the same Availability Zone is free. Data transfer between different Availability Zones in the same region incurs charges. Data transfer to and from the internet is charged per service, with rates specific to the originating region.
2. **Factors Determining Amazon CloudFront Pricing**: CloudFront pricing is influenced by several factors, including data transfer volume, number of HTTP/HTTPS requests, geographic region, and additional features like AWS WAF and AWS Shield. Costs vary by region, with higher rates for data transfer to more expensive regions.

1. **Cost Calculation for Amazon SageMaker**: SageMaker pricing includes charges for compute resources, storage, and data transfer. You pay for the instance type and duration of use for training and hosting models, as well as storage for datasets and models. Additional costs may apply for features like SageMaker Studio and Data Wrangler.
2. **Pricing Model for Amazon Rekognition**: Rekognition pricing is based on the type of usage, such as image analysis, video analysis, custom labels, and face liveness. Charges are incurred per image or video analyzed, with tiered pricing based on volume. Face metadata storage also incurs monthly charges.
3. **Free Tier Budget Alerts in AWS Budgets**: The AWS Free Tier includes 62 budget days per month, which allows you to create and monitor a single budget within the free tier limit.
4. **Cost of Additional Budget Alerts in AWS Budgets**: Beyond the free tier, additional budget alerts are charged at $0.02 per budget per month.
5. **Free Tier in AWS Cost Explorer**: The AWS Free Tier includes access to Cost Explorer with basic features, such as cost and usage reports, for free. This allows you to analyze your spending and usage patterns without additional charges.
6. **Additional Charges for Advanced Reports in AWS Cost Explorer**: Advanced features like hourly granularity and the Cost Explorer API incur additional charges. Hourly granularity is charged at $0.00000033 per usage record, and the Cost Explorer API is charged at $0.01 per request.