

Azure Fundamentals questions and answer

Azure Identity, Security, and Networking concepts, ideal for anyone looking to deepen their knowledge of **Azure fundamentals**.

Section 1: Azure Basics

1. **What is Microsoft Azure?**

Answer: A cloud computing platform offering services like virtual machines, databases, AI, and storage.

2. **What are the main cloud computing models?**

Answer:

- **IaaS** (Infrastructure as a Service): Provides virtualized infrastructure.
- **PaaS** (Platform as a Service): Provides a development platform.
- **SaaS** (Software as a Service): Delivers software applications over the internet.

3. **What are Azure Regions and Availability Zones?**

Answer:

- **Regions:** Physical locations where Azure data centers are located.
- **Availability Zones:** Isolated locations within a region to ensure high availability.

4. **What are the benefits of cloud computing?**

Answer:

- Cost-efficiency
- Scalability
- Security
- Disaster recovery

Section 2: Core Azure Services

5. **What is an Azure Virtual Machine (VM)?**

Answer: A scalable, on-demand computing resource.

6. **What is Azure App Service?**

Answer: A PaaS offering to host web apps, RESTful APIs, and mobile backends.

7. **What is Azure Blob Storage?**

Answer: Object storage for unstructured data such as images and videos.

8. **What is Azure SQL Database?**

Answer: A managed relational database service.

Section 3: Azure Management and Governance

9. **What is Azure Resource Manager (ARM)?**

Answer: A management layer for deploying and managing Azure resources.

10. **What are Resource Groups in Azure?**

Answer: Containers to manage and organize Azure resources.

11. **What is Azure Policy?**

Answer: A governance tool to enforce rules and compliance on Azure resources.

12. **What is Azure Cost Management?**

Answer: A tool for analyzing and managing Azure costs and resource usage.

Section 4: Azure Networking

13. **What is a Virtual Network (VNet)?**

Answer: An isolated network to securely connect Azure resources.

14. **What is an Azure Load Balancer?**

Answer: A service to distribute network traffic across multiple resources.

15. **What is Azure DNS?**

Answer: A service to manage domain name system (DNS) records in Azure.

16. **What is Azure VPN Gateway?**

Answer: A service to connect on-premises networks securely to Azure.

Section 5: Security and Identity

17. **What is Azure Active Directory (AAD)?**

Answer: A cloud-based identity and access management service.

18. **What is Multi-Factor Authentication (MFA)?**

Answer: A security feature requiring two or more verification methods.

19. **What is Azure Key Vault?**

Answer: A service for securely storing secrets, keys, and certificates.

20. **What is Azure Security Center?**

Answer: A tool for threat protection and security recommendations.

Section 6: Monitoring and Analytics

21. What is Azure Monitor?

Answer: A service to collect, analyze, and act on telemetry data from Azure resources.

22. What is Azure Log Analytics?

Answer: A tool to query and analyze log data in Azure Monitor.

23. What is Application Insights?

Answer: A service to monitor performance and detect issues in applications.

Section 7: AI, Machine Learning, and IoT

24. What is Azure Machine Learning?

Answer: A cloud service for building and deploying machine learning models.

25. What is Azure Cognitive Services?

Answer: Pre-built APIs for tasks like speech recognition and computer vision.

26. What is Azure IoT Hub?

Answer: A service for managing IoT devices and collecting their data.

Section 8: Azure DevOps

27. What is Azure DevOps?

Answer: A suite of tools for CI/CD, code repositories, and project management.

28. What is Azure Pipelines?

Answer: A tool for automating build and release workflows.

29. What is Azure Boards?

Answer: A project management tool for tracking work items and agile processes.

Section 9: Advanced Topics

30. What is Azure Kubernetes Service (AKS)?

Answer: A managed container orchestration service.

31. What is Azure Functions?

Answer: A serverless compute service to run code on-demand.

32. What is Azure Logic Apps?

Answer: A service for building workflows and integrating apps and services.

33. What is Azure API Management?

Answer: A tool for managing APIs securely and efficiently.

Azure Fundamentals – Comprehensive Q&A (500 Questions and Answers)

Section 1: Azure Basics (50 Questions)

1. What is Microsoft Azure?

Answer: Microsoft Azure is a cloud platform for building, deploying, and managing services and applications via Microsoft-managed data centers.

2. What are the three types of cloud computing models?

Answer:

- **IaaS:** Offers virtualized computing resources over the internet.
- **PaaS:** Provides a platform allowing developers to build applications without managing the underlying infrastructure.
- **SaaS:** Delivers software applications over the internet on a subscription basis.

3. What are the benefits of Azure over on-premises data centers?

Answer:

- Scalability
- High availability
- Cost-effectiveness
- Disaster recovery

4. What is a cloud deployment model?

Answer: Defines how cloud resources are deployed:

- Public Cloud
- Private Cloud
- Hybrid Cloud

5. What is Azure Free Tier?

Answer: A program allowing users to explore Azure services for free with limited usage for 12 months.

General Cloud Computing Concepts

1. What is the difference between public cloud and private cloud?

Answer:

- **Public Cloud:** Services are delivered over the internet and shared among multiple users.

- **Private Cloud:** Resources are used exclusively by a single organization.
- 2. **What is a hybrid cloud?**
Answer: A combination of public and private clouds, allowing data and applications to be shared between them.
- 3. **What is elasticity in cloud computing?**
Answer: The ability to scale resources up or down dynamically based on demand.
- 4. **What is scalability in Azure?**
Answer: The ability to increase or decrease resources manually or automatically to meet workload demands.
- 5. **What is high availability in Azure?**
Answer: Ensuring minimal downtime and reliable access to services through redundancy and failover.
- 6. **What are the main categories of Azure services?**
Answer:
 - Compute
 - Networking
 - Storage
 - Databases
 - AI and Machine Learning
 - DevOps
- 7. **What is an Azure data center?**
Answer: A physical facility that hosts Azure's cloud computing infrastructure.
- 8. **What is disaster recovery in Azure?**
Answer: A strategy to recover services and data after a disruption using Azure Backup, Site Recovery, or replication.

Azure Account and Subscription

- 9. **What is an Azure subscription?**
Answer: A container for Azure resources, allowing billing and access management.
- 10. **Can a single Azure account have multiple subscriptions?**
Answer: Yes, an account can manage multiple subscriptions for different projects or cost centers.
- 11. **What is a tenant in Azure?**
Answer: A dedicated instance of Azure Active Directory associated with an organization.

12. What is the purpose of Azure credits?

Answer: Credits are prepaid amounts used to consume Azure services, often included in free trials or enterprise agreements.

13. What is the Azure Free Tier?

Answer: A program offering limited free services for 12 months and lifetime free access to select resources.

14. What are the different Azure support plans?

Answer:

- Basic (Free)
- Developer
- Standard
- Professional Direct
- Premier

15. How is billing calculated in Azure?

Answer: Based on resource usage (pay-as-you-go), reserved instances, or consumption rates.

Azure Regions and Availability Zones

16. What is an Azure Region?

Answer: A set of data centers in a specific geographic location.

17. What are paired regions in Azure?

Answer: Two regions within the same geography linked for disaster recovery and data replication.

18. What is the advantage of Availability Zones?

Answer: They provide fault tolerance by isolating resources in separate physical data centers within a region.

19. How does Azure ensure data residency?

Answer: Data residency is ensured by hosting data in specific regions to comply with regulatory requirements.

20. What is latency in the context of Azure regions?

Answer: The time it takes for data to travel between Azure data centers and end-users.

Cloud Cost Management in Azure

21. What tools are available for Azure cost management?

Answer: Azure Cost Management and Billing tools.

22. What is a Reserved Instance?

Answer: A pricing option to prepay for resources for 1 or 3 years, offering significant discounts.

23. What are the benefits of Azure Advisor?

Answer: Personalized recommendations for cost optimization, performance, security, and availability.

24. What is pay-as-you-go pricing?

Answer: A model where you pay only for the resources you consume.

25. What is the Total Cost of Ownership (TCO) Calculator?

Answer: A tool to estimate cost savings by comparing on-premises infrastructure with Azure.

Security and Compliance

26. What is Azure Trust Center?

Answer: A resource for understanding Azure's security, privacy, and compliance practices.

27. What are Compliance Certifications in Azure?

Answer: Industry standards Azure complies with, such as ISO 27001, GDPR, HIPAA, etc.

28. How does Azure ensure data security?

Answer: Through encryption, access controls, and tools like Azure Security Center.

29. What is Azure Policy?

Answer: A service to enforce compliance and governance policies on resources.

30. What is shared responsibility in cloud computing?

Answer: The model where Azure secures infrastructure, and customers secure their data and apps.

Azure Portal and Tools

31. What is the Azure Portal?

Answer: A web-based interface for managing Azure resources.

32. What is Azure CLI?

Answer: A command-line tool for managing Azure resources.

33. What is Azure PowerShell?

Answer: A scripting tool to automate Azure resource management.

34. What is Azure Resource Manager (ARM)?

Answer: The deployment and management layer for Azure resources.

35. What is an Azure Resource?

Answer: Any manageable item in Azure, such as VMs, storage accounts, or databases.

36. What are ARM templates?

Answer: JSON files used for defining and deploying Azure resources.

Virtualization and Compute Concepts

37. What is virtualization in Azure?

Answer: Technology that allows multiple virtual machines to run on a single physical machine.

38. What is serverless computing?

Answer: A model where Azure automatically manages the infrastructure, scaling, and server operations.

39. What is the difference between VMs and containers?

Answer:

- VMs virtualize hardware.
- Containers virtualize the OS for lightweight application deployment.

40. What are Azure Functions?

Answer: A serverless compute service for running event-driven code.

41. What is an Azure Batch?

Answer: A service to run large-scale parallel and high-performance computing jobs.

Azure Usage Scenarios

42. Who are the typical users of Azure?

Answer: Developers, IT admins, businesses, and organizations of all sizes.

43. What industries benefit from Azure?

Answer: Healthcare, finance, retail, gaming, education, and government.

44. What is the Azure Marketplace?

Answer: A platform for third-party solutions and applications available for Azure users.

45. What is the purpose of Dev/Test pricing?

Answer: Special pricing for development and testing environments.

46. What is the importance of backup and restore in Azure?

Answer: To ensure data availability and recoverability during failures.

Miscellaneous Concepts

47. What is an Azure SLA?

Answer: A Service Level Agreement that defines guaranteed uptime and performance.

48. What is fault tolerance in Azure?

Answer: The ability of a system to continue functioning in case of hardware or software failures.

49. How does Azure support multi-cloud environments?

Answer: Through tools like Azure Arc to manage resources across multiple clouds.

50. What is Azure Cognitive Services?

Answer: Prebuilt AI APIs for tasks like language understanding, speech recognition, and vision analysis.

General Cloud Computing Concepts

1. What is a cloud service provider?

Answer: A company that offers cloud-based services, such as Microsoft Azure, AWS, or Google Cloud.

2. What is infrastructure as a service (IaaS)?

Answer: A cloud model providing virtualized computing resources over the internet, such as virtual machines and storage.

3. What is platform as a service (PaaS)?

Answer: A model that offers development tools and frameworks for building, deploying, and managing applications.

4. What is software as a service (SaaS)?

Answer: A model delivering software applications over the internet, typically on a subscription basis.

5. What is Azure Resource Manager (ARM)?

Answer: A framework for deploying, managing, and organizing Azure resources.

6. What are the core characteristics of cloud computing?

Answer:

- On-demand self-service
- Broad network access
- Resource pooling
- Scalability
- Measured service

7. What is the main difference between elasticity and scalability?

Answer:

- **Scalability:** Ability to handle increased workload by adding resources.
 - **Elasticity:** Ability to scale resources up or down dynamically based on demand.
8. **What is Azure Governance?**
Answer: Policies and practices for managing and monitoring Azure resources effectively.
9. **What is a cloud consumption model?**
Answer: A pay-as-you-go billing approach where you pay only for the resources you consume.
10. **What are Azure Availability Sets?**
Answer: A feature to ensure VM availability by spreading them across fault and update domains.
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Azure Identity and Access

11. **What is Azure Identity Protection?**
Answer: A tool in Azure AD to detect and remediate identity-related risks.
12. **What is Conditional Access in Azure AD?**
Answer: A policy-based system to control user access based on conditions like location or device.
13. **What is an Azure AD Tenant?**
Answer: A dedicated Azure AD instance associated with an organization.
14. **What are Managed Identities in Azure?**
Answer: Identities automatically managed by Azure for use with Azure services.
15. **What is Just-In-Time (JIT) VM Access?**
Answer: A feature to reduce exposure to attacks by allowing access to VMs only when needed.
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Azure Pricing and Costs

16. **What are pricing tiers in Azure?**
Answer: Different levels of resource offerings (e.g., Basic, Standard, Premium) based on performance and cost.
17. **What are Azure Reserved Instances?**
Answer: Prepaid virtual machines for a fixed duration (1 or 3 years) offering significant discounts.
18. **What is the Azure Hybrid Benefit?**
Answer: A program allowing you to use existing licenses for cost savings on Azure.

19. How does Azure handle unused resources?

Answer: You are billed for all active resources; it's essential to stop or delete unused ones to save costs.

20. What are Spot VMs?

Answer: Discounted virtual machines for workloads that can handle interruptions.

Azure Compute and Virtual Machines

21. What are the types of Azure Virtual Machines?

Answer:

- General-purpose
- Compute-optimized
- Memory-optimized
- GPU-optimized
- Storage-optimized

22. What is Azure VM Scale Sets?

Answer: A feature to automatically deploy and manage a group of VMs based on demand.

23. What is the difference between Availability Sets and Scale Sets?

Answer:

- **Availability Sets:** Protect against hardware failures.
- **Scale Sets:** Automatically scale the number of VMs based on demand.

24. What is a Managed Disk in Azure?

Answer: A disk whose management, scalability, and durability are handled by Azure.

25. What is Azure Dedicated Host?

Answer: A physical server dedicated to your organization's workload.

Networking Basics in Azure

26. What is a Network Security Group (NSG)?

Answer: A rule-based firewall to control inbound and outbound traffic to Azure resources.

27. What is a Public IP Address in Azure?

Answer: An IP address assigned to Azure resources, accessible over the internet.

28. What is Azure Front Door?

Answer: A service for global load balancing and fast content delivery.

29. What is the purpose of a Virtual Network Gateway?

Answer: To securely connect on-premises networks to Azure.

30. What is the difference between Azure DNS and Azure Private DNS?

Answer:

- **Azure DNS:** Resolves domain names for public-facing services.
 - **Azure Private DNS:** Resolves names within private networks.
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Azure Storage and Databases

31. What are the types of Azure Storage?

Answer:

- Blob Storage (unstructured data)
- File Storage (shared files)
- Queue Storage (message queuing)
- Table Storage (NoSQL)

32. What is Azure Blob Storage?

Answer: A service to store unstructured data like documents, images, and videos.

33. What is the difference between Hot and Cool Blob Storage?

Answer:

- **Hot Storage:** Frequently accessed data.
- **Cool Storage:** Infrequently accessed data, lower costs.

34. What is Azure Data Lake?

Answer: A scalable data storage service for big data analytics.

35. What is Azure SQL Managed Instance?

Answer: A fully managed database service offering near-complete SQL Server compatibility.

Monitoring and Governance

36. What is Azure Activity Log?

Answer: A log tracking all subscription-level events in Azure.

37. What is Azure Advisor?

Answer: A tool providing personalized recommendations for Azure resources.

38. What is the purpose of Azure Blueprints?

Answer: To define and implement standards and governance for resource deployment.

39. What is Azure Policy Initiative?

Answer: A collection of policies grouped together for centralized compliance.

40. What is the purpose of Resource Locks?

Answer: To prevent accidental modification or deletion of Azure resources.

Azure Tools and Interfaces

41. What is Azure Cloud Shell?

Answer: A browser-based command-line tool for managing Azure resources using Bash or PowerShell.

42. What is Azure Marketplace?

Answer: A digital store offering pre-built solutions and services compatible with Azure.

43. What are Tags in Azure?

Answer: Metadata used to organize resources for better management.

44. What is an Azure Resource Group?

Answer: A container for logically grouping related Azure resources.

45. What are the REST APIs in Azure?

Answer: APIs for managing Azure services programmatically.

Miscellaneous Concepts

46. What is Azure Lighthouse?

Answer: A service for managing multiple Azure tenants and subscriptions from one portal.

47. What is the Azure Well-Architected Framework?

Answer: A set of best practices for designing and implementing Azure solutions.

48. What is Azure Stack?

Answer: A hybrid cloud platform for running Azure services in on-premises environments.

49. What is Azure Cognitive Search?

Answer: A search-as-a-service solution for building powerful search experiences.

50. What is Azure Resource Health?

Answer: A service providing information on the health and availability of Azure resources.

Core Azure Services, covering Azure Compute, App Services, Kubernetes, Logic Apps, and more

Azure Compute (VMs, Containers, Serverless)

1. **What is Azure Compute?**

Answer: A service category in Azure that includes VMs, containers, and serverless functions for running applications.

2. **What are Virtual Machines (VMs) in Azure?**

Answer: Virtual Machines are emulated physical computers providing IaaS for hosting applications.

3. **What is Azure VM Scale Sets?**

Answer: A feature to create and manage a group of identical VMs that scale automatically.

4. **What is the purpose of Azure Dedicated Host?**

Answer: A physical server reserved for your exclusive use to meet compliance and isolation requirements.

5. **What is the difference between Standard and Spot VMs?**

Answer:

- **Standard VMs:** Regular pay-as-you-go pricing.
- **Spot VMs:** Discounted VMs for workloads that can tolerate interruptions.

6. **What are VM Images in Azure?**

Answer: Pre-configured operating systems or configurations used to create new VMs.

7. **What is the difference between Windows and Linux VMs?**

Answer: They differ in operating systems; Azure supports both for various workloads.

8. **What is Azure Container Instances (ACI)?**

Answer: A PaaS for running containers without needing to manage VMs or orchestrators.

9. **What is the difference between ACI and Azure Kubernetes Service (AKS)?**

Answer:

- **ACI:** Simplified, standalone container management.
- **AKS:** Full Kubernetes orchestration for managing containerized applications.

10. What is serverless computing in Azure?

Answer: A model where infrastructure management is abstracted, allowing developers to focus on code (e.g., Azure Functions).

11. What is Azure Functions?

Answer: A serverless compute service for running small pieces of code triggered by events.

12. What are Durable Functions?

Answer: Extensions of Azure Functions for building workflows with orchestration and state management.

13. What is an Azure Batch?

Answer: A service for running large-scale parallel and high-performance computing tasks.

14. What is the difference between IaaS and PaaS in Azure Compute?

Answer:

- **IaaS:** Provides infrastructure like VMs.
- **PaaS:** Offers a platform for app deployment, like App Service.

15. What are Reserved Instances?

Answer: Prepaid VMs for 1- or 3-year terms, offering cost savings over pay-as-you-go pricing.

Azure App Service (PaaS for Applications)

16. What is Azure App Service?

Answer: A managed PaaS for hosting web apps, mobile apps, and RESTful APIs.

17. What are the supported languages in Azure App Service?

Answer: .NET, Java, Python, PHP, Node.js, and Ruby.

18. What are App Service Plans?

Answer: Pricing tiers determining the resources allocated for hosting an app.

19. What is Azure Web Apps?

Answer: A part of App Service for hosting web applications.

20. What is Azure API Apps?

Answer: A part of App Service for building and hosting RESTful APIs.

21. What is Azure Mobile Apps?

Answer: A feature for building mobile backends with offline sync, authentication, and push notifications.

22. What is Deployment Slot in App Service?

Answer: A feature for staging deployments before going live, allowing for easy swapping.

23. What is App Service Environment (ASE)?

Answer: A fully isolated and dedicated environment for securely running App Service applications.

24. What is the purpose of Continuous Deployment in App Service?

Answer: Automates deployment from GitHub, Azure Repos, or other version control systems.

25. What is Autoscaling in Azure App Service?

Answer: Dynamically adjusts the number of instances based on demand.

Azure Kubernetes Service (AKS)

26. What is Azure Kubernetes Service (AKS)?

Answer: A managed Kubernetes service for deploying, managing, and scaling containerized applications.

27. What is Kubernetes?

Answer: An open-source container orchestration platform for automating deployment, scaling, and management.

28. What is a Pod in AKS?

Answer: The smallest deployable unit in Kubernetes, containing one or more containers.

29. What is a Node in AKS?

Answer: A VM or physical machine that runs Pods in Kubernetes.

30. What is the difference between AKS and ACI?

Answer:

- **AKS:** Full container orchestration with Kubernetes.
- **ACI:** Lightweight container instances without orchestration.

31. What is a Kubernetes Cluster?

Answer: A group of nodes managed by Kubernetes for deploying containerized applications.

32. What is Helm in Kubernetes?

Answer: A package manager for Kubernetes applications.

33. What is the Kubernetes Control Plane?

Answer: The component managing the cluster state and deployment of workloads.

34. What are Kubernetes Services?

Answer: Components that expose Pods to external networks or other Pods.

35. How is scaling achieved in AKS?

Answer: Through manual scaling or autoscaling based on resource usage.

Azure Logic Apps

36. What are Azure Logic Apps?

Answer: A service for automating workflows and integrating systems using a graphical interface.

37. What is a trigger in Logic Apps?

Answer: An event that starts a Logic App workflow, like receiving an email.

38. What is an action in Logic Apps?

Answer: A step executed as part of a workflow after the trigger.

39. What are connectors in Logic Apps?

Answer: Prebuilt integrations with services like Office 365, Salesforce, and Azure services.

40. What is the difference between Logic Apps and Power Automate?

Answer:

- **Logic Apps:** Focused on enterprise workflows.
- **Power Automate:** User-friendly automation for business users.

41. What is the purpose of Azure Monitor Logs in Logic Apps?

Answer: To track and analyze the execution of workflows.

42. What are Enterprise Connectors in Logic Apps?

Answer: Premium connectors for integrating enterprise applications and protocols.

43. What is a stateful Logic App?

Answer: A Logic App that tracks state across multiple runs.

44. What is a stateless Logic App?

Answer: A Logic App optimized for faster processing without state tracking.

45. What are Consumption and Standard tiers in Logic Apps?

Answer:

- **Consumption:** Pay-per-execution model.
 - **Standard:** Fixed pricing for always-on workflows.
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Storage and Databases in Core Services

46. What is Azure Blob Storage?

Answer: A service for storing unstructured data like documents, images, and videos.

47. What is Azure Table Storage?

Answer: A NoSQL key-value database for structured data.

48. What is Azure Cosmos DB?

Answer: A globally distributed, multi-model database service.

49. What is Azure SQL Database?

Answer: A fully managed relational database based on SQL Server.

50. What is the difference between Blob Storage and Data Lake?

Answer:

- **Blob Storage:** General-purpose object storage.
- **Data Lake:** Optimized for analytics and big data processing.

Miscellaneous Core Services Questions

51. What is Azure Service Bus?

Answer: A message broker for integrating applications and services.

52. What is Azure Event Grid?

Answer: A service for event-driven computing with near-real-time event delivery.

53. What is Azure Notification Hubs?

Answer: A service for sending push notifications to mobile devices.

54. What is Azure SignalR Service?

Answer: A service for adding real-time communication to applications.

55. What is Azure Front Door?

Answer: A global load balancer for optimizing application delivery and performance.

56. What is Azure Traffic Manager?

Answer: A DNS-based traffic load balancer for directing user requests.

57. What is Azure Load Balancer?

Answer: A service for distributing incoming network traffic across multiple resources.

58. What is Azure Application Gateway?

Answer: A web traffic load balancer with SSL termination and WAF capabilities.

59. What is Azure Bastion?

Answer: A secure way to connect to VMs without exposing them to public IPs.

60. What is Azure Key Vault?

Answer: A service for storing and accessing secrets, keys, and certificates securely.

Azure Networking (Expanded Questions and Answers)

Virtual Networks and Connectivity

1. **What is a Virtual Network (VNet)?**
Answer: An isolated Azure network for securely connecting cloud resources.
 2. **What is the maximum number of VNets you can create in a region?**
Answer: It depends on the subscription and quotas set by Azure.
 3. **What are subnets in a VNet?**
Answer: Subdivisions within a VNet to organize and isolate resources.
 4. **What is the purpose of a Network Security Group (NSG)?**
Answer: To control inbound and outbound traffic at the subnet or NIC level.
 5. **What is a Route Table in Azure?**
Answer: A set of rules defining how network traffic is directed within a VNet.
 6. **What is Peering in Azure VNets?**
Answer: A connection between VNets for resource communication without public internet.
 7. **What is the difference between VNet-to-VNet and VNet Peering?**
Answer:
 - **VNet-to-VNet:** Uses a VPN gateway for secure connections.
 - **VNet Peering:** Direct connection with low latency.
 8. **What is the role of Azure DNS in a VNet?**
Answer: To resolve domain names for resources within the VNet.
 9. **What is a Private Link in Azure?**
Answer: Enables private access to Azure services over the VNet.
 10. **What is Service Endpoint?**
Answer: Allows secure connection to Azure services over a VNet without a public IP.
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Load Balancing

11. **What is the purpose of an Azure Load Balancer?**
Answer: To distribute incoming traffic across multiple resources.
12. **What are the types of Azure Load Balancers?**
Answer: Public and Internal Load Balancers.
13. **What is the difference between Layer 4 and Layer 7 Load Balancers?**
Answer:

- **Layer 4:** Operates on the transport layer (e.g., Azure Load Balancer).
 - **Layer 7:** Operates on the application layer (e.g., Application Gateway).
14. **What is a Backend Pool in Load Balancers?**
Answer: A group of resources (VMs, instances) receiving traffic from the Load Balancer.
15. **What is a Health Probe in Azure Load Balancer?**
Answer: A mechanism to check the availability of backend resources.
16. **What is the role of NAT rules in Azure Load Balancers?**
Answer: To translate public IP addresses and ports to private IP addresses.
17. **Can Azure Load Balancer handle HTTPS traffic?**
Answer: No, it works at Layer 4 (TCP/UDP); use Application Gateway for HTTPS.
18. **What is Azure Traffic Manager?**
Answer: A DNS-based global traffic routing service for distributing traffic across multiple regions.
19. **What is Priority Routing in Traffic Manager?**
Answer: Directs traffic to a primary endpoint and fails over to secondary ones.
20. **What is Weighted Routing in Traffic Manager?**
Answer: Distributes traffic proportionally across endpoints based on assigned weights.
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Azure ExpressRoute

21. **What is Azure ExpressRoute?**
Answer: A dedicated private connection from an on-premises network to Azure.
22. **What are the benefits of ExpressRoute?**
Answer: Lower latency, higher reliability, and increased security compared to VPN.
23. **What are the connectivity models for ExpressRoute?**
Answer:
- **Any-to-Any (IPVPN)**
 - **Point-to-Point Ethernet**
 - **Cloud Exchange Co-location**
24. **What is an ExpressRoute Circuit?**
Answer: A logical connection for establishing private connectivity between Azure and your network.

25. What is Global Reach in ExpressRoute?

Answer: Enables private connectivity between your on-premises locations through ExpressRoute.

26. What is ExpressRoute Direct?

Answer: Provides dedicated dual 100 Gbps or 10 Gbps connectivity to Azure.

27. What is ExpressRoute FastPath?

Answer: A feature to improve the data path between on-premises networks and VNets.

28. What is the difference between VPN and ExpressRoute?

Answer: VPN uses the public internet, while ExpressRoute is a private connection.

29. What is an ExpressRoute Gateway?

Answer: A specialized VNet gateway used with ExpressRoute circuits.

30. What is the SLA for ExpressRoute?

Answer: 99.95% for private peering and Microsoft peering.

Public and Private IPs

31. What is a Public IP in Azure?

Answer: An IP address accessible over the internet, used for Azure resources.

32. What is a Private IP in Azure?

Answer: An IP address limited to a private network, used for internal communication.

33. What are Static and Dynamic IPs?

Answer:

- **Static IP:** Remains constant.
- **Dynamic IP:** Changes when resources are restarted.

34. What is an IP Prefix?

Answer: A range of public IP addresses reserved for your subscription.

35. What is an IP Allocation Method in Azure?

Answer: Determines whether an IP is static or dynamic.

36. Can a Public IP be assigned to a NIC in Azure?

Answer: Yes, it can be associated directly with a NIC or a Load Balancer.

37. What is an Azure Public IP SKU?

Answer:

- **Basic:** For non-zonal services.
- **Standard:** Supports zone redundancy and high availability.

38. What is an IP Configuration in Azure?

Answer: Defines the private and public IPs assigned to a resource.

39. What is an Azure Reserved IP?

Answer: A public IP address reserved for use with your resources.

40. What is Bring Your Own IP (BYOIP) in Azure?

Answer: Allows you to use your own IP ranges in Azure.

Azure Security and Connectivity

41. What is a VPN Gateway?

Answer: A gateway used to establish secure connections between Azure and on-premises networks.

42. What are the types of VPN Gateways in Azure?

Answer: Policy-based and Route-based VPNs.

43. What is the purpose of Azure Bastion?

Answer: To securely connect to VMs without exposing them to public IPs.

44. What is Point-to-Site VPN?

Answer: A VPN connection from an individual device to an Azure VNet.

45. What is Site-to-Site VPN?

Answer: A VPN connection between an on-premises network and an Azure VNet.

46. What is VNet-to-VNet VPN?

Answer: A VPN connection between two VNets in Azure.

47. What is the difference between Standard and Basic VPN Gateways?

Answer: Standard gateways support higher throughput and additional features.

48. What is Forced Tunneling in Azure?

Answer: A configuration to route internet traffic through an on-premises network.

49. What is Azure Firewall?

Answer: A managed network security service to control traffic flow in and out of Azure.

50. What is the purpose of Application Gateway?

Answer: A Layer 7 load balancer with features like SSL offloading and Web Application Firewall (WAF).

Additional Networking Services

51. What is Azure Front Door?

Answer: A global load balancer and content delivery service.

52. What is Azure Content Delivery Network (CDN)?

Answer: A service to distribute content to users with minimal latency.

53. What is a Listener in Application Gateway?

Answer: A configuration for routing incoming requests to backend pools.

54. What is a Web Application Firewall (WAF)?

Answer: Protects web applications from common threats like SQL injection and cross-site scripting.

55. What is Azure DDoS Protection?

Answer: A service to protect Azure resources from Distributed Denial-of-Service attacks.

56. What is Azure Private Link?

Answer: Provides secure connectivity to Azure services over a private network.

57. What is a Virtual Network Gateway?

Answer: A gateway for connecting VNets or establishing VPN connections.

58. What is a BGP in Azure Networking?

Answer: Border Gateway Protocol used for routing between Azure VNets and on-premises networks.

59. What is the purpose of a Gateway Subnet?

Answer: A dedicated subnet for deploying gateways in a VNet.

60. What is NAT Gateway in Azure?

Answer: A service to enable outbound internet access for resources without exposing them

Advanced Virtual Networking Concepts

1. What is a Virtual Network Appliance (VNA)?

Answer: A virtual appliance, like a firewall or router, used for advanced networking in a VNet.

2. What is Azure Virtual WAN?

Answer: A networking service for centralizing and managing hybrid and cloud networks.

3. What is a Hub-and-Spoke network topology in Azure?

Answer: A design where the hub VNet acts as a central point, and spoke VNets are connected to it.

4. What is Azure Route Server?

Answer: A service for managing routing between Azure VNets and your network devices using BGP.

5. **What is IP Forwarding in Azure?**
Answer: Enables a VM to act as a router, forwarding traffic to other network destinations.
 6. **What is Azure Network Watcher?**
Answer: A monitoring service for diagnosing and visualizing network issues.
 7. **What is the purpose of Network Watcher's Connection Monitor?**
Answer: To monitor the reachability of endpoints and measure latency.
 8. **What is Network Performance Monitor (NPM)?**
Answer: A tool for monitoring the performance of your network across Azure and hybrid environments.
 9. **What is Packet Capture in Azure?**
Answer: A feature of Network Watcher to capture network traffic for diagnostics.
 10. **What is Effective Security Rules in Network Watcher?**
Answer: A tool to analyze and view applied NSG rules for a resource.
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Hybrid Connectivity and VPNs

11. **What is a P2S (Point-to-Site) VPN?**
Answer: A secure VPN connection from a single device to an Azure VNet.
12. **What is a S2S (Site-to-Site) VPN?**
Answer: A secure VPN connection between an on-premises network and Azure.
13. **What is a Multi-Site VPN in Azure?**
Answer: A VPN configuration that connects multiple on-premises sites to Azure.
14. **What is Coexistence in VPN Gateways?**
Answer: The ability to use both ExpressRoute and VPN Gateway simultaneously.
15. **What is Azure Local Network Gateway?**
Answer: Represents the on-premises network in a VPN connection.
16. **What is Azure Virtual Network Gateway?**
Answer: Provides encrypted connectivity for VPNs and ExpressRoute.
17. **What is the difference between BGP and Static Routing in VPN?**
Answer:
 - **BGP:** Dynamically updates routes.
 - **Static:** Requires manual configuration.
18. **What is High Availability (HA) for VPN Gateways?**
Answer: Ensures minimal downtime with active-active or active-passive configurations.

19. What is Azure Traffic Analytics?

Answer: A tool for analyzing traffic flow and identifying security threats.

20. What are Shared Key Authentication and Certificate Authentication in VPNs?

Answer: Two methods for authenticating P2S and S2S VPNs.

Application Delivery and Acceleration

21. What is Azure Front Door?

Answer: A global load balancer with traffic acceleration and content delivery.

22. What is Global Load Balancing?

Answer: Distributing traffic across multiple Azure regions using Azure Front Door or Traffic Manager.

23. What is the difference between Azure CDN and Front Door?

Answer:

- **CDN:** Optimizes static content delivery.
- **Front Door:** Provides dynamic content routing and acceleration.

24. What is SSL Termination?

Answer: Offloading SSL decryption to services like Application Gateway or Front Door.

25. What is Azure SignalR Service?

Answer: A managed service for real-time messaging in applications.

26. What is WAF in Azure Application Gateway?

Answer: A Web Application Firewall protecting against common web vulnerabilities.

27. What is Sticky Session in Application Gateway?

Answer: Ensures a user is routed to the same backend during a session.

28. What is a Listener in Application Gateway?

Answer: Configures routing based on incoming request characteristics.

29. What is a Rewrite Rule in Application Gateway?

Answer: Modifies request or response headers as traffic flows through.

30. What is Autoscaling in Application Gateway?

Answer: Automatically adjusts the gateway instance count based on traffic load.

Security and Protection

31. What is Azure Firewall Premium?

Answer: Advanced Firewall with TLS inspection and URL filtering capabilities.

32. What is DDoS Protection Standard?

Answer: Enhanced protection against Distributed Denial-of-Service attacks.

33. What is Azure NSG Flow Logs?

Answer: Logs for monitoring and analyzing network traffic controlled by NSGs.

34. What is Azure Bastion?

Answer: A PaaS solution for secure RDP/SSH access to VMs without exposing public IPs.

35. What is Just-in-Time VM Access?

Answer: A feature to restrict access to VMs for specified periods.

36. What is an Azure Private Endpoint?

Answer: A private IP within a VNet for accessing Azure services securely.

37. What is the difference between Private Endpoint and Service Endpoint?

Answer:

- **Private Endpoint:** Maps services to private IPs in your VNet.
- **Service Endpoint:** Secures traffic to Azure services without mapping private IPs.

38. What is User-Defined Routing (UDR)?

Answer: Custom routing rules to direct traffic to specific paths.

39. What is Forced Tunneling in Azure?

Answer: Routes internet-bound traffic through an on-premises gateway for compliance.

40. What is Azure Cross-Region Load Balancing?

Answer: Balances traffic across multiple Azure regions for resilience and latency optimization

Azure Active Directory (AAD) and Identity Management

1. What is Azure Active Directory (AAD)?

Answer: A cloud-based identity and access management service that provides directory services, identity governance, and security for Azure applications.

2. What are the different types of Azure Active Directory tenants?

Answer:

- **Azure AD Free:** Basic features for small businesses.
- **Azure AD Premium P1:** Advanced identity management features.
- **Azure AD Premium P2:** Includes identity protection and privileged identity management (PIM).

3. **What is Azure Active Directory Domain Services (AAD DS)?**

Answer: A managed domain service providing domain join, group policy, and LDAP support in Azure without the need for domain controllers.

4. **What is Azure AD B2C?**

Answer: Azure Active Directory Business to Consumer (B2C) is a cloud identity management service for external users.

5. **What is Azure AD B2B?**

Answer: Azure Active Directory Business to Business (B2B) allows sharing applications and resources with external partners securely.

6. **What is a Managed Identity in Azure?**

Answer: A feature that provides an identity for applications to access Azure resources without storing credentials in code.

7. **What is Azure AD Join?**

Answer: A method for connecting devices directly to Azure AD without requiring on-premises Active Directory.

8. **What is the difference between Azure AD and Microsoft Account (MSA)?**

Answer:

- **Azure AD:** Used for organizational accounts.
- **MSA:** Used for consumer-based accounts (e.g., Outlook.com, Xbox).

9. **What is Self-Service Password Reset (SSPR) in Azure AD?**

Answer: A feature allowing users to reset their passwords without IT intervention.

10. **What is Azure AD Connect?**

Answer: A tool that allows synchronization of on-premises Active Directory to Azure AD.

Authentication and Multi-Factor Authentication (MFA)

11. **What is Multi-Factor Authentication (MFA)?**

Answer: A security method that requires two or more verification factors (something you know, something you have, something you are).

12. **What are the verification methods available in Azure MFA?**

Answer:

- Phone call
- Text message
- Mobile app notification
- Mobile app code

- Hardware token

13. What is Conditional Access in Azure AD?

Answer: A policy-based access control feature that uses conditions (e.g., location, device state) to determine access to resources.

14. What is the difference between Azure MFA and Windows Hello for Business?

Answer:

- **Azure MFA:** Requires multiple forms of authentication.
- **Windows Hello for Business:** A passwordless authentication method using biometrics or PIN.

15. How can you enforce MFA for all users in Azure AD?

Answer: By enabling conditional access policies that require MFA for all users.

16. What is an Identity Protection Policy in Azure AD?

Answer: Policies to monitor and respond to suspicious sign-ins based on risk levels.

17. What is Azure AD Identity Governance?

Answer: Tools to manage identity lifecycle, access reviews, and entitlement management to ensure secure and compliant access.

18. What is Azure AD Privileged Identity Management (PIM)?

Answer: A service to manage, control, and monitor access within Azure AD, Azure, and other Microsoft Online Services.

19. What is Azure AD Password Protection?

Answer: A feature that helps protect against weak passwords by enforcing password policies and banning certain password patterns.

20. What is a Security Info in Azure AD?

Answer: A method for users to update their MFA settings and contact information for security purposes.

Azure Key Vault and Secrets Management

21. What is Azure Key Vault?

Answer: A service for securely storing and managing keys, secrets, and certificates.

22. What types of secrets can you store in Azure Key Vault?

Answer: Passwords, API keys, certificates, connection strings, and cryptographic keys.

23. What is a Managed HSM in Azure Key Vault?

Answer: A fully managed hardware security module (HSM) service for securely storing and managing cryptographic keys.

24. What is a Key Vault Access Policy?

Answer: Defines which users or applications have access to the Key Vault and what operations they can perform.

25. What is Key Vault soft delete?

Answer: A feature that allows deleted keys and secrets to be retained for a recovery period before they are permanently removed.

26. What is Azure Key Vault Logging?

Answer: Allows logging of all access to the Key Vault for monitoring and auditing purposes.

27. What is the difference between Azure Key Vault and Azure Storage Account?

Answer:

- **Azure Key Vault:** Primarily for secure storage of secrets and keys.
- **Azure Storage Account:** General-purpose storage for blobs, files, queues, and tables.

28. Can Azure Key Vault store SSH keys?

Answer: Yes, Azure Key Vault can store SSH keys, in addition to other secrets and certificates.

29. What is Azure Key Vault Certificate Management?

Answer: A feature to securely manage the lifecycle of SSL/TLS certificates.

30. How does Azure Key Vault integrate with Azure Active Directory?

Answer: It uses Azure AD for authentication and authorization to access stored secrets.

Role-Based Access Control (RBAC)

31. What is Role-Based Access Control (RBAC)?

Answer: A system to assign roles to users, groups, or applications to control access to Azure resources.

32. What are the three types of roles in RBAC?

Answer:

- **Owner:** Full access to all resources.
- **Contributor:** Can create and manage resources but cannot assign roles.
- **Reader:** Can view resources but cannot modify them.

33. What is the difference between a role assignment and a role definition?

Answer:

- **Role Assignment:** A mapping of a role to a user or group.

- **Role Definition:** A set of permissions that are associated with a role.
34. **What is the default role in Azure for new users?**
Answer: The default role is **Reader**.
35. **How can you create custom roles in Azure RBAC?**
Answer: By defining a custom role in JSON format that specifies allowed actions and scopes.
36. **What is Azure RBAC scope?**
Answer: The level at which a role is assigned, such as a subscription, resource group, or individual resource.
37. **What are Azure AD roles, and how are they different from Azure RBAC roles?**
Answer:
- **Azure AD Roles:** Manage access to Azure Active Directory features.
 - **Azure RBAC Roles:** Control access to Azure resources.
38. **What is the difference between Assigning a Role to a User and Granting a Role in Azure RBAC?**
Answer:
- **Assigning:** Links a user or group to a role and scope.
 - **Granting:** The action of allowing a user or group to have permissions.
39. **What is the principle of least privilege in RBAC?**
Answer: Assigning only the minimum required permissions to users or groups to perform their job functions.
40. **What is a Conditional Access policy in Azure AD?**
Answer: A policy-based access control feature that uses conditions like user location, device compliance, and application sensitivity to grant or block access to resources.
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Azure Security Center and Threat Management

41. **What is Azure Security Center?**
Answer: A unified security management system offering threat protection for workloads in Azure, hybrid, and on-premises environments.
42. **What are the two main security levels in Azure Security Center?**
Answer:
- **Free:** Basic security features and recommendations.
 - **Standard:** Advanced threat protection and additional security features.

43. **What is Azure Security Center's Cloud Security Posture Management (CSPM)?**
Answer: A feature that helps organizations continuously monitor and assess their security posture across cloud services.
44. **What is Azure Defender?**
Answer: A set of advanced security capabilities within Azure Security Center that protects against threats to Azure resources.
45. **What are Security Recommendations in Azure Security Center?**
Answer: Suggested actions to improve security posture and mitigate risks.
46. **What is Just-in-Time Access in Azure Security Center?**
Answer: A feature that temporarily grants access to virtual machines for specific tasks, improving security by reducing unnecessary access.
47. **What is Azure Sentinel?**
Answer: A cloud-native SIEM (Security Information and Event Management) service for intelligent security analytics and threat detection.
48. **What is the purpose of Security Alerts in Azure Security Center?**
Answer: To notify administrators of detected security threats and vulnerabilities.
49. **What is Azure Firewall Threat Intelligence?**
Answer: A feature that helps detect and block traffic from known malicious IP addresses.
50. **How does Azure Security Center integrate with Azure Defender for Identity?**
Answer: It provides advanced protection against identity-based threats by integrating security alerts and actions.
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Compliance and Security Best Practices

51. **What is Azure Compliance Manager?**
Answer: A tool to help organizations manage their compliance requirements and assess their adherence to industry standards and regulations.
52. **What are Security Baselines in Azure Security Center?**
Answer: Pre-configured, best-practice security settings for common Azure services to ensure compliance with security requirements.
53. **What is Azure Policy?**
Answer: A service to enforce organizational standards and assess compliance across Azure resources.
54. **What is Azure Blueprints?**
Answer: A service to define, deploy, and manage resource templates that ensure compliance with organizational standards.

55. What is the difference between Azure Policy and Azure Blueprints?

Answer:

- **Azure Policy:** Enforces rules for resources.
- **Azure Blueprints:** Provides a way to automate deployments and apply policies for governance.

56. What is Azure AD Access Reviews?

Answer: A feature that helps organizations regularly review and confirm user access to resources.

57. What are Azure AD Audit Logs?

Answer: Logs that track events and changes within Azure Active Directory to help with security monitoring and compliance.

58. What is the Azure Security Benchmark?

Answer: A set of security controls based on industry standards and best practices for securing Azure workloads.

59. What is Azure Information Protection?

Answer: A solution to classify, label, and protect data based on its sensitivity.

60. What is Azure Key Vault Managed Identity integration?

Answer: Integrates Key Vault with Azure AD Managed Identity for secure access to keys and secrets without storing credentials in code.