### **AWS VPC IP Exhaustion Mitigation SOP**

##### Objective:

##### To systematically address IP exhaustion within an AWS VPC by analyzing, optimizing, and potentially restructuring the IP address space to ensure scalability and availability.

##### **Pre-requisites:**

##### AWS account credentials with the necessary permissions for VPC management.

##### Access to the AWS Management Console or AWS CLI.

##### Collaboration with application owners and stakeholders.

##### **Steps:**

##### **Step 1: Current IP Address Usage Assessment**

##### 1.1. Access the AWS Management Console or use the AWS CLI to navigate to the VPC Dashboard.

##### 1.2. Review the current IP address usage within the VPC:

##### Identify the VPC CIDR block.

##### List all subnets along with their CIDR blocks.

##### Examine the utilization of Elastic IPs (EIPs).

##### Identify any existing VPC peering connections.

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##### **Step 2: Future Resource Requirements Analysis**

##### 2.1. Collaborate with application owners and stakeholders to understand future resource requirements:

##### Document anticipated increases in EC2 instances, load balancers, and other resources.

##### Consider any upcoming changes in network architecture or application deployments.

##### 2.2. Evaluate the impact of resource growth on the existing IP address space.

##### **Step 3: Subnet Design Review**

##### 3.1. Assess the existing subnet design:

##### Analyze subnet sizes and available IP addresses.

##### Identify subnets with limited available IP addresses.

##### 3.2. Consider whether the current subnet design aligns with anticipated growth.

##### **Step 4: Elastic IP Optimization**

##### 4.1. Identify and review the usage of Elastic IPs within the VPC:

##### List all associated EC2 instances using Elastic IPs.

##### Verify the necessity of each Elastic IP.

##### 4.2. Release any unused or unnecessary Elastic IPs.

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##### **Step 5: Unused Resources Identification**

##### 5.1. Identify and terminate any unused or underutilized resources within the VPC:

##### List EC2 instances, network interfaces, and elastic load balancers that are not actively utilized.

##### Collaborate with relevant teams to confirm resource status before termination.

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##### **Step 6: Reserved Instances Consideration**

##### 6.1. Evaluate the option of using Reserved Instances:

##### Assess cost savings and benefits.

##### Consider Reserved Instances for instances with stable usage patterns.

##### **Step 7: Subnet CIDR Block Modification**

##### 7.1. If necessary, modify the CIDR blocks of existing subnets:

##### Evaluate the impact on routing and network connectivity.

##### Plan for a maintenance window and notify stakeholders.

##### 7.2. Execute the CIDR block modifications and update route tables accordingly.

##### **Step 8: VPC Peering Implementation**

##### 8.1. Consider VPC peering to facilitate communication between resources in different VPCs:

##### Assess security and routing requirements.

##### Establish VPC peering connections as needed.

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##### **Step 9: VPC Migration Planning**

##### 9.1. If the existing VPC design is not scalable, plan for a VPC migration:

##### Collaborate with stakeholders to define a migration plan.

##### Schedule a maintenance window and communicate the migration schedule to all relevant parties.

##### 9.2. Execute the VPC migration plan, ensuring minimal impact on running applications.

##### **Step 10: Monitoring and Periodic Review**

##### 10.1. Set up CloudWatch alarms to monitor IP address utilization within the VPC.

##### 10.2. Conduct periodic reviews of IP address usage and adjust configurations as needed.

##### **Step 11: Documentation of Changes**

##### 11.1. Document all changes made to the VPC configuration:

##### Maintain a record of subnet configurations, IP allocations, and any modifications.

##### **Step 12: Communication of Changes**

##### 12.1. Communicate any changes to relevant stakeholders:

##### Provide detailed information on modifications made to the VPC.

##### Ensure that all team members are aware of the changes and their potential impact.

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