1]What is transit gateway ? How is it different from VPC peering?

A Transit Gateway is a service provided by Amazon Web Services (AWS) that allows customers to connect multiple Virtual Private Clouds (VPCs) and on-premises networks together in a centralized hub-and-spoke architecture. It simplifies network connectivity and management, particularly in complex network setups with multiple VPCs and remote networks.

1. Isolation and Segmentation:

   - A VPC provides a logically isolated section of the cloud where you can launch AWS resources. It acts as a private network in the cloud, allowing you to create a segmented environment for your applications and services.

2. Custom Networking:

   - With a VPC, you have control over your network configuration. You can define your own IP address range, create subnets, configure route tables, and set up network gateways. This flexibility allows you to design a network that meets the specific requirements of your applications.

3. Subnetting:

   - A VPC can be divided into multiple subnets. Subnets are segments of the VPC's IP address range where you can place resources. This allows you to organize and manage your resources based on different security and operational requirements.

4. Internet Connectivity:

   - By default, instances in a VPC are not accessible from the internet. However, you can configure internet access by attaching an Internet Gateway to your VPC. This allows resources within the VPC to communicate with the internet and vice versa.

5. Private Networking:

   - In addition to internet connectivity, you can create private subnets within a VPC that do not have direct access to the internet. This is useful for hosting sensitive workloads that should not be exposed to the public internet.

6. Security Groups and Network Access Control Lists (NACLs):

   - VPCs use security groups and network access control lists (NACLs) to control inbound and outbound traffic at the instance and subnet levels. Security groups are stateful, and NACLs are stateless, providing different layers of security control.

7. Virtual Private Network (VPN) and Direct Connect:

   - VPCs support secure connectivity to on-premises data centers through VPN connections or AWS Direct Connect. This allows you to extend your on-premises network to the cloud securely.

8. Elastic Load Balancers (ELB) and Auto Scaling:

   - VPC integrates with Elastic Load Balancers (ELB) and Auto Scaling, enabling the automatic distribution of incoming application traffic across multiple instances and the ability to scale resources based on demand.

9. Peering and Transit Gateways:

   - VPC peering allows you to connect VPCs together and route traffic between them privately. Transit Gateway is a centralized hub for connecting multiple VPCs and on-premises networks, simplifying network architecture.

10. Resource Deployment:

   - Within a VPC, you can deploy various AWS resources such as Amazon EC2 instances, RDS databases, S3 storage, and more. The VPC acts as the networking foundation that ties these resources together.