**Pillar four: Cost Optimization**

**What it’s about:**

* Use the Cost Optimization pillar to reduce your costs to a minimum and use those savings for other parts of your business. A cost-optimized system allows you to pay the lowest price possible while still achieving your business objectives.
* At A Cloud Guru, they built our platform on Serverless Technology, allowing us to have an extremely low cost platform (and we can then pass those savings on to you).

**Design Principles:**

* Transparently attribute expenditure.
* Use managed services to reduce cost of ownership.
* Trade capital expense for operating expense.
* Benefit from economies of scale.
* Stop spending money on data center operations.

**Definition:**

* Matched supply and demand:
  + Try to optimally align supply with demand. Don’t over provision or under provision, instead as demand grows, so should your supply of compute resources. Think of things like Autoscaling which scales with demand. Similarly, in a serverless context, use services such as Lambda that only execute (or respond) when a request (demand) comes in.
  + Services such as CloudWatch can also help you keep track as to what your demand.
  + Matched supply and demand questions
    - How do you make sure your capacity matches but does not substantially exceed what you need?
    - How are you optimizing your usage of AWS services?
* Cost-effective resources:
  + Using the correct instance type can be key to cost savings. For example, you might have a reporting process that running on a t2-Micro and it take 7 hour to complete. That same process could be run on an m4.2xlarge in a manner of minutes. The result remains the same but the t2.micro is more expensive because it ran for longer.
  + A well architected system will use the more cost efficient resources to reach the end business goal.
  + Cost-effective resources Questions:
    - Have you selected the appropriate resource types to meet your cost targets?
    - Have you selected the appropriate pricing model to meet your cost targets?
    - Are there managed services (higher-level services than Amazon EC2, Amazon EBS, and Amazon S3) that you can use to improve your ROI?
* Expenditure awareness:
  + With cloud you no longer have to go out and get quotes on physical servers, choose a supplier, have those resources delivered, installed, made available, etc. you can provision things within seconds, however, this comes with its own issues. Many organizations have different teams, each with their own AWS accounts. Being aware of what each team is spending and where is crucial to any well architected system. You can use cost allocation tags to track this, bulling alerts as well as consolidated billing.
  + Expenditure Awareness Questions:
    - What access controls and procedures do you have in place to govern AWS costs?
    - How are you monitoring usage and spending?
    - How do you decommission resources that you no longer need, or stop resources that are temporarily not needed?
    - How do you consider data-transfer charger when designing your architecture?
* Optimizing over time:
  + AWS moves fast. There are hundreds of new services (and potentially new services this year). A service that you chose yesterday may not be the best service to be using today. For example consider MySQL RDS, Aurora was launched at re:invent 2014 and is now out of preview. Aurora may be a better option now for your business because of its performance and redundancy. You should keep track of the changes made to AWS and constantly re-evaluate your existing architecture. You can do this by subscribing to the AWS blog and by using services such as Trusted Advisor.
  + Optimizing over time Questions:
    - How do you manage and/or consider the adoption of AWS services.

**Key AWS Services:**

* Matched Supply and demand:
  + Autoscaling.
* Cost-effective resources:
  + EC2 (reserved instances), AWS Trusted Advisor.
* Expenditure awareness:
  + CloudWatch Alarms, SNS.
* Optimizing over time:
  + AWS Blog, AWS Trusted Advisor.

**Exam Tips – Cost Optimization:**

* Cost Optimization in the cloud consists of 4 areas;
  + Matched supply and demand.
  + Cost-effective resources.
  + Expenditure awareness.
  + Optimizing over time.

**Exam Tips – Cost Optimization Questions:**

* Matched supply and Demand:
  + How do you make sure your capacity matches but does not substantially exceed what you need?
  + How are you optimizing your usage of AWS services?
* Cost – Effective Resources:
  + Have you selected the appropriate resource types to meet your cost targets?
  + Have you selected the appropriate pricing model to meet your cost targets?
  + Are there managed services (higher-level services than Amazon EC2, Amazon EBS, and Amazon S3) that you can use to improve your ROI?
* Expenditure awareness:
  + What access controls and procedures do you have in place to govern AWS costs?
  + How are you monitoring usage and spending?
  + How do you decommission resources that you no longer need, or stop resources that are temporarily not needed?
  + How do you consider data-transfer charger when designing your architecture?
* Optimizing over time:
  + How do you manage and/or consider the adoption of AWS services.