

For cybersecurity and networking students, the creation of Virtual Private Clouds (VPCs), subnets, and bastion hosts in Amazon Web Services provides an opportunity to develop their skills in a secure and controlled environment. In AWS, a VPC allows users to create a virtual network topology that is isolated from other virtual networks in the cloud (AWS, n.d.). Resources launched within a VPC are by default isolated from the internet, and can be connected to the internet using an Internet Gateway or a NAT Gateway (AWS, n.d.). Subnets can also be created within a VPC to further segment resources and control network traffic (AWS, n.d.). Public subnets are associated with a route table that allows resources within the subnet to be accessed from the internet, while private subnets use a NAT gateway to allow resources within the subnet to access the internet (AWS, n.d.). A bastion host is a server that provides secure access to resources within a private subnet and can reduce the exposure of private instances to the internet (AWS, n.d.). The use of a bastion host can reduce the attack surface, simplify access control, and improve network security (AWS, n.d.).

Best practices for VPC design, subnet creation, and bastion host configuration include using multiple availability zones for improved resiliency, avoiding overlapping IP address ranges with other VPCs, creating separate subnets for different types of resources, and using network ACLs and security groups to control traffic flow (AWS, n.d.). When configuring a bastion host, using a separate security group for the host, implementing a Jump box pattern, and monitoring access logs are essential for reducing the risk of unauthorized access (AWS, n.d.). Multi-factor authentication is also recommended to secure access to the bastion host (AWS, n.d.). By following these best practices, cybersecurity and networking students can develop their skills in a secure and robust environment.

AWS. (n.d.). What is a Bastion Host and Why Would You Use One?. Retrieved April 30, 2023, from <https://aws.amazon.com/blogs/security/what-is-a-bastion-host/>

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