AZ-104 Azure Administrator

Exam Roadmap & Study Map

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1 WHAT IS AZ-104?

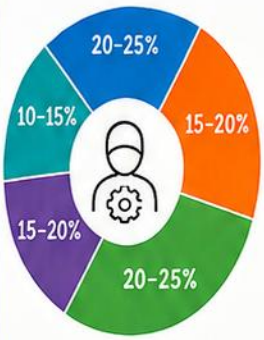
AZ-104 validates your ability to administer Microsoft Azure environments.

You'll work with Azure services to deliver, manage, and monitor cloud solutions efficiently and securely.

2 ADMINISTRATOR ROLE

Implement, manage, and monitor core Azure services to support secure, available, and compliant cloud solutions.

3 SKILLS MEASURED



1. Identity & Governance 20–25%
2. Storage 15–20%
3. Compute 20–25%
4. Virtual Networking 15–20%
5. Monitor & Manitain Azure Resources 10–15%

4 TOOLS YOU SHOULD KNOW

Azure Portal	Web UI to manage & monitor Azure resources.
Azure CLI	Command-line tool for scripting & automation.
PowerShell	PowerShell modules for managing Azure resources.
ARM Templates	JSON templates to deploy & manage resources.
Bicep	Declarative IaC language for Azure deployments.
Microsoft Entra ID	Identity, access & app management in Azure.

5 STUDY STRATEGY

- Understand the service purpose
  Know what a service does and when to use it.
- Practice configuration
  Work through scenarios in the portal, CLI, or PowerShell.
- Compare similar services
  Understand the differences to answer "best fit" questions.
- Troubleshoot with logs & settings
  Use diagnostics, metrics, and logs to find and fix issues.
- Verify with hands-on labs
  Reinforce learning with labs, sandboxes, and mini-projects.

EXAM MINDSET (BEST PRACTICES)

- Least privilege access
  Grant only what's needed.
- Automate & standardize
  Use IaC, scripts, and policies.
- Secure by design
  Use private connectivity, encryption, and policies.
- Monitor everything
  Use logs, alerts, and dashboards.
- Plan for recovery
  Backup, replicate, and test your recovery plan.

Think like an admin: secure, efficient, reliable, and cost-effective.

6 WHAT'S AHEAD IN THIS SERIES

Page 2 — IDENTITY & GOVERNANCE
Users, groups, roles, RBAC, policies, PIM, Conditional Access, Entra ID.

Page 3 — STORAGE
Storage accounts, containers, files, disks, backups, Azure Files.

Page 4 — COMPUTE
Virtual machines, VMSS, App Services, Functions, containers, Runbooks.

Page 5 — VIRTUAL NETWORKING
VNets, subnets, NSG, VPN, ExpressRoute, DNS, Load Balancer.

Page 6 — MONITOR & RECOVERY
Monitoring, alerts, Log Analytics, Backup, Site Recovery.

Page 7 — FINAL REVIEW
Key concepts, cheat sheets, exam tips, and practice scenarios.

REMEMBER

- Know the core services and how they fit together.
- Practice with real scenarios, not just theory.
- Read every question carefully. Look for keywords & scope.
- Manage time well. Flag tough ones and come back.
- Stay calm, trust your prep, and you've got this!

Build. Manage. Monitor. Automate. Secure. That's the Azure Administrator mindset!

You've got this!

AZ-104 Azure Administrator

Identity & Governance

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WHY IDENTITY & GOVERNANCE MATTER

- Secure the right access to the right resources.
- Enforce rules & standards consistently.
- Organize & scale your Azure environment.
- Control costs and reduce risk.

Strong identity + smart governance = Secure, compliant, and cost-effective Azure.

1 MANAGE USERS AND GROUPS

Create users & groups
Add, remove, update.
Use dynamic groups where possible.

Group membership
Add/remove members.
Nested groups supported.

Assign licenses
Per-user or group-based (Microsoft 365 / Azure).

External users (Guests)
Invite B2B users for collaboration.

Self-service password reset
Enable SSPR for users.
Requires Azure AD P1 or P2.

2 AZURE RBAC – THE BUILDING BLOCK

Access is defined by: Principal + Role + Scope

Principal	Role	Scope
User, group, service principal, managed identity	Job function (e.g., Reader, Contributor)	Where the access applies (resource or higher level)

SCOPE HIERARCHY (INHERITANCE FLOWS DOWN)

Management Group
Collection of subscriptions. Apply policies & RBAC at scale.

↓

Subscription
Billing boundary. Assign access, policies, and budgets.

↓

Resource Group
Logical container for related resources.

↓

Resource
Individual Azure resource (VM, Storage, etc.).
Lowest scope = most specific.

GOVERNANCE TOOLKIT

TOOL	WHAT IT DOES	USED FOR
Azure Policy	Define rules for resources.	Enforce compliance, standards, and governance.
Resource Locks	Lock resources or resource groups.	Prevent accidental deletion or changes.
Tags	Name/value pairs on resources.	Organization, cost tracking, automation, and policies.

Use Policy to enforce, Locks to protect, and Tags to organize!

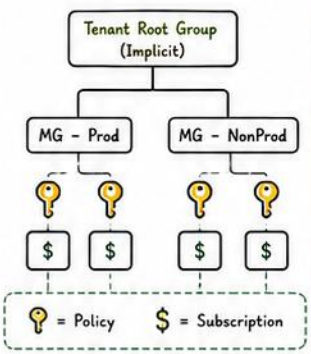
4 SUBSCRIPTIONS & MANAGEMENT GROUPS

Organization
Use management groups to organize subscriptions by business unit, env, region, or compliance need.

Billing
Subscriptions are billing boundaries. Consolidate or separate based on cost & ownership.

Isolation
Keep workloads isolated by using separate subscriptions.

Inheritance
RBAC, Policy, and some settings inherit from parent (MG) to child.



5 COST MANAGEMENT

Budgets
Set budgets at subscription, resource group, or mg level.

Cost alerts
Get notified when costs reach a threshold.

Cost analysis
Analyze spending by service, resource, tag, location, and time.

Azure Advisor
Get recommendations to optimize cost, performance, reliability, and security.

TIPS

- Tag resources for accurate reporting.
- Review Advisor recommendations regularly.
- Use Reserved Instances & Savings Plans where possible.

EXAM TIPS / BEST-ANSWER PATTERNS

- Need permissions for users/groups? → Use RBAC (Principal + Role + Scope)
- Need to enforce rules or compliance? → Use Azure Policy
- Need to prevent accidental deletion? → Use Resource Locks
- Need to organize & track resources? → Use Tags
- Need to manage at scale? → Use Management Groups

REMEMBER

- Least privilege access.
- Governance ensures consistency.
- Monitor costs continuously.
- Secure & optimize – every decision counts!
- You've got this!

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You've got this!

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Implement & Manage Storage

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1 INTRO: STORAGE ADMINISTRATION

Storage in Azure is durable, highly available, secure, and scalable.

In AZ-104 you will:

- Configure storage accounts
- Control access & security
- Choose redundancy options
- Manage data in Blobs & Files
- Work with networking & tools

2 SECURE ACCESS TO STORAGE

Microsoft Entra ID + RBAC
Use Entra ID to authenticate and RBAC to authorize access at fine-grained level.

Shared Access Signatures (SAS)
Granular, time-limited access to specific resources using a signed URI.

Access Keys
Account keys provide full access to the storage account (use carefully).

COMPARISON

Method	Scope	Best for	Security
RBAC (Entra ID)	Fine-grained	Users & apps	High
SAS	Resource-level	Delegated access	Medium
Access Keys	Account-wide	Apps, scripts	Low

3 STORAGE ACCOUNT CONFIGURATION

Account Purpose
General purpose v2 (GPv2) recommended for most scenarios.

Security Basics
Require secure transfer (HTTPS) Disable old auth (allow Azure services or access key).

Encryption
Microsoft-managed keys (default) or Customer-managed keys (CMK) with Azure Key Vault.

Network Access
Choose: Public access / Selected networks / Private endpoints only.

4 REDUNDANCY CHOICES

LRS (Locally Redundant Storage)
3 copies within a single data center.

ZRS (Zone-Redundant Storage)
3 copies across availability zones within a region.

GRS (Geo-Redundant Storage)
3 copies in primary region + 3 in paired region (async).

RA-GRS (Read-Access GRS)
Same as GRS + read access to secondary region.

GZRS (Geo-Zone-Redundant)
3 copies per zone in primary + 3 in paired region.

RA-GZRS (Read-Access GZRS)
Same as GZRS + read access to secondary region.

Choose based on durability, availability, RPO/RTO and cost.

5 BLOB STORAGE (OBJECT STORAGE)

Containers
Organize blobs in containers (similar to folders).

Access Tiers
- Hot: Frequent access
- Cool: Infrequent access
- Archive: Long-term retention (lowest cost)

Lifecycle Management
Automatically move data across tiers or delete based on rules.

Soft Delete
Protects against accidental deletes. Recover within retention period.

Versioning
Keep multiple versions of a blob. Restore previous versions when needed.

Immutability (Optional)
WORM (Write Once Read Many) policy to prevent deletion or modification for compliance.

Use block blobs for most data, append blobs for logging, page blobs for VMs and databases.

6 AZURE FILES (FILE SHARES)

File Protocols
- SMB: For Windows clients
- NFS: For Linux/Unix clients

Snapshots
Point-in-time, read-only snapshot of a file share. Great for backups.

Soft Delete
Retain deleted files & shares for recovery within retention period.

Share Access
Control with NTFS (SMB) permissions or POSIX (NFS) permissions and Azure AD.

7 NETWORKING FOR STORAGE

Storage Firewall
Allow access from specific IP ranges or virtual networks.

Service Endpoints
Secure traffic from VNets to storage over Microsoft backbone.

Private Endpoints
Private IP in your VNet for storage access via Private Link.

Private DNS
Use Azure Private DNS zone (privatelink.blob.core.windows.net) to resolve private endpoints.

Private endpoints provide the highest level of network isolation.

8 OPERATIONS & TOOLS

Azure Storage Explorer
- Manage storage accounts
- Upload/Download blobs
- Manage file shares & queues
- View metadata & properties

AzCopy
- Fast CLI utility for data transfer
- Upload, download, copy, sync
- Ideal for automation & scripts
- Supports SAS & OAuth

COMMON TASKS
- [x] Create storage account
- [x] Configure access
- [x] Manage containers/shares
- [x] Set lifecycle rules
- [x] Monitor usage & metrics
- [x] Backup & restore data

9 MONITORING & DATA PROTECTION

Azure Monitor
Track metrics: capacity, transactions, latency, availability, ingress/egress.

Alerts
Create alerts on metrics & logs (e.g., capacity > 80%).

Backup Strategies
Use snapshots, versioning, and geo-redundancy to protect your data.

10 COST OPTIMIZATION TIPS

Choose the right access tier
Use lifecycle rules to automate tier transitions and deletion.

Select appropriate redundancy
Balance cost vs durability & availability needs.

Monitor usage
Remove unused data and orphaned snapshots.

Use compression (AzCopy)
Enable compression to reduce transfer time and cost.

11 QUICK DECISION GUIDE

OBJECT STORAGE vs FILE SHARES

Blob Storage		Azure Files
Unstructured data, media, logs, backups, web content.	VS	Shared files, applications, lift & shift.

PRIVATE ACCESS vs PUBLIC ACCESS

Private (Recommended)	Public (When needed)
Private endpoints, service endpoints, firewall rules.	Allow public access, only when required. Use SAS or RBAC.

SAS vs ACCESS KEYS

SAS	Access Keys
Limited scope, time-bound, resource-level.	Full account access, high risk, use sparingly.

QUICK CHECKLIST
- [x] Secure transfer (HTTPS)
- [x] Private access configured
- [x] RBAC applied
- [x] Redundancy chosen
- [x] Monitoring & alerts set

REMEMBER

Plan for security & compliance. | Automate with scripts & CLI. | Test recovery regularly. | Document & tag everything. | Optimize cost continuously. | You've got this!

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Deploy & Manage Compute

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INTRO: COMPUTE ADMIN OVERVIEW

Compute helps you run apps and workloads in the cloud. Azure offers virtual machines, scalable services, containers, and platforms to meet different needs with security, resilience, and cost-efficiency.

- ☑ Choose the right service for the workload
- ☑ Deploy securely with IaC
- ☑ Ensure availability and scale
- ☑ Monitor, update, and optimize

1 ARM & BICEP BASICS

ARM (JSON) and Bicep let you define infrastructure as code.

- ☑ Declarative: define the desired state
- ☑ Repeatable, consistent & versioned
- ☑ Parameterize for flexibility
- ☑ Outputs for re-use & integration

BICEP BUILDING BLOCKS

param · Variables · Resource · Output

DEPLOYMENT FLOW

DEFINE (Write Bicep) → VALIDATE (Validate templates) → DEPLOY (Deploy to resource group) → REVIEW (Check outputs & resources)

2 VIRTUAL MACHINES

CREATE VMs

Choose image (Publisher, Offer, SKU), region, resource group, admin access (SSH/RDP), authentication (password/SSH key).

SIZE SELECTION

Pick the right VM size based on CPU, memory, storage, and workload needs.

Perf.

DISKS

OS disk (managed), data disks (managed)
types: Standard SSD, Premium SSD, Ultra Disk.

NETWORKING

Attach to VNet, subnet, NSG, public IP, load balancer, and manage rules.

IDENTITIES

Use system or user-assigned managed identities for secure access to Azure resources.

3 AVAILABILITY CONCEPTS

AVAILABILITY SETS

- Group of VMs across update domains and fault domains.
- Protects from hardware failures and planned maintenance.

AVAILABILITY ZONES

1 2 3

- Physically separate datacenters in the same region.
- Best protection from datacenter outages.

SET vs. ZONE

Sets protect within a datacenter. Zones protect across datacenters. Use zones for critical production workloads when possible.

4 VIRTUAL MACHINE SCALE SETS

- ☑ Deploy & manage a set of identical VMs.
- ☑ Automatically scale based on demand.
- ☑ Built-in load balancing, health monitoring, and rolling upgrades.
- ☑ Use with autoscale rules (CPU, queue length, schedule, custom metrics).

5 APP SERVICE (PaaS)

APP SERVICE PLANS
Define compute resources & region.

SCALING
Scale Up (more power)
Scale Out (more instances)

CUSTOM DOMAINS & TLS
Map custom domain, add TLS/SSL certificates for secure traffic.

BACKUP & RESTORE
Enable backups, configure retention, and restore when needed.

DEPLOYMENT SLOTS
Use slots for dev/test, swap with production safely.

BEST FOR

- ☑ Web apps
- ☑ REST APIs
- ☑ Mobile backends
- ☑ Event-driven apps
- ☑ Quick deployments

6 CONTAINERS OVERVIEW

AZURE CONTAINER REGISTRY (ACR)

- Private Docker registry
- Store & manage container images
- Integrate with pipelines

AZURE CONTAINER INSTANCES (ACI)

- Run containers on demand
- Serverless, fast & simple
- Great for jobs & short-lived tasks

CONTAINER APPS

- Serverless containers on KEDA
- Scale to zero, event-driven
- Built-in Dapr, revisions, ingress

7 EXAM TIPS – CHOOSE THE RIGHT COMPUTE FOR THE SCENARIO

USE APP SERVICE WHEN:

- ☑ You need to host web apps or APIs
- ☑ You want PaaS (no VM management)
- ☑ You need easy scaling & slots
- ☑ You can use platform features

USE VM SCALE SETS WHEN:

- ☑ You need full OS & custom stack
- ☑ You expect variable load
- ☑ You need autoscale & load balancing
- ☑ You want granular control

USE SIMPLE CONTAINER SERVICE WHEN:

- ☑ Short-lived or scheduled jobs → ACI
- ☑ Event-driven, scale-to-zero → Container Apps
- ☑ Need a private image registry → ACR

ACI · CONTAINER APPS · ACR

USE SINGLE VM WHEN:

- ☑ Steady, predictable workload
- ☑ Specialized software/licensing
- ☑ You need direct OS access

REMEMBER

- Automate with Bicep/ARM.
- Design for availability.
- Scale based on demand.
- Secure with identities & NSG.
- Monitor & optimize costs.

Think like an admin: simple, secure, scalable!

Build. Manage. Monitor. Automate. Secure. That's the Azure Administrator mindset!

You've got this!

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Virtual Networking

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1 INTRO: NETWORKING IN AZURE

Networking is the backbone of secure, scalable, and highly available Azure solutions.

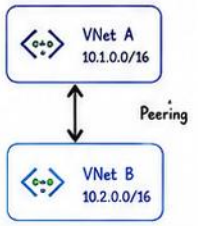
Azure gives you isolated virtual networks, private connectivity, intelligent routing, and controlled access to resources and services.

Design for security, performance, and simplicity.

2 VNets & SUBNETS

- ☑ VNet has a private address space.
- ☑ Subnets segment resources.
- ☑ Each subnet = unique IP range.
- ☑ Plan CIDR blocks carefully.

3 VNET PEERING



- ☑ Private connectivity over Microsoft backbone.
- ☑ Low latency, high throughput.
- ☑ No gateway required.
- ☑ Not transitive: A ↔ B and B ↔ C ≠ A ↔ C.

4 PUBLIC IPs & AZURE BASTION

PUBLIC IP ADDRESS

- Static or dynamic.
- Used for resources that need inbound access (e.g., LB, NAT Gateway, Bastion).

AZURE BASTION

- Secure RDP/SSH to VMs over TLS.
- No public IP on VMs.
- Deployed inside a subnet.

Use Bastion instead of exposing RDP/SSH to the internet.

5 NSGs & ASGs

NSG FLOW

- Allow or deny traffic.
- Applied to subnet or NIC.
- Stateful: return traffic is allowed automatically.

RULE EVALUATION

1. Higher priority (lower number) first.
2. If no match, default rules apply.
3. Deny beats allow at same priority.

DEFAULT RULES

AllowVNetInBound	✓
AllowAzureLoadBalancerInBound	
DenyAllInBound	✗
AllowVNetOutBound	✓
AllowInternetOutBound	✓
DenyAllOutBound	✗

ASGs (APPLICATION SECURITY GROUPS)

- Group VMs by application tier.
- Use ASG in NSG rules for easier management.
- Dynamic member updates.

6 ROUTING

SYSTEM ROUTES

- Provided by Azure.
- Includes VNet, Internet, Azure services, peering, BGP, etc.

USER-DEFINED ROUTES (UDR)

- Override system routes.
- Associate to a subnet (route table).
- Next hop types:
  - ☑ Virtual appliance
  - ☑ Virtual network gateway
  - ☑ Internet
  - ☑ Virtual network
  - ☑ None (blackhole)

NEXT HOP (EXAMPLES)	
	Virtual Appliance (firewall/NVA)
	Virtual Network Gateway
	Internet (0.0.0.0/0)
	Blackhole (none)
	Virtual Network

7 PRIVATE ACCESS FOR SERVICES

SERVICE ENDPOINTS

- Extends VNet identity to Azure services.
- Traffic stays on Microsoft backbone.
- Supports: Storage, SQL, Key Vault, Cosmos DB, etc.
- Configure in subnet.

PRIVATE ENDPOINTS

Private IP in your VNet to access a service.

- Uses Private Link.
- Service is not exposed to public internet.
- Pair with Private DNS for name resolution.

Private Endpoints + Private DNS = Private & seamless access.

8 AZURE DNS

PUBLIC DNS

- Resolves public names on internet.
- Built-in resolution in Azure.

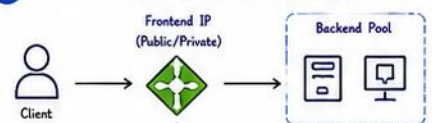
PRIVATE DNS ZONE

- Host private DNS records for VNets.
- Use Private DNS Resolver for on-prem to resolve private zones.

COMMON USES

- ☑ Map privatelink.* to Private Endpoints.
- ☑ Resolve internal app names.
- ☑ Split-horizon DNS with forwarders.

9 AZURE LOAD BALANCER (BASIC)



HEALTH PROBE

- Checks VM health.
- Configurable protocol, port, interval.
- Unhealthy VMs are removed from pool.

LB RULE

- Listens on frontend IP.
- Protocol, port & backend port.
- Distributes traffic (5-tuple hash).

LOAD BALANCING TYPES

- Standard (recommended)
- Basic (classic)
- Internal or Public
- Zone-redundant options.

Use Standard LB for high availability, scalability, and advanced features.

10 TROUBLESHOOTING CHECKLIST

CHECK IP PATH

- ☑ Correct source/dest IP?
- ☑ Is resource in same VNet/subnet?
- ☑ Peering/route in place?

CHECK DNS

- ☑ Name resolves?
- ☑ Using correct zone?
- ☑ Private DNS / forwarders set?

CHECK NSGs & ASGs

- ☑ Inbound rule allow?
- ☑ Outbound rule allow?
- ☑ Priority conflicts?

CHECK ROUTES

- ☑ System or UDR?
- ☑ Next hop correct?
- ☑ No blackhole?

CHECK HEALTH PROBES

- ☑ Probe configured?
- ☑ VM responding?
- ☑ Removed from pool?

Use Network Watcher & Connection Troubleshoot for deep insights.

REMEMBER

- Design networks like code – plan, document, and review.
- Least privilege traffic. Use NSGs, ASGs & Private Access.
- Prefer managed services & private connectivity where possible.
- Monitor, test, and iterate for performance & reliability.
- Simple design, secure by default, automate & repeat!

Plan networks smartly. Connect securely. Operate confidently. That's the Azure Administrator mindset!

You've got this!

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Monitor, Backup & Recovery

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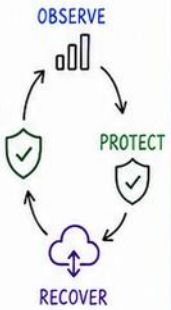
1 WHY IT MATTERS

Observe, protect, and recover your Azure resources to ensure availability, performance, and business continuity.

Good monitoring finds issues early. Strong backup & DR keep you resilient.



2 AZURE MONITOR

Metrics
Time-series data for platform & custom metrics.

Logs
Detailed records from Azure services & resources.

Diagnostic Settings
Send logs & metrics to Log Analytics, Storage, Event Hub, or Partner.

Insights
Application, VM, Container, and Network Insights for proactive monitoring.

Logs Metrics Alerts

3 LOG ANALYTICS & KQL BASICS

Log Analytics Workspace
Central place to store & analyze log data.

KQL (Kusto Query Language)
Query rich data fast.

```
// Top 5 failed sign-ins
SigninLogs
| where ResultType != 0
| summarize Count = count()
| by UserPrincipalName
| top 5 by Count desc
```

Common Operators
where, summarize, project, extend, join, sort by, top, render

4 ALERTS & ACTION GROUPS

Alerts notify you when conditions are met so you can act fast.

Alert Rule Types
- Metric
- Log search
- Activity log
- Event hub

Action Groups
Send notifications or trigger actions.

Email SMS Webhook Azure Function

Tip: Keep it actionable & reduce noise.

5 NETWORK WATCHER & CONNECTION MONITOR

Network Watcher helps diagnose networking issues.

IP Flow Verify – Check NSG flow decisions.

NSG Diagnostic – View effective security rules.

Connection Troubleshoot – Diagnose connectivity issues.

Connection Monitor
End-to-end tests across regions for continuous network monitoring.

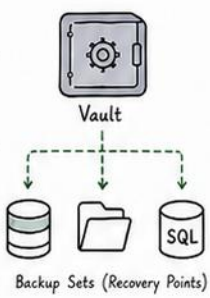
6 AZURE BACKUP

Backup Vault
Central location to store backups.

Backup Policies
Define frequency, retention (daily, weekly, monthly, yearly).

Backup Items
VMs, Files, SQL, SAP HANA, Azure Disks, and more.

Restore
Restore entire items or individual files/folders. Use restore points.



7 AZURE SITE RECOVERY (ASR)

Replicate, fail over, and protect your apps to a paired region.

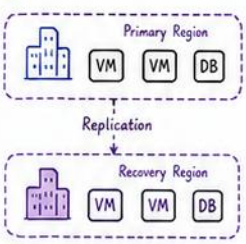
Replicate
Enable replication from source to target region.

Test Failover
Validate in isolated environment without impacting production.

Failover
Planned or unplanned failover to target region.

Reprotect
Reverse replication back to source region.

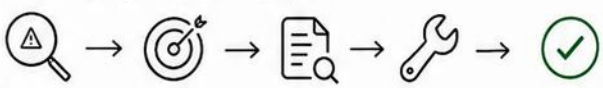
Failback
Fail back to primary region when ready.



RPO = How much data can you afford to lose? RTO = How fast must you recover?

8 OPERATIONAL TROUBLESHOOTING LOOP

A simple loop to resolve issues quickly.



1 DETECT – Alert or signal indicates an issue.

2 SCOPE – Identify affected resources, users, regions.

3 QUERY – Use Monitor, Logs, KQL to find root cause.

4 FIX – Apply change, patch, or scaling to resolve.

5 VERIFY – Confirm issue is resolved & monitor.

Helpful Tools

Azure Monitor | Log Analytics | Activity Log | Health Check | Advisor | Support + Diagnostics

REMEMBER

BACKUP (Protect Data)
- Protects data from deletion, corruption, or ransomware.
- Restore to same region.
- Use Azure Backup.

VS

SITE RECOVERY (Protect Workloads)
- Protects workloads from region outages and disasters.
- Restore to another region.
- Use Azure Site Recovery.

TEST YOUR RECOVERY
Regularly test backups & failovers. Practice makes recovery real!

Monitor continuously. | Alert intelligently. | Protect proactively. | Recover confidently. | Test regularly. | Stay calm, you've got this!

Observe. Protect. Recover. Repeat. That's the Azure Administrator mindset!

You've got this!

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High-Yield Review & Final Tips


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1 HIGH-YIELD COMPARISONS (KNOW THE DIFFERENCE!)

1. RBAC vs POLICY

RBAC
Controls WHO can do WHAT.
- Users, groups, roles, scopes
- Enforced at runtime

POLICY
Controls WHAT is allowed.
- Set rules & constraints
- Enforced at compliance time

2. DELETE LOCK vs READ-ONLY LOCK

DELETE LOCK
Prevents deletion of the resource.
- Can still update
- Protects from accidental delete

READ-ONLY LOCK
Prevents deletion AND changes.
- Resource becomes read-only
- Stronger protection

3. SAS vs ACCESS KEY

SAS
Delegated access with fine-grained permissions.
- Time-limited
- Scope-limited (container/blob)

ACCESS KEY
Full account access to data plane.
- Long-lived
- Use with care & rotate

4. SERVICE ENDPOINT vs PRIVATE ENDPOINT

SERVICE ENDPOINT
Extends VNet identity to Azure services over MS backbone.
- No extra resource
- Public IP still used

PRIVATE ENDPOINT
Private IP in your VNet to access PaaS securely.
- Private IP
- Best for sensitive data

5. AVAILABILITY SET vs ZONE

AVAILABILITY SET
- Protects from rack failure
- Resources in the same region
- Max 3 fault domains

AVAILABILITY ZONE
- Protects from datacenter failure
- Physically separate zones
- Higher resilience

6. BACKUP vs SITE RECOVERY

BACKUP
Protects against accidental delete, corruption, malware.
- Same region
- Restore data

SITE RECOVERY
Protects against disasters & outages.
- Cross-region
- Failover & failback

2 USEFUL AZURE CLI PATTERNS

```
# Login & set subscription
az login
az account set --subscription <SUB_ID>

# List resource groups
az group list -o table

# Create a resource group
az group create -n MyRG -l eastus

# List VMs in a resource group
az vm list -g MyRG -o table

# Start/Stop/Deallocate a VM
az vm start -g MyRG -n MyVM
az vm stop  -g MyRG -n MyVM
az vm deallocate -g MyRG -n MyVM

# Show public IP of a VM
az vm show -d -g MyRG -n MyVM \
  --query "publicIps" -o tsv
```

3 SERVICE-CHOICE CHEAT SHEET

Shared files across VMs	**Azure Files** — SMB (file shares) managed & scalable
Object data, media, logs	**Blob Storage** — Scalable, durable, cost-effective
Managed web app	**App Service** — PaaS for web apps, APIs, mobile backends
Private RDP/SSH to VMs	**Azure Bastion** — Secure browser-based VM access
Private access to PaaS	**Private Endpoint** — Access services over private IP
Scale out VMs easily	**VM Scale Set (VMSS)** — Autoscale, load balance, updates at scale

4 EXAM-DAY CHECKLIST

READ THE SCOPE
Understand what's asked. Focus on Azure resources & services in scope.

USE LEAST PRIVILEGE
Grant only what's needed. Prefer managed identities & RBAC roles.

CHECK DEPENDENCIES
Think about networking, identity, storage, costs, and region availability.

CHOOSE BEST-FIT SERVICE
Use the right service for the requirement. Avoid reinventing!

STAY CALM & MANAGE TIME
Tackle easy wins first. Review flagged questions & trust your prep!

YOU'VE MADE IT! ANYTHING IS POSSIBLE!

Keep learning. Keep building. Keep growing in Azure!

REVIEWED WELL. PREPARED WELL. YOU GOT THIS!

BUILD Hands-on makes it stick.
MANAGE Resources, costs, & access.
MONITOR Health, alerts & performance.
AUTOMATE Powershell, CLI, & templates.
SECURE Identity, network & data.
BACKUP & RECOVER Plan, test, and be ready.

Azure is a journey, not a destination. Keep practicing & building your cloud superpowers!

You've got this!