**Project Overview**

In this exercise, we’ll design a highly available, redundant e-commerce and analytics solution on AWS for ABC Company using Cloudcraft.

**Step-by-Step Solution Design**

1. **Add User Access**
   * Start by adding a user to the design by dragging a user icon to the perimeter of your diagram.
   * Add an EC2 instance with the following specifications
     + **Platform:** Linux
     + **CPU:** 3.1 GHz Intel Skylake E5-2686 v5 (4 vCPUs)
     + **Memory:** 16 GiB
     + **Storage:** EBS-only with up to 2780 Mbps throughput
     + **Network Performance:** Up to 5 Gbps
2. **Primary Database (RDS)** 
   * Add an Amazon RDS instance as the primary database with a MySǪL engine, selecting an M5 large instance type.
   * **Connection:** Link the EC2 instance to this RDS instance.
   * **List RDS Specifications:** Include details of the RDS instance.
3. **Caching with ElastiCache (Redis)** 
   * Add an ElastiCache instance with the Redis engine, M5 large type.
   * **Virtual Private Cloud (VPC):** Create a new VPC named “Cached Database,” assigning the RDS and ElastiCache instances to it.
   * **Customer Gateway:** Add a customer gateway to enable secure access to and from the VPC.
   * **Connections:** Connect the EC2 instance to the customer gateway, the customer gateway to the RDS, and finally connect ElastiCache to the path between the gateway and the RDS.
4. **Auto Scaling** 
   * Duplicate your EC2 instance, creating two additional instances, and add Auto Scaling to manage these.
   * **Connections:** Draw connections from the user to the Auto Scaling setup and from Auto Scaling to the customer gateway.
5. **Load Balancer for Auto Scaling** 
   * Add an Elastic Load Balancer (Classic Load Balancer, 10 GB data processing) to manage traffic to the Auto Scaling group.
   * **Connections:** Route user access through the load balancer to the Auto Scaling instances.
6. **Replica VPC for Redundancy** 
   * Create a replica of the “Cached Database” VPC with a similar RDS and ElastiCache configuration. Name this new VPC “Replica.”
   * **Customer Gateway:** Add a gateway to “Replica” for access management.
   * **Traffic Management:** Add a second Classic Load Balancer (10 GB data) to manage traffic between “Cached Database” and “Replica.”
7. **Email Service Setup**
   * Add an email-sending service that ABC can use with their domain.
   * **Design Placement:** Decide where this component should be in the architecture and explain your choice.
8. **Analytics with Redshift and Lambda** 
   * Add Amazon Redshift for data warehousing and a Lambda function for analytics processing.
   * **Redshift Overview:** Describe key capabilities of Redshift.
   * **Connections:** Link Redshift and Lambda to relevant components in your architecture.



**Final Tasks**

1. **Design Summary - 10 Points**
   * Write a brief explanation of each step you took in your design process, focusing on how each part contributes to operation, application, storage, reliability, and elasticity.
2. **Multi-Region Redundancy** - **10 Points**
   * Duplicate your entire design to create a redundant infrastructure in a secondary region (i.e., create a replica in US-WEST-1). Ensure the replicated infrastructure matches the primary region’s specifications for high availability.
   * **Connections:** Set up Route 53 for failover between the regions to manage traffic routing in case of a primary region failure.
   * Repeat Step 2 above (Cost Analysis) and compare the costs between a single site solution and your redundant solution.